ISSRF 2025

Dr. B. Lal Institute of Biotechnology
An Exclusive Biotechnology Institute

International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare

&

35th Annual Meeting of the Indian Society for the Study of Reproduction and Fertility

14th – 16th February, 2025

Venue: Rajasthan International Centre, Jaipur, India

Organized By

Dr. B. Lal Institute of Biotechnology, Jaipur

In association with

Sponsors

Correspondence

Dr. Sudipti Arora
Organizing Secretary
Research Scientist and Assistant Director
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Indian Society for the Study of Reproduction and Fertility (ISSRF)

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ISSRF

Dr. B. Lal Institute of Biotechnology
An Exclusive Biotechnology Institute

Invitation

Dear Colleagues,

Warm Greetings!!!

It is our great pleasure to extend a cordial invitation to you to participate in the **"International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare"** and **35th Annual Meeting of Indian Society for the Study of Reproduction and Fertility (ISSRF 2025)** to be organized by **Dr. B. Lal Institute of Biotechnology, Jaipur.** This conference is scheduled to be held during **14th – 16th February, 2025** at the Rajasthan International Centre, Jaipur, India.

Reproductive biology is a multidisciplinary field that encompasses the intricate molecular mechanisms and clinical practices influencing reproductive health and outcomes. ISSRF 2025 aims to bring together the **biomedicine professionals, academic scientists, researchers, clinicians, and industry experts** working in the area of **reproduction, reproductive cancers and assisted reproduction technology** to exchange and share their experiences and research results on diverse aspects of reproductive biology. The conference will also provide a premier interdisciplinary platform for presenting and discussing the most recent findings, innovations, trends, challenges and practical solutions in the field of reproductive health.

The conference will cover a wide range of themes, including the **lifestyle, 'omics' of reproduction, healthcare and industrial interventions like Cancer, ART, and the environmental, nutritional, mental and psychological impacts on reproduction**. The conference deliberations will undoubtedly accelerate research and development in this crucial area of public health.

The scientific programme will consist of keynote addresses, plenary lectures, invited lectures, panel discussions, communication with prominent researchers and industry experts, and poster presentations. This conference will provide an excellent opportunity for **Ph.D./M.Sc./MD/DNB/B.Sc./B.Tech.** students to interact with **senior scientists, obstetricians, gynaecologists, ART specialists, public health personnel, and faculty members**. It will also provide them an international platform to put forth and discuss their own findings in front of the eminent scientists and scholars working in the field of reproductive biology.

We eagerly look forward to your timely response and active participation.

Best regards,

Prof. N. K. Lohiya
Preşident-ISSRF
Contact No.: +91 9829124048

Dr. Sudipti Arora
Organizing Secretary-ISSRF-2025
Contact No.: +91 9829675677


ISSRF 2020


SYNERGY OF LIFE

GLIMPSES


ISSRF 2024


ISSRF 2024
International Conference on Reproductive Health
INNOVATION . INTEGRATION . IMPLEMENTATION
Valedictory Ceremony

सत्यमेव जयते

हरिभाऊ बागडे
राज्यपाल, राजस्थान

संदेश

मुझे यह जानकर प्रसन्नता हुई कि 'सेन्टर फॉर एडवान्स्ड स्टडीज, जूलॉजी विभाग, राजस्थान विश्वविद्यालय' द्वारा इंडियन सोसायटी फॉर द स्टडी ऑफ रिप्रोडक्शन एण्ड फर्टीलिटी के संयुक्त तत्वाधान में अन्तर्राष्ट्रीयसंगोष्ठी का आयोजन किया जा रहा है।

जैविक विज्ञान और भू-उर्वरता के अलोक में भविष्य की संभावनाओं की दृष्टि से यह संगोष्ठी उपादेयी होगी, ऐसा विश्वास है।

मेरी हार्दिक शुभकामनाएं हैं।

(हरिभाऊ बागडे)

सत्यमेव जयते

CHIEF MINISTER
RAJASTHAN

Message

I am delighted to learn that Dr. B. Lal Institute of Biotechnology, in association with Dr. B. Lal Clinical Laboratory Pvt. Ltd. is organizing the International Conference on Reproductive Biomedicine and the 35th Annual ISSRF meeting. A souvenir is also being published to commemorate this occasion.

Reproductive health is fundamental to individual well-being and play a pivotal role in the overall health and development of societies. With rapid advancement in biomedicine, fertility treatment and cancer care, we are witnessing breakthrough that have the potential to revolutionize healthcare practices and improve the lives of millions globally.

This event brings together expert from around the world to discuss vital issues in reproductive sciences, gynecology, oncology and related fields. It serves as a valuable platform for scientists, clinicians and industry leaders to share knowledge, exchange ideas and collaborate on innovative solutions that will shape the future of reproductive health.

The presence of eminent personalities, including Noble laureates and Padam Shree Awardees, underscores the significance of this gathering in advance medical research and practice. I am confident that the discussions and deliberations here will lead to new insights.

I extends my warm greetings to all the participants of the conference and the 35th Annual ISSRF Meeting and wish the event great success. May it strengthen collaborations and inspire continued excellence in the field of reproductive biomedicine.

(Bhajan Lal Sharma)

Prof. Alpana Kateja
Vice-Chancellor
University of Rajasthan, Jaipur

Message

I give my immense pleasure to know that International Conference on Reproductive Biomedicine and the 35th Annual ISSRF Meeting is being organized by Dr. B. Lal Institute of Biotechnology in the association with Dr. B. Lal Clinical Laboratory Pvt. Ltd. during February 14-15, 2025 in Jaipur and a Souvenir is being published on this occasion.

The theme of this conference is highly beneficial for achieving research and education in reproductive biology and fertility. I am confident that the event will provide an excellent platform for researchers to engage with experts from various scientific fields, fostering fruitful discussions and knowledge exchange.

I sincerely hopeful that the concrete recommendations resulting from this conference will pave the path for future research directions in the field of reproductive science, gynecology, oncology and related fields.

I extend my warm greetings to the organizing members for choosing this significant theme and with the conference grand success.

(Prof Alpana Kateja)

Dr. Deepak Maheshwari
Principal and Controller
SMS Medical College
& Attached Group Hospitals
JLN Marg, Jaipur - Rajasthan

Message

It is matter of great pride and privilege to extend my greetings to all the esteemed delegates, organizers and participants of the International Conference of Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare and the 35th Annual ISSRF Meeting of the Indian Society for the Study of Reproduction and Fertility (ISSRF-2025).

Advances and reproductive medicine and fertility research are critical for addressing the evolving healthcare needs of society. This prestigious conference provides an excellent platform for discussing innovations, sharing clinical experiences and fostering collaborations among experts from diverse domains. Such academic gatherings play a pivotal role in bridging the gap between basic research and clinical application, ultimately enhancing patient care and outcome.

I commend the organizers for their efforts in hosting this significant event and bringing together leading minds in reproductive science. I am confident that the discussions and insights shared during the conference will have a far-reching impact on the field.

My best wishes for a successful and inspiring conference experience for all participants.

With warm regards.

(Dr. Deepak Maheshawri)

V. Saravana Kumar
Secretary
Department of Science & Technology
Government of Rajasthan

Message

It is my privilege to extend warm greetings to all participants of the **International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare,** as well as the **35th Annual Meeting of the Indian Society for the Study of Reproduction and Fertility (ISSRF-2025).**

Reproductive biomedicine is a dynamic and rapidly evolving field, holding immense promise to address some of the most critical challenges in healthcare today. By integrating foundational biological research with cutting-edge clinical practices, this field is advancing innovative solutions that have the potential to significantly improve both individual well-being and broader public health outcomes. This conference serves as a vital pl'atform for fostering productive discussions, cultivating interdisciplinary collaborations, and driving impactful research that will shape the future of reproductive health.

I commend the organizers for bringing together an exceptional group of global experts, researchers, and practitioners, who will no doubt contribute to advancing the boundaries of reproductive health science. Your collective efforts are not only inspiring but also crucial in bridging the gap between scientific discovery and its real-world applications for human welfare. The Government of Rajasthan remains steadfast in its commiiment to nurturing a culture of scientific inquiry, innovation, and technological advancement. Through strategic investments in research, infrastructure, and capacity-building, we are dedicated to empowering the scientific community to tackle complex health challenges. Science and technology play a pivotal role in transforming lives, driving economic growth, and achieving sustainable development. Events such as this reinforce our shared vision of using knowledge and innovation to address critical health issues and enhance the quality of life for all.

I extend my best wishes for the success of this conference and hope that the discussions and collaborations here will inspire groundbreaking advancements and practical solutions in reproductive biomedicine, strengthening the globalfoundation of health and well-being.

With warm regards.

(V. Saravana Kumar)

Prof. N. K. Lohiya
FNASc, FAMS, FIAES, FEMSI
Emeritus Professor - NAMS & President - ISSRF
NASI Senior Scientist & Secretary-NASI Rajasthan Chapter
Editor-in-Chief: Journal of Reproductive Healthcare and Medicine (JRHM)
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Website: www.issrf.org; https://jrhm.org/

Message

I am honored to extend a warm welcome to the distinguished delegates, dignitaries, and guests attending the **International Conference on Reproductive Biomedicine: Integrating Basic Biological and Applied Research into Clinical Practice for Human Welfare along with 35th Annual Meeting of the Indian Society for the Study of Reproduction and Fertility (ISSRF-2025)** being organized by **Dr. B. Lal Institute of Biotechnology (BIBT),** Jaipur **during 14th–16th February, 2025 at Rajasthan International Centre, Jaipur.**

It is with great pleasure that we celebrate the ISSRF's successful journey, marked by annual meetings and national/international conferences addressing critical reproductive health issues. The ISSRF's initiative to organize national seminars on reproductive health awareness has been particularly impactful, gaining immense popularity among adolescents and providing them with evidence-based scientific knowledge.

It is also encouraging to see that renowned scientists and clinicians from prestigious institutions, universities, hospitals, and organizations are participating in this event. Their valuable contributions are expected to lead to meaningful outcomes in addressing the conference's key objectives.

I would like to commend the organizers for crafting an outstanding scientific program, enriched by valuable input from partner associations such as DBCL, FOGSI, ISAR, IFS, ACE, FPSI, IMS, MP PCOS(I) and BioClues.

Additionally, it is with great pride that we announce the release of the 33rd issue of the ISSRF Newsletter on " **Epigenetic Mechanisms in Reproductive Biology**," along with the **proceedings of the ISSRF-2025** event, during the inaugural session.

On behalf of the Society, I would like to congratulate the recipients of the **ISSRF-2025 Awards**, recognizing their exceptional scientific contributions to various aspects of reproductive health.

I extend my heartfelt best wishes for the resounding success of the conference.

(Prof. N. K. Lohiya)

Dr. B. Lal Gupta
Co-Chairperson, ISSRF 2025
Director
Dr. B. Lal Institute of Biotechnology &
Dr. B. Lal Clinical Laboratory Pvt. Ltd.

Message

It is with immense pride and enthusiasm that I welcome you to the International Conference on Reproductive Biomedicine & the 35th Annual ISSRF Meeting (ISSRF 2025). This prestigious gathering serves as a platform for leading scientists, clinicians, and scholars from across the globe to exchange groundbreaking ideas, foster collaborations, and drive forward the frontiers of reproductive health and fertility research.

As the Co-Chairperson of ISSRF 2025 and the Director of Dr. B. Lal Institute of Biotechnology and Dr. B. Lal Clinical Laboratory Pvt. Ltd., it is an honor to co-organize this event alongside the esteemed ISSRF society. Our shared commitment to advancing scientific innovation and translational research in reproductive biomedicine is reflected in the diverse scientific program, featuring distinguished speakers, interactive discussions, and hands-on workshops.

This year, we are also introducing three parallel events—Med Innovation, a specialized workshop on PCOS, and a comprehensive training workshop on IVF/IUI techniques—aimed at bridging the gap between cutting-edge research, clinical practice, and reproductive diagnostics. With a strong focus on assisted reproductive technologies (ART), this conference will serve as a vital platform for IVF specialists, clinicians, embryologists, and diagnostic partners to engage with the latest advancements, exchange expertise, and foster collaborations that drive innovation in reproductive healthcare. Furthermore, we are deeply honored that the Honorable Governor of Rajasthan, Shri Haribhau Bagde, will grace the inaugural session as the Chief Guest, further underscoring the significance of this conference in shaping the future of fertility treatments and reproductive medicine.

I extend my heartfelt gratitude to all participants, speakers, and organizers for their dedication in making ISSRF 2025 a grand success. I am confident that this conference will inspire new ideas, foster meaningful collaborations, and pave the way for transformative advancements in reproductive biomedicine.

Wishing you an enriching and insightful experience at ISSRF 2025!

(Dr. B. Lal Gupta)

Dr. Sudipti Arora
Organizing Secretary, ISSRF 2025
Research Scientist & Assistant Director
Dr. B. Lal Institute of Biotechnology
Jaipur

Message

It is with great joy and enthusiasm that I extend a warm welcome to all distinguished delegates, esteemed speakers, researchers, and young scientists to the **International Conference on Reproductive Biomedicine & the 35th Annual ISSRF Meeting (ISSRF 2025)**. This prestigious event, organized in collaboration with the I**ndian Society for the Study of Reproduction and Fertility (ISSRF)**, is a celebration of scientific excellence, collaboration, and innovation in reproductive health and fertility research.

ISSRF 2025 promises to be an intellectually stimulating experience, bringing together leading experts, Nobel laureates, Padma Shri awardees, and global pioneers to share their cutting-edge research and insights. Our carefully curated scientific program, combined with engaging workshops and interactive sessions, will provide a dynamic platform to discuss the latest advancements and challenges in reproductive biomedicine.

In addition to the core scientific deliberations, we are excited to host three parallel events—Med Innovation (an idea competition for school students), a specialized workshop on Polycystic Ovary Syndrome (PCOS), and an advanced training workshop on IVF/IUI techniques—ensuring a holistic learning experience for all participants. The PCOS workshop will be a key highlight, addressing one of the most prevalent yet often overlooked reproductive health challenges. With insights from leading clinicians, researchers, and diagnostic experts, this workshop aims to bridge the gap between research and clinical management, offering cutting-edge strategies for diagnosis, treatment, and patient care. We are proud to collaborate with ASSOCHAM and IIHMR, whose support will enhance the impact of these initiatives, fostering stronger industry-academia partnerships and driving advancements in reproductive healthcare.

As we embark on this journey of knowledge-sharing and collaboration, I sincerely hope this conference sparks meaningful discussions, fosters new partnerships, and paves the way for impactful scientific contributions. Let us work together to advance reproductive healthcare and make a lasting difference in the field.

I extend my heartfelt gratitude to all participants, speakers, and organizing members for their unwavering commitment to the success of ISSRF 2025.

Wishing you an enriching, inspiring, and fruitful experience at this landmark event!

Sudipti

(Dr. Sudipti Arora)

Patrons

Padma Bhushan
Prof. G. P. Talwar
Former Director, NII
TRF, New Delhi

Dr. V. M. Katoch
Former Secretary
DHR & DG-ICMR
New Delhi

Padma Shri
Dr. M. L. Madan
Former Vice-Chancellor
DUVASU, Mathura

Chairperson

Prof. N. K. Lohiya
President-ISSRF
Emeritus Professor-NAMS
University of Rajasthan, Jaipur

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Chairman & Managing Director
Dr. B. Lal Clinical Laboratory Pvt. Ltd.
& Dr. B. Lal Institute
of Biotechnology, Jaipur

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Director & Head, Fortis
Memorial Research
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Dr. Anil Suri
Vice-President-ISSRF
Director, SRCC
Mahatma Gandhi
Medical College and
Hospital, Jaipur

Dr. R. S. Sharma
Secretary-ISSRF
Distinguished Professor
Sharda University
Greater Noida, UP

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Medical Director
Dr. B. Lal Clinical Laboratory Pvt. Ltd.

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Dr. Anju Soni
President, IMS

Dr. Duru Shah
President, PCOS(I)

Dr. Prashanth N. Suravajhala
Founder, BioClues

Organizing Secretaries

Dr. Sudipti Arora
Research Scientist & Assistant Director
Dr. B. Lal Institute of Biotechnology (BIBT), Jaipur

Dr. Monika Agrawal
Senior Consultant Microbiology
Dr. B. Lal Clinical Laboratory

Convener

Dr. Aditi Nag
Assistant Professor
BIBT, Jaipur

Co-Conveners

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Head, RD&I
BIBT, Jaipur

Dr. Nidhi Shukla
Assistant Professor
BIBT, Jaipur

Treasurer

Dr. Sonika Saxena
Vice-Principal
BIBT, Jaipur

Coordinators

Dr. Izharul Haq
Assistant Professor
BIBT, Jaipur

Prof. A. S. Ansari
UoR, Jaipur

Dr. Barkha Khilwani
Post-Doc Fellow
UoR, Jaipur

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- Rakesh Kumar
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- Shio Kumar Singh
- Shivam Priyadarşhi
- Sonia Malik
- Srabani Mukherjee
- Sudha Prasad
- Sudhaa Sharma
- Sunil Kumar
- T. C. Sadasukhi
- T. G. Shrivastava
- T. Rajkumar
- Umesh Rai
- Vikash Swarankar

International Scientific Advisory Committee

SCIENTIFIC PROGRAMME

Day-1	14 February, 2025
8:30 AM	Registration
9:30 AM	Inaugural Ceremony

Chief Guest

Shri Haribhau Kisanrao Bagde
Hon'ble Governor
State of Rajasthan

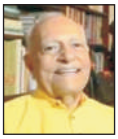
Guest of Honor

Prof. Alpana Kateja
Hon'ble Vice-Chancellor
University of Rajasthan, Jaipur

Guest of Honor

Dr. M. L. Swarankar
Emeritus Chairperson
MGUMST, Jaipur

Presiding Guest



Padmabhushan
Prof. G. P. Talwar
Docteur es Sciences, DSc (hc), FAMS, FASc
FNASc, FNA, FRCOG (London), FWAAS
Director Research
Talwar Research Foundation

Prof. N. K. Lohiya
President-ISSRF

Dr. R. S. Sharma
Secretary-ISSRF

Dr. B. Lal Gupta
Co-Chairperson
ISSRF-2025

Dr. Sudipti Arora
Organizing Secretary
ISSRF-2025

Felicitation of Lifetime Achievement Awardees

Dr. Neena Malhotra
MD, DNB, FRCOG, FAMS, FICOG
Head, Department of Obstetrics and Gynecology, All India Institute of Medical Sciences, New Delhi

Dr. K. D. Nayar
MD, DGO, Dip Obst., FICOG
Chief Consultant, Infertility & IVF
Mata Chanan Devi Hospital, New Delhi

Dr. Narendra Malhotra
MD, FIAJAGO, FICMU, FICOG, FICMCH, FRCOG, FICS, FMAS, AFIAPM, FICRM
Director, ART Rainbow IVF, Agra

Inauguration of Exposition by Hon'ble Governor & Group Photograph

10:30 AM	High Tea
11:00 AM	**Chairpersons**  **M. L. Swarankar**, MGUMST, Jaipur  **G. Taru Sharma**, NIAB, Hyderabad **Keynote Address-I**  **Neena Malhotra,** AIIMS, New Delhi The Future of Fertility Preservation In India

Founder President Dr. T. C. Anand Kumar Memorial Oration

Chairpersons

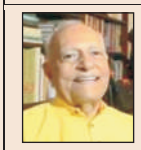
 **Ashutosh Halder**, AIIMS, New Delhi

 **Karpagam Anand Kumar**, Bangaluru

11:25 AM — **Oration–I**

Srabani Mukherjee, ICMR-NIRRCH, Mumbai
Unraveling Pathophysiology of Polycystic Ovary Syndrome by Multifaceted Approach

Day1 Session-1	**Reproductive Cancers and Diseases**				
	Chairpersons				
		**Rashmi Kaul** OSU, Tulsa U.S.A.			**Monika Agarwal** DBCL, Jaipur
11:50 AM	**IT**		**Arun Chougule,** Swasthya Kalyan Group, Jaipur Cancer of Reproductive Organs: Strategies for Prevention, Early Diagnosis and Effective Treatment		
12:10 AM	**IT**		**R. S. Sharma**, Galgotias University, Greater Noida, UP Impact of Radio Frequency Radiation (RFR) Emitted from Cell Phone on Human Semen Quality		
12:30 PM	**IT**		**G. Taru Sharma**, NIAB, Hyderabad Role of Signaling Pathways in Osteogenic Differentiation of Canine Mesenchymal Stem Cells		
12:50 PM	**Conclusion and Remarks by Chairpersons**				
Day 1 Session-2	**Reproductive Cancer and Genomics**				
	Chairpersons				
		**Roya Rozati** MHRT, Hyderabad			**G. Sai Kumar** IVRI, Bareilly
12:55 PM	**IT**		**Jyotsna Batra,** Queensland University of Technology, Australia Prostate Cancer in the Post-GWAS Era		
1:15 PM	**IT**		**Rakesh Kumar**, SMVDU, Katra ANKLE1 as a Novel Mutation Site in Breast and Ovarian Cancer Among Jammu and Kashmir Population and its Role in Cell DNA Damage and Repair Processes		
1:35 PM	**IT**		**P. D. Gupta,** CCMB, Hyderabad Importance of Changes in the Gut Microbiota Milieu During Pregnancy and Beyond		
1:55 PM	**Conclusion and Remarks by Chairpersons**				
2:00 PM	**Lunch Break and Poster Session**				
	Prof. G. P. Talwar Gold Medal Award				
	Chairpersons				
		**G. P. Talwar** TRF, New Delhi			**N. K. Lohiya** UoR, Jaipur
2:45 PM	**Oration–II**		**Taruna Madan Gupta,** ICMR, New Delhi Immunotherapy of Prostate Tumor by Innate Immune Agonists of Cancer		
Day1 Session-3	**Nutrition and Lifestyle Impact on Reproduction Physiology**				
	Chairpersons				
		**Chandana Halder** BHU, Varanasi			**Vikrant Bhor** NIRRCH, Mumbai
3:10 PM	**IT**		**Ashutosh Halder,** AIIMS, New Delhi Genomics of Common Reproductive Endocrine Disorders		

3:30 PM	IT		**Samir Kumar Patra,** NITR, Rourkela Search for Ovarian Cancer Biomarkers: An Integrated Bioinformatics and Coordinated Network Analysis Reveals Clusters of Differentially Expressed Genes and Key Hub Genes
3:50 AM	IT		**Rima Dada**, AIIMS, New Delhi PCOS- A Common Complex Endocrinopathy- Integrated Management by Yoga
4:10 PM	IT		**B. Manivannan,** Genaxy Scientific Pvt Ltd., New Delhi/Solan Drug Regulations in Development of Reproductive Biomedicines
4:30 PM	IT		**Priyanka Narad,** ICMR, New Delhi Revolutionizing Reproductive Health: The Role of AI in Optimizing Fertility and Maternal Care
4:50 PM	**Conclusion and Remarks by Chairpersons**		
	Young Scientist Awards-I		
	Chairpersons		
	 **M. L. Madan** DUVASU, Mathura	 **R. S. Sharma** Galgotias University Greater Noida, UP	
4:55 PM	**Founder President Dr. T. C. Anand Kumar Young Scientist Awards**		
	YSA		**Sriparna Pal**, BHU, Varanasi Ameliorative Potential of Melatonin in Ovarian Dysfunction from BPS Exposure: A Focus on Key Survival and Redox Pathways
	YSA		**Nisha Sharma,** AIIMS, New Delhi Identification of Testis Derived Differentially Expressed Spermatogenic MicroRNAs in Idiopathic Hypospermatogenesis
5:25 PM	**Prof. G. P. Talwar Young Scientist Awards**		
	YSA		**Jasmine Nayak**, Ravenshaw University, Cuttack What Makes Men with Low Seminal ROS Infertile?
	YSA		**Apoorva Challa**, AIIMS, New Delhi Multi-omics Strategies for Elucidation of Pathophysiology of Bacterial Vaginosis
5:55 PM	**High Tea**		
6:15 PM	**Cultural Programme**		
7:00 PM	**Welcome Dinner**		
Day-2	**15 February, 2025**		
	**Prof. V. P. Kamboj Memorial Oration**		
	Chairpersons		
	 **G. P. Talwar** TRF, New Delhi	 **Mala Kamboj** PGDIS, Rohtak	
9:00 AM	**Oration–III**		**N. K. Lohiya**, University of Rajasthan, Jaipur Unlocking the Potential of Natural Product Based Solutions for Male Fertility and Contraception

	**Prof. N. R. Moudgal Memorial Oration**				
	Chairpersons				
		**Rupert Ecker** TissueGnostics Brisbane, Australia		**Dheer Singh** ICAR-NDRI, Karnal	
9:25 AM	**Oration–IV**		**Vikrant M. Bhor**, ICMR-NIRRCH, Mumbai Microbiome-Mediated Immune Modulation Influencing the Course of HCMV Infection During Pregnancy		
Day2 Session-4A	**Mental Health, Obesity, PCOS and Breast Cancer**				
	Chairpersons				
		**Om P. Sharma** Skillman, USA		**A. B. Gupta** MNIT, Jaipur	
9:50 AM	**Keynote Address-II**		**K. D. Nayar,** Mata Chanan Devi Hospital, New Delhi Environmental Changes - A Challenge to Reproductive Health		
10:15 AM	**IT**		**Rashmi Kaul,** OSU, USA Complement Regulatory Protein Regulation in Human Papilloma Virus- Induced Cell Carcinogenesis		
10:35 AM	**IT**		**Surabhi Gupta,** AIIMS, New Delhi Factors Regulating Epithelial to Mesenchymal Transition (EMT) in Trophoblast Differentiation: Implications for Placental Pathologies		
10:55 AM	**IT**		**Nidhi Patni**, Narayana Hospital Jaipur Less is More in the Treatment of Breast Carcinoma		
11:15 AM	**IT**		**Amlan Kanti Ray**, Diverse Genomics PVt. Ltd., Kolkata Unfolding of Space-Time: Translation, Transmission, Transformation		
11:35 AM	**Conclusion and Remarks by Chairpersons**				
11:40 AM	**High Tea and Poster Presentations**				
Day 2 Session-5A	**From Genes to Lifestyle: Innovations in Research and Treatment**				
	Chairpersons				
		**Jyotsna Batra** Queensland University of Technology, Australia		**Srabani Mukherjee** ICMR-NIRRCH Mumbai	
12:10 PM	**IT**		**Om P. Sharma**, Skillman, USA Adenosine Pathway: A Promising Therapeutic Target For Cancer Therapy		
12:30 PM	**IT**		**Asmita Patil,** AIIMS, New Delhi Pollution and health: Tomorrow's Children!		
12:50 PM	**IT**		**Satish Dipankar**, AIIMS, Mangalagiri Effect of Zumba Exercise Training on Arterial Stiffness, Pulse Wave Velocity and Serum Homocysteine Levels Among Female Adults with PCOD		

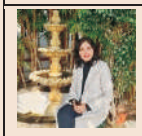
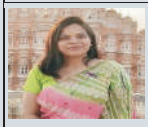
1:10 PM	Industrial Parterners	Abbott		**Charu Yadav**, Medanta-the Medicity, Gurugram Bridging the gap in women cardiac health using hsTnI
1:20 PM		Roche		**Rakhi Singh,** Abalone Clinic and IVF center, Noida AMH Assay: Transforming PCOS Diagnosis and Management
1:30 PM		QuidelOrtho		**Shikha Malhotra**, Transfusion Medicine –India & SAARC QuidelOrtho Superiority of VITROS Enhanced Chemiluminescence Technology in the detection of Fertility Hormones
1:40 PM	**Lunch Break and Poster Session**			
Day2 Session-6A	**Reproductive Physiology and Health**			
	Chairpersons			
		**Arvind Gupta** Rajasthan Hospital Jaipur		**Kiran Katoch** IIHMR, Jaipur
2:30 PM	**Keynote Address-III**		**M. L. Madan,** DUVASU, Mathura Perspectives in Embryo and IVF Technologies – The Good, Bad, and Ugly	
2:55 PM	IT		**Anil Suri,** MGUMST, Jaipur Translational Cancer Research, Discovery & Innovations Challenges	
3:15 PM	IT		**Seema Rai**, GGV, Bilaspur Interaction of Melatonin, Proteins, and Clock Genes in Polycystic Ovarian Syndrome Rats: A New Insight for Novel Therapeutic Intervention of PCOS	
3:35 PM	IT		**Rupasri Ain**, CSIR-IICB, Kolkata Regulation of Trophoblast Development by Long Non-Coding RNAs	
3:55 PM	IT		**Suneel Onteru,** NDRI, Karnal Prospective Direct Genetic Markers for Postpartum Anestrus in Murrah Buffaloes	
4:15 PM	**Conclusion and Remarks by Chairpersons**			
4:20 PM	**High Tea**			
Day2 Session-7	**Omics of Reproduction**			
	Chairpersons			
		**T. C. Sadasukhi** MGUMST, Jaipur		**M. Kasturi** BBV, Pilani
4:50 PM	IT		**Rupert Ecker,** TissueGnostics, Brisbane, Australia AI Empowered Tissue Classification	
5:10 PM	IT		**Prashant N. Suravajhla,** AVV, Amritapuri Bridging the Gap Between Biologists and Data Scientists: Where Are We Heading? Reflections From Our Case Studies	

5:30 PM	**IT**		**Radha Chaube**, BHU, Varanasi Interplay of Ghrelin, Adiponectin and Leptin in PCOS
5:50 PM	**IT**		**Sriram Sheshadri**, Nirma University, Ahmedabad Gut Microbiota-Derived Trimethylamine N-Oxide: A Novel Target for the Treatment of Preeclampsia
6:10 PM	**IT**		**Prashanth G. Bagali,** GIRHR, Bengaluru Unlocking the Future of Fertility: Advancements in Genomic Testing for Reproductive Genetics Research
6:30 PM	**Conclusion and Remarks by Chairpersons**		
6:35 PM	**Annual GBM ISSRF**		
7:15 PM	**Gala Dinner**		
Day-3	**16 February, 2025**		
	**Prof. L. S. Ramaswami Memorial Oration**		
	Chairpersons		
	**Arun Chougule** Swasthya Kalyan Group, Jaipur		**Krishna Mohan M.** JNU, Jaipur
9:00 AM	**Oration–V**		**Deepa Bhartiya**, Epigeneres Biotech Pvt Ltd, Mumbai Translating Stem Cell Insights to the Clinics for Early Prediction of Cancer
	**Prof. S. S. Guraya Memorial Oration**		
	Chairpersons		
	**S. S. Hundal** PAU, Ludhiana		**Surinder Guraya** USA
9:25 AM	**Oration–VI**		**Dilip K. Swain,** Washington University in St. Louis, St. Louis Molecular Mechanisms of Sperm Temperature Sensing
Day3 Session-8A	**Molecular and Metabolic Insights in Reproductive Health**		
	Chairpersons		
	 **Suneeta Mittal** Fortis Memorial Research Institute, Gurugram		**Seema Srivastava** UoR, Jaipur
9:50 AM	IT		**Pradeep Kumar G**, University of Kerala, Kerala Regulation of Gene Expression by mir-34c and mir-449a during the Onset of Spermatogenesis in the Mouse Testis
10:10 AM	IT		**Jaideep Malhotra,** Rainbow IVF, Agra Premature Ovarian Insufficiency
10:30 AM	IT		**Arvind Gupta,** Rajasthan Hospital, Jaipur Managing Sarcopenic Obesity- Integrating the elderly health

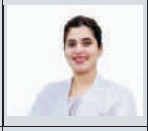
10:50 AM	IT		**Pradeep Mahajan,** StemRx BioScience Solutions Pvt. Ltd., Mumbai Management of Insulin Resistance in Infertility
11:10 AM	**Conclusion and Remarks by Chairpersons**		
11:15 AM	**High Tea**		
Day3 Session-9A	**Advancements in Technologies Related to Reproduction and fertility**		
	Chairpersons		
	 **Anil Suri** MGUMST, Jaipur	 **H. N. Verma** JNU, Jaipur	
11:35 AM	**Keynote Address-IV**		**Narendra Malhotra**, ART Rainbow IVF, Agra Fertility Preservation: Yesterday, Today, and Tomorrow
12 noon	IT		**Suneeta Mittal**, Fortis Memorial Research Institute, Gurugram Adolescent PCOS and its Long-Term Implication
12:20 PM	IT		**Pankaj Talwar,** i-HOMaa Infertility and Child Care Centre, New Delhi Green *In Vitro* Fertilization (IVF): Advancing Sustainability in Reproductive Medicine
12:40 PM	IT		**Roya Rozati,** MHRT, Hyderabad Infertility, Treatment and the Link to Cancer
01:00 PM	IT		**Rupesh Shrivastava,** AIIMS, New Delhi The Landscape of Immunoporosis and Bone Health in post COVID-19 Era
01:20 PM	**Conclusion and Remarks by Chairpersons**		
01:25 PM	**Lunch Break**		
Day3 Session-10A	**Future of Fertility and Aging**		
	Chairpersons		
	 **Anil Kaul** IIPH, Hyderabad	 **Jayaprakash Divakaran** Abu Dhabi, UAE	
2:15 PM	**Keynote Speaker -V**		**Shiv Gautam,** Gautam Hospitals, Jaipur Mental Health and Reproduction
2:40 PM	TRANSASIA		**Ashish Gupta,** NIMS Medical College and Hospital, Jaipur Key CBC Parameters for Assessing Women's Health
2:55 PM	**Conclusion and Remarks by Chairpersons**		
	**Dr. (Mrs.) Mridula Kamboj Memorial Oration**		
	Chairpersons		
	 **V. M. Katoch** JIPMER Puducherry	 **Bela Kamboj** Prakash Netra Kendra Pvt. Ltd., Lucknow	
3:00 PM	**Oration–VII**		**Monika Sachdev**, CSIR-CDRI, Lucknow Chebulinic Acid Enriched Fraction (CAEF) for the Management of Benign Prostatic Hyperplasia (BPH)

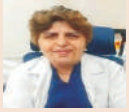
	Young Scientist Awards-II				
	Chairpersons				
		**V. M. Katoch** JIPMER, Puducherry			**A. S. Ansari** UoR, Jaipur
3:25 PM	**Prof. N. R. Moudgal Young Scientist Awards**				
	YSA		**Seema Karnwal**, NDRI, Karnal Capacitation Induced AKAP3 Degradation, Promotes Sp17 Movement towards Sperm Head, Enhances Sperm Zona-Pellucid Binding		
	YSA		**R. Arunkumar**, NDRI, Karnal Sperm Proteomics Reveals Alterations in Fertility-Associated Protein Abundance Following FMD Vaccination in Sahiwal Bulls		
3:55 PM	**Dr. (Mrs.) Mridula Kamboj Young Scientist Awards**				
	YSA		**Shrabani Saugandhika**, AIIMS, New Delhi Transcriptome Profiling of Testis from High Salt Diet Fed Mice Reveals Altered Immune Homeostasis Causing Testicular Dysfunction		
	YSA		**Delna Irani**, NIRRCH, Mumbai Male Circulatory Phthalate Levels in Fertile and Irpl Couples and their Correlation with Semen Parameters, Sperm DNA Fragmentation and Methylation		
4:25 PM	**Prof. S. S. Guraya Young Scientist Awards**				
	YSA		**Mukul Anand,** DUVASU, Mathura Supplementation of Low-Density Lipoprotein (LDL) the Tris Based Semen Extender Improves the Post Thaw Semen Quality in Boer Buck		
	YSA		**Aasiya Syed**, Institute of Science, Nagpur Histological Changes in Epididymis of Male Albino Rats Treated with *Apamarga Kshara* Extract of *Achyranthes aspera*		
4:55 PM	**Prof. V. P. Kamboj Young Scientist Awards**				
	YSA		**Priyanka Wagh Belhekar**, NIV, Pune Genomic Instability, Immune Response, and Therapeutic Approaches in HPV-Associated Cervical Cancer		
	YSA		**Durva Panchal**, NIRRCH, Mumbai Decoding Metabolomic Shifts from Pre-Ovulation to Ovulation		

Day2 Session 7A	**Med-Innovate 2025**		
09:30 AM	**Registration**		
10:00 AM	Welcome address & Introduction of the Session		**Kritika Shah,** BIBT, Jaipur
Panel Discussion **From Startup to Scale-Up: Navigating the Healthcare Innovation Journey**			
10:15 AM	**Moderator**		**Kushal Pareek,** IIHMR Startups, Jaipur
	P1		**Sudip Chowdhury,** Ovobee
	P2		**Sahil Jagnani,** Mobilabs
	P3		**Vaibhav Tripathi,** Femease
	P4		**Samarth Gupta,** BootWay
11:10 AM	**Med-Innovate-2025**		
	Chairpersons		
		**Saksham Gupta** BIBT Jaipur	 **Puneet Datta** IIHMR Startups, Jaipur
	Ideathon Presentations		
01:00 PM		**Pritika Agarwal,** Vidyashram School, Jaipur Turner Syndrome: Unveiling the X Factor	
01:00 PM	**Results**		
01:15 PM	Closing Remarks & Felicitation		**Sonika Saxena,** BIBT, Jaipur

Session-5B	**Workshop** **Breaking the Silence on PCOS** **ASSOCHAM Rajasthan Women Wing**		
	Moderator		
		**Isha Gambhir,** Neelkanth Fertility Hospital, Jaipur	
03:00 PM	Welcome address & Introduction of the Workshop		**Sudipti Arora,** BIBT, Jaipur
03:15 PM		**Isha Gambhir,** Neelkanth Fertility Hospital, Jaipur Introduction of PCOS and Calculating your Wellness Score	
		**Geeta Ahuja,** Alwell Clinic and Sonography Centre, Jaipur Impact of PCOS on Physical health and fertility	
		**Meeta Mathur**, BIG LADDER Impact of PCOS on Mental health and emotional well-being	
		**Nitisha Sharma,** Assocham Raj Committee on Child Welfare Mind Over Matter: The Role of Spirituality in Overcoming PCOS and Health Struggles	
		**Jyoti Sharma,** Femease Empowering women for self -care through ecofriendly products	
		**Vibha Chaturvedi Sharma,** Surya Hospital, Jaipur Innovations in diagnostics to combat and manage PCOS	
		**Amanpreet Bharadwaj,** Nutrition Coach Impact of Lifestyle Modifications on PCOS Management	
04:00 PM	**Special Session on Sustainable Menstruation & Breaking The Stigma**		
		**Anita Goyal,** NatureEco India	
04:15 PM	**Q & A/Discussions** **Moderator- Isha**		
04:45 PM	**Launch of KYC package by Dr. B. Lal Clinical Laboratory Pvt. Ltd.** **Monika Agarwal**		
04:55 PM	**Closing Remarks & Felicitation**		**Sudipti Arora,** BIBT, Jaipur

Day3 Session-8B	Technical Session			
	Chairpersons			
		**Prashant N. Survajhala** Amrita University Amritapuri		**Monika Shashank** DBCL, Jaipur
09:00 AM	**IT**		**Sunil K. Polipalli,** LN Hospital, New Delhi Awareness and Impact of Genetic Testing & Prenatal Genetic Counseling in India	
09:20 AM	**IT**		**Gyanendra Singh,** NIOH, Ahmedabad Biochanin-A and Phloretin alleviates cadmium-induced testicular injury via ameliorating oxidative stress and activating the Nrf2/HO-1 pathway	
09:40 AM	**OP**		**Kritika Jain,** AIIMS, New Delhi Expression analysis of oxidative stress related genes and associated miRNAs in idiopathic recurrent pregnancy loss	
09:50 AM	**OP**		**Megha Sharma**, AIIMS, New Delhi Lactobacillus acidophilus derived Extracellular Vesicles (EVs) ameliorate Dexamethasone-Induced inhibition of Osteoblastogenesis	
	Technical Session			
	Chairpersons			
		**Monika Agarwal** DBCL, Jaipur		**Anita Rathi** Rathi Hospital Jaipur
10:10 AM	**IT**		**Indrashis Bhattacharya**, Central University of Kerala, Kesaragod Testicular Single Cell Transcriptomic Atlas: A Key to Idiopathic Male Infertility	
10:30 AM	**IT**		**Sudhir Chandra Roy,** ICAR-NIANP, Bengaluru Application of Metabolomics for Development of Next Generation Semen Extender for Livestock and Improving Fertility of Semen	
10:50 AM	**IT**		**Mukesh Kumar**, Govt College, Bharatpur Reproductive Health Status of Female: A Piece of Original Study	
11:10 AM	**OP**		**Rakesh Verma,** BHU, Varanasi Bisphenol S Induced Testicular Dysfunctions: Protective Actions of Melatonin	
11:20 AM	**OP**		**Shruti R. Hansda,** BHU, Varanasi Role of melatonin in PCOS induced oxidative stress and metabolic alterations	
11:30 AM	**OP**		**Mousumi Bal,** NIRRCH, Mumbai Contribution of Endometrial Stem Cells in Deep Infiltrating Endometriosis and Ovarian Endometrioma: A comprehensive analysis of endometrial Epithelial Progenitor/Stem Cells, Mesenchymal Stem Cells and Side Populations	
11:40 AM	**High Tea**			

Day3 Session-9B	Workshop 1: Ovulation Induction in ART (Assisted Reproductive Technology)				
		**Convener** **Sapna Basandani,** Anmol Fertility Clinic, Jaipur			
	Chairpersons				
		**Neelam Jain** Rajasthan Hospital Jaipur		**Geetanjali Garg** S .K. Multispeciality Hospital, Jaipur	
12:00 Noon	**L1**		**Divya Jethwani,** National Institute of Medical Science and Research, Jaipur Ovulation Induction Protocols: A Four Decade Journey in IVF		
12:10 PM	**L2**		**Deepa Talreja,** Matratva Fertility, Jaipur Pre-Treatment and Workup Before Ovarian Stimulation		
12:20 PM	**L3**		**Nidhi Kabra,** Dr. Kabra's Fertility Square and Cardiac Care Clinic, Jaipur New Developments in Ovulation Induction Protocols for PCOS		
12:30 PM	**L4**		**Ritu Agarwal,** Ritu IVF, Jaipur Strategies to Optimize Ovarian Stimulation in IUI and IVF		
	Chairpersons				
		**Preeti Sharma** Cocoon Hospital Jaipur		**Suman Mittal** NIMS Medical College Jaipur	
12:40 PM	**L5**		**Mamta Gupta,** Srishti Hospital & IVF Centre, Jaipur Is there an Ideal Stimulation Protocol for Poor Ovarian Reserve		
12:50 PM	**L6**		**Isha Gambhir,** Neelkanth IVF, Jaipur Mastering the Personalization of Ovarian Stimulation in IVF		
01:00 PM	**L7**		**Yasmin Syed,** National Institute of Medical Science and Research, Jaipur Ovulation Trigger: Options and Timing in IVF		
01:10 PM	**L8**		**Urmila Sharma,** ISHWA IVF and Fertility Centre, Jaipur Empty Follicle Syndrome Causes and Treatment		
01:20 PM	**Lunch**				

	Panel Discussion: Difficult IVF Case Scenarios				
	Chairpersons				
		**Divya Rathi** Rathi Hospital, Jaipur		**Pooja Roongta** Shivkripa Maternity and General Hospital	
	Moderators				
		**Sapna Basandani** Anmol Fertility Clinic, Jaipur		**Ch Venkata Ramana Devi** V. R. K. Medical College Hyderabad	
02:00-02:45 PM	**P1**		**Ritu Agarwal,** Ritu IVF, Jaipur		
	P2		**Nidhi Kabra,** Dr. Kabra's Fertility Square and Cardiac Care Clinic, Jaipur		
	P3		**Deepa Talreja**, Matratva Fertility, Jaipur		
	P4		**Divya Jethwani,** National Institute of Medical Science and Research, Jaipur		
	P5		**Yasmin Sayed,** National Institute of Medical Science and Research, Jaipur		
Session-10B	**Workshop 2** **Insights into the Fundamentals of Intrauterine Insemination (IUI)**				
			**Convener** **Anju Mathur,** Mangalam Hospital, Jaipur		
	Chairpersons				
		**Pooja Rungta** Shiv Kripa Maternity and General Hospital		**Roya Rozati** MHRT, Hyderabad	
02:45 PM	**L1**		**Namita Kotia**, Aastha Fertility Clinic Stimulation Protocol: Is it needed and which one?		
02:55 PM	**L2**		**Anjana Rathi**, Rathi Hospital and IVF Centre, Beawar Addressing the challenges in IUI: When, which and how much trigger to use		
03:05 PM	**L3**		**Neelam Bapna,** Shivani Fertility & IVF Centre, Jaipur The current Legal Requirements for ART Level 1 Clinics in India		
03:15 PM	**L4**		**Alka Gahlot**, NIMS, Jaipur Factors affecting the success rate and how to Optimize		

03:25 PM	**L5**		**Sanjay Shukla, Sr. Consultant Embryologist** Sperm Preparation Techniques in IUI: from Basic to Advanced

Panel Discussion: Optimizing IUI Success: A Clinical and Andrology Lab Perspective

Chairpersons

	**Suneeta Mittal** Fortis Memorial Research Institute, Gurugram		**K. Rajini** Rajbhavan Hyderabad

Moderators

	**Tanu Batra** Indira IVF		**Alka Gahlot** NIMS, Jaipur

03:35 – 04:20 PM	**P1**		**Sana Naqash,** Mahatma Gandhi Medical College, Jaipur Fertility Centre, Jaipur
	P2		**Richa Ainani Ahluwalia,** Zivia IVF, Jaipur
	P3		**Gayathri Chillakuru,** Indira IVF, Jaipur
	P4		**Deepika Gurnani,** Indira IVF, Jaipur
	P5		**Asifa Majeed,** Asmee IVF Centre, Jaipur

Day 3 **5:25 PM**	**Valedictory Function**

Chief Guest	**Guest of Honor**	**Presiding Guest**
		
Dr. V. M. Katoch MD, FNASc, FASc, FAMS, FNA President, JIPMER, Puducherry Former Secretary DHR and Director-General, ICMR NASI-ICMR Chair on Public Health Research, RUHS, Jaipur	**Shri V. Saravana, IAS** Secretary to Government Department of Science and Technology Government of Rajasthan, Jaipur	**Padma Shri** **Dr. M. L. Madan** DSc (hc), FNAS, FNAAS, FNAVS FISAR, FEVA Former Vice-Chancellor DUVASU, Mathura and PDAU, Akola

6:30 PM	**High Tea**

ISSRF 2025

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KEYNOTE SPEAKER

ORATION

INVITED TALK

YOUNG SCIENTIST AWARD

ORAL PRESENTATION

POSTER PRESENTATION

KEYNOTE SPEAKERS

KS-1

The Future of Fertility Preservation in India

Neena Malhotra
Department of Obstetrics and Gynecology, and WHO Collaborative Center for Human Reproduction and Cervical cancer Prevention,
All Institute of Medical Sciences, New Delhi, India
Email: malhotraneenaaiims@gmail.com

Fertility preservation (FP) is a vital branch of reproductive medicine that involves freezing gametes, embryos, or gonadal tissue for future use. Over the past two decades, FP has evolved into a well-established practice, addressing medical and social needs. It is particularly crucial for women experiencing premature ovarian reserve loss due to malignancies, auto-immune diseases, benign ovarian tumors, or endometriosis. Women undergoing chemotherapy or radiotherapy face an urgent need for FP, as these treatments can severely impact ovarian function. Cancer statistics indicate a rising number of young individuals affected by malignancies, with survival rates ranging from 60–80% over five years. In India alone, an estimated 11.4 lakh cancer cases were projected by 2020, with 40–80% affecting women aged 16–45 years. As survival rates improve, the demand for onco-fertility services, including dedicated cryopreservation units for oocytes, embryos, and ovarian tissue, continues to grow. However, a lack of awareness among both patients and healthcare providers remains a significant barrier. Gynecologists and oncologists often fail to refer patients for FP early enough, underscoring the urgent need for structured referral pathways to enhance access to onco-fertility services. Beyond medical necessity, social reasons are increasingly driving FP, particularly among women postponing childbearing for career and financial security. Declining fertility rates in India have heightened the interest in oocyte vitrification, with social egg freezing gaining traction. While the ideal number of oocytes for successful live births post-embryo freezing is estimated at 12–15, the required number for successful outcomes after social egg freezing remains uncertain. Social freezing also presents financial burdens, lacks insurance coverage, and necessitates extensive counseling regarding age-related fertility decline. Studies on North Indian women suggest fertility decline begins around 31–34 years, emphasizing the need for timely fertility decisions. Despite its potential, FP in India faces significant social, economic, and cultural challenges. High costs associated with gonadotropins, laboratory procedures, gamete handling, and storage place a financial strain on both patients and healthcare providers. While private clinics offer FP services, public-funded centers remain scarce, limiting accessibility for lower-income groups. Ethical concerns surrounding FP include uncertainty in guaranteeing live births, parental consent for pre-pubertal girls, and posthumous handling of stored biological materials. To bridge these gaps, collaboration between public and private sectors is essential. Increasing awareness, reducing costs, and integrating FP into standard healthcare protocols can significantly expand access. Given the growing demand, FP has the potential to become a transformative solution for preserving reproductive potential, ensuring better quality of life for both cancer survivors and individuals opting for social fertility preservation.

Keywords: Fertility preservation; reproductive medicine; onco-fertility.

KS-2

Environmental Changes - a Challenge to Reproductive Health

Kanad Dev Nayar
Akanksha IVF Centre, New Delhi, India
Email: kdnayar@usa.net

Reproductive environmental health examines the effects of environmental pollutants, including toxic chemicals, air pollution, and climate change, on human reproductive health. Exposure to pesticides, heavy metals, plastics, and industrial and electronic waste has increased due to modernization, yet their reproductive consequences remain underexplored. These toxicants are present in food, water, air, personal care products, and household materials, significantly impacting fertility in both men and women.

A global decline in fertility rates has been observed, with endocrine-disrupting chemicals (EDCs) identified as major contributors. EDCs disrupt ovarian function, impair ovulation, and contribute to conditions such as estrogen deficiency, premature ovarian failure (POF), and infertility. Additionally, transplacental transfer of EDCs exposes the fetus, increasing risks of miscarriage, preterm birth, low birth weight, neurodevelopmental disorders, and childhood cancers.

Environmental toxicants affect male fertility by altering testosterone, FSH, and LH levels. Increased oxidative stress leads to sperm DNA fragmentation, impaired spermatogenesis, and testicular structural abnormalities, ultimately reducing fertility.

Preventing exposure to toxic environmental chemicals is essential for reproductive health. Policies should mandate safety assessments of chemicals before their release, ensuring protection of vulnerable populations. Healthcare professionals, researchers, and policymakers must collaborate to raise awareness and implement regulatory frameworks.

Addressing environmental factors affecting fertility requires a global, multidisciplinary approach. Implementing policies to reduce toxic exposures, promoting sustainable alternatives, and increasing public awareness are crucial steps in safeguarding reproductive health for future generations.

Keywords: Reproductive environmental health; endocrine-disrupting chemicals; fertility; air pollution; climate change; toxic exposure

KS-3

Perspectives in Embryo and IVF Technologies: The Good, Bad, and Ugly

M L Madan
Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya (DUVASU),
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Reproductive processes, weaving intensely under a unique technological advance, Embryo transfer (ET), Assisted reproductive technologies (ART), and In Vitro fertilization (IVF) have resulted in producing a high impact on livestock and human population. ART have recently made certain new translational advances bringing in new technology and innovation successfully and at the same time making the techniques more promising and a lot more successful. The most recent among them include; time lapse imaging, innovations in improving culture media, microfluidics and sperm selection, enhancing ovarian function, improving fertility by ovarian regeneration, cryobiology and preservation technologies for embryos/sperms. In addition to these techniques, advances in genetic evaluation methods have been utilized for genetic evaluation of IVF embryos. The invasive and non-invasive pre implantation genetic testing (PGT), Molecular technology procedures screen embryos for genetic abnormalities before they are implanted ensuring only the best are used in the reproduction process. Recent attention has also gone towards macro genomics, the study in which individual response of a person is evaluated and customised medication dosage to maximise efficiency and minimise side effects is evolved. The new protocols and a high degree of efficiency achieved in IVF represent the good scientific advance benefiting human health and animal production. Conception via in vitro or in vivo appears to have an influence on measurable outcomes of offspring physiology, manifesting differently across species. Importantly, it can be noted that these measurable differences are noticeable in healthy, fertile animal populations. Thus, common ART interventions may have long-term consequences for those conceived through these techniques. Optimizing animal and human studies that investigate the safety of new reproductive technologies will provide insight into safeguarding the introduction of novel interventions into the clinical setting. Offspring produced through IVM/IVF/ICSI can have different physiology compared to their in vivo conceived counterparts. These underline the Bad part of technology. The gametes, oocytes and sperm, have lost their citadel of embryo formation and embryos have also now a new emergence through stem cell technology, in which not only the embryos but the clones of the embryos are also produced. The stem cell technology coupled with gene technologies have, in a way blown the wind over the traditional IVF through innovation of developing an embryo /young one from a somatic, epithelial or a mesenchymal cell with different capabilities and capacities in structure, function, health and production The designer technology has ethical, societal and social implications, the unbridled use of which leads us to a scary and ugly science.

Keywords: Assisted reproductive technologies; *In Vitro* fertilization, stem cell technology

KS-4

Fertility Preservation: Yesterday, Today, and Tomorrow

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Fertility preservation has evolved significantly over the past few decades, transitioning from experimental approaches to becoming an integral part of reproductive medicine. Initially driven by the need to safeguard fertility in cancer patients undergoing gonadotoxic treatments, its scope has expanded to include individuals delaying parenthood(social indications), transgender individuals, and those with genetic or autoimmune conditions. This review examines the historical evolution of fertility preservation, current practices, and future directions, focusing on advancements in cryopreservation techniques, ovarian and testicular tissue preservation, and emerging technologies like artificial gametogenesis and in vitro gamete maturation. Addressing current challenges and potential future innovations, this paper provides a comprehensive overview of fertility preservation's transformative journey.

Keywords: Fertility preservation; sperm freezing; oocyte freezing; vitrification; embryo freezing; testicular freezing; social freezing; artificial gametogenesis.

KS-5

Mental Health and Reproduction

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Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It has intrinsic and instrumental value and is integral to our well-being. At any one time, a diverse set of individual, family, community and structural factors may combine to protect or undermine mental health. Although most people are resilient, people who are exposed to adverse circumstances – including stressful life events, other stressors like poverty, violence, disability and inequality – are at higher risk of developing mental health abnormalities. The late 20th century trend to delay birth of the first child until the age at which female reproductive capacity is lower has increased the incidence of age-related infertility. The trend and its consequences have also stimulated interest in the possible factors in the female and the male that may contribute to the decline in fecundity with age; in the means that exist to predict reproduction. The number of oocytes decreases with age until the menopause. Older male age affects the likelihood of conception, abnormalities in sperm chromosomes and in some components of the semen. Age is as accurate as any other predictor of conception with assisted reproductive technology. The decline in fecundity becomes clinically relevant when women reach their mid-30s, when even assisted reproduction treatment cannot compensate for the decline in fecundity associated with delaying attempts at conceiving. Pregnancies among women aged >40 years are associated with more non-severe complications, more premature births. Psychological factors such as stress, anxiety, and depression can increase the risk of infertility. Psychological distress can also be a result of infertility itself. Some psychiatric disorders like male sexual dysfunction, premature ejaculation, erectile dysfunction, impotentia ejaculandi can influence infertility in the couple while in female's frigidity, vaginismus, dysperunia and menstrual disturbances in patients who are on psychotropic medication leading to increased levels of female hormones and prolactin can also play a significant role in infertility and reproduction. Infertility is a stressful life event and depressive symptoms are normal responses to the life crisis of the infertile couple. Grief reactions are common among infertile females and males, and the mourning process is considered important in order to resolve the infertility crisis. However, in certain women and men these normal grief reactions are sustained and turn into pathological grief, which is largely consistent with the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th edn) definition of major depression. The paper discusses these various aspects of reproduction and management of mental disorders.

Keywords: Age related Infertility; DSM-IV; Psychological factors; mental stress; mental disorders

ORATIONS

OR-1

Unraveling Pathophysiology of Polycystic Ovary Syndrome by Multifaceted Approach

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Polycystic ovary syndrome (PCOS) is a major cause of ovulatory infertility in women of reproductive age with adverse reproductive and metabolic implications. It is a complex and heterogeneous disorder. We have adopted a multifaceted multi-omic approach to understanding the intricate pathophysiology of PCOS that drive ovarian defects in these women. Our study on proteome mapping of human follicular fluid yielded one of the largest datasets with many novel proteins identified for the first time in the ovary. Comparative quantitative proteomics identified several proteins involved in immune function, oxidative stress, metabolism, angiogenesis, extracellular matrix remodeling etc. deregulated in follicular fluid of PCOS women compared to controls. Our studies have shed light on mechanisms of defect in COC function for the first time, as well as altered follicular angiogenesis and skewed redox homeostasis in PCOS. Together, our data demonstrates compromised oocyte developmental capacity, poor oocyte quality, corpus luteum insufficiency and recurrent miscarriages in PCOS. Comprehensive studies have been conducted to elucidate ovary-specific epigenetic dysregulation in the etiopathogenesis of PCOS. We have extensively demonstrated changes in DNA methylation and demethylation profiles along with altered expression of their enzymatic machinery in granulosa cells of PCOS women. Further microRNA and their methylation status are also altered in granulosa cells of PCOS women. This indicates intricate crosstalk between DNA methylation and miRNA regulates gene expression and orchestrates the epigenetic landscape of PCOS. Overall, our research findings illustrate the pathophysiology of this endocrine disorder which can guide patient management in the long run.

Keywords: Polycystic ovary syndrome; multi-omics; quantitative proteomics.

OR-2

Immunotherapy of Prostate Tumor by Innate Immune Agonists

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Prostate cancer (PCa) is one of the deadliest reproductive cancers in men with increasing incidence in India. Onco-immunotherapy via blocking immune check-point inhibitors has revolutionized the treatment landscape of several malignancies, though not in the metastatic castration-resistant prostate cancer owing to potent immunosuppressive and non-responsive “cold” tumor microenvironment (TME). Turning up the heat of such cold TME via triggering innate immunity is now of significant interest to restore the immune-surveillance as a complementary treatment paradigm for PCa. Surfactant protein-D (SP-D), a member of the C-type lectin family (CLRs) and retinoic-acid inducible gene-I like receptors (RLRs) are two innate immune pattern-recognition receptors (PRRs) that are being extensively researched to harness their potential in enhancing antitumor immunity. Our research demonstrated for the first time that the prostate tumor milieu adversely impacted the innate immune receptors surfactant protein-D (SP-D) and retinoic-acid inducible gene-I (RIG-I)- like receptors (RLRs) in a transgenic murine model of PCa (TRAMP). Importantly, exogenous supplementation with recombinant fragment of human SP-D (rfhSP-D) and synthetic 5'ppp-dsRNA (agonist of RIG-I) showed improved anti-PCa activity by inducing apoptosis and conveyed pro-phagocytic “eat me” signals in TME under ex vivo and in vivo conditions. Local and transient intra-tumoral administration of 5'ppp-dsRNA led to re-programmed TME by modulating the number and nature of infiltrating immune cells in subcutaneous tumor implanted syngeneic models. These promising treatment-strategies were shown to transform an immunologically “cold” TME into an immune-responsive “hot” TME while leading to active immune surveillance of the tumor. The present study provides strong evidence for the involvement of SP-D and RIG-I in the immunomodulation of prostate cancer microenvironment. Strategies employed in the present study to activate the innate sensing pathways are a valuable addition to the growing arsenal of next generation treatment paradigms for cancer immunotherapy.

Keywords: Prostate cancer; tumor microenvironment; surfactant protein-D; retinoic-acid inducible gene-I.

OR-3

Unlocking the Potential of Natural Product Based Solutions for Male Fertility and Contraception

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Natural products have long been valued for their medicinal properties, and their potential in male contraceptive development is gaining interest. These contraceptives use compounds from plants, animals, and other natural sources to prevent pregnancy. Some natural compounds disrupt spermatogenesis (sperm production) by affecting hormone levels or directly targeting sperm-producing cells. Others impair sperm motility or function, preventing fertilization. Male infertility is a growing issue globally, with factors impacting sperm health and reproductive function. Traditional treatments often focus on medical interventions, but natural solutions are being explored to improve male fertility. Herbal remedies, antioxidants, dietary adjustments, and lifestyle changes are gaining attention for their potential to enhance sperm count, motility, and overall fertility. Key natural products, like ashwagandha, maca root, *Tribulus terrestris*, and antioxidants, have shown promise in fertility enhancement. Plant-derived compounds are particularly promising in developing male contraceptives. Gossypol from cottonseed and Neem (*Azadirachta indica*) have demonstrated contraceptive effects by inhibiting spermatogenesis, disrupting sperm function, and modulating hormones. *Carica papaya* seeds and extracts contain bioactive compounds with contraceptive effects. Studies suggest papaya extracts can reduce sperm count and motility without major side effects, making it a strong candidate for male contraception. Despite promising results, challenges remain, including variability in efficacy, safety concerns, and the need for standardized formulations. Ongoing research aims to optimize dosages, understand the mechanisms, and advance clinical trials to confirm the safety and effectiveness of papaya-based contraceptives. As research continues, *Carica papaya* holds the potential to play a significant role in male contraceptive development, offering a natural and accessible solution for reproductive health.

Keywords: Contraceptives; Natural products; Male infertility; Spermatogenesis

OR-4

Microbiome-Mediated Immune Modulation Influencing the Course of HCMV Infection During Pregnancy

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The gut microbiome plays a pivotal role in regulating immune responses, particularly during pregnancy when maternal immune tolerance and fetal protection are essential. Over the past few years, we have investigated the bidirectional relationship between the gut microbiome and immune modulation in healthy pregnant women as well as those with human cytomegalovirus (HCMV) infection and bad obstetric history (BOH). Our research revealed notable shifts in immune cell populations during early pregnancy, including increased granulocytic and monocytic myeloid-derived suppressor cells (MDSCs) and dynamic changes in natural killer (NK) cell subsets. A positive correlation between Bacteroidetes and regulatory NK cells suggested a microbiome-driven anti-inflammatory response, while Proteobacteria and Actinobacteria were linked to pro-inflammatory immune profiles. Dysbiosis in women with BOH disrupted these delicate immune balances, evidenced by altered macrophage polarisation and cytokine expression following exposure to fecal supernatants in vitro. Complementing these findings, detailed investigations of HCMV-specific immunity uncovered significant distinctions between recent and recurrent infections. Recent HCMV infections, characterised by intermediate IgG avidity and high PCR positivity, were strongly associated with pro-inflammatory cytokine responses, adverse pregnancy outcomes, and congenital CMV transmission. Immune profiling revealed heightened cytokine activity in CD4+ and CD8+T cells against key HCMV antigens, emphasising their central role in maternal-fetal immune interactions.These insights underscore the role of the gut microbiome in immune modulation during pregnancy and its disruption in the context of HCMV infection and BOH and also provide a foundation for future interventions, including microbiome modulation and integrated HCMV screening to improve maternal and neonatal health outcomes.

Keywords: HCMV; BOH; gut microbiome; immune response; pregnancy outcomes.

OR-5

Translating Stem Cell Insights to the Clinics for Early Prediction of Cancer

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There was a lot of excitement and hope when human embryonic stem (hES) cell lines were reported in 1998. However, the need for spare human embryos to derive these cells led to the evolution of another technology that allowed the dedifferentiation and reprogramming of somatic cells back to embryonic state termed induced pluripotent stem (iPS) cells. Both hES and iPS cells are pluripotent and can differentiate into 200 odd cell types in the body. Treating infertility, making gametes, and reversing diabetes were considered low-hanging fruits but the progress over more than two decades has remained dismal. It has been realized that regulating the epigenetic state of differentiating cell progenitors in vitro is not simple. This is the main reason why mature gametes have not been produced in culture for infertile couples. Another branch of science that has reached a roadblock is finding the underlying pathomechanisms leading to various pathologies like infertility, endometriosis, PCOS, fibroids, thin endometrium, and cancer. Attempts made globally to delineate the genetic basis for these disease states have remained futile. Cancer, PCOS, etc. are still described as complex, multifactorial diseases with unknown etiology; there is no definitive test yet available to detect endometriosis and women remain undiagnosed for almost 7- 8 years. Research over the last two decades by my group has shown that these pathologies reflect stem cell dysfunctions. Tissue-resident stem cells have a crucial role in maintaining lifelong tissue homeostasis and their dysfunctions result in various disease states. Cancer initiates due to uncontrolled expansion of tissue-resident, pluripotent, and most primitive, very-small embryonic-like stem cells (VSELs) which also get mobilized into circulation from Stage 0 onwards. It is possible to monitor these stem cells in blood for early detection of cancer. Moreover, NGS studies on the stem and progenitor cells in circulation provide a snapshot of what is happening in the tumor in vivo. This is a huge advance because it is possible to monitor the effect of therapy, confirm remission, need for adjuvant therapy and also risk recurrence by a non-invasive blood test. There is a huge interest in predicting cancer early when it is a weak disease as it can be easily reversed. The whole journey from the bench to the bedside where it is now possible to predict cancer early, possibly reverse it, and also develop more efficient ways to manage cancer patients based on stem cell-based tests now available in the market will be discussed.

Keywords: Human embryonic stem cell lines; induced pluripotent stem cells; very-small embryonic-like stem cells; cancer.

OR-6

Molecular Mechanisms of Sperm Temperature Sensing

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The sperm essential channel CatSper is located at the sperm principal piece, and activation results in flagellar influx of calcium and induction of hyperactivation. The absence of CatSper results in male infertility and therefore, precise activation of CatSper is critical, as premature activation can impair sperm function. CatSper is a voltage-dependent calcium channel and is activated by alkaline pH and follicular secretions. Till date, there is no report how CatSper is affected by physiological temperature. In this study, we are reporting a first ever new modality of CatSper regulation and its association with polyamines. We used a whole cell sperm patch clamp and recorded the CatSper current from wild type and CatSper null mice cauda epididymal sperm cells. We also recorded the CatSper current from TRPV4 null mice sperm. During the whole study, the temperature was regulated by an inline heater directly connected to the digitizer and the software. Comprehensive whole cell patch clamp recordings showed an activation of CatSper with the rise in physiological temperature, and this temperature-dependent activation of CatSper was absent in CatSper null mice sperm cells. The TRPV4 null mice sperm cells showed a similar type of temperature-dependent activation of CatSper current. The major sperm polyamine Spermine inhibited the temperature sensing and gating of CatSper. Our results evidently suggested that murine CatSper is temperature-gated and is activated in the oviduct to the most by the physiological temperature. The premature activation is prevented by the spermine.

Keywords: sperm patch clamp; CatSper, temperature sensing, spermine, gating

OR-7

Chebulinic Acid Enriched Fraction (CAEF) for the Management of Benign Prostatic Hyperplasia (BPH)

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Benign prostatic hyperplasia (BPH) is a clinical problem of old-aged men, in which neoplastic, nonmalignant enlargement of the prostate leads to its dysfunctionality and decreased urinary flow rate. Presently, alpha-blockers and 5 alpha-reductase (5-AR) inhibitors, which are usually steroids. Most of such steroids have been reported to have quite a few side effects; hence the plant-based therapeutic agents and phytomedicine-based interventions are warranted for the treatment of BPH. Our studies demonstrate the therapeutic potential of Chebulinic acid enriched fraction (CAEF) extracted from the fruits of Terminalia chebula; for the management of BPH in Rat model. Orchiectomy was done in SD male rats, and after a week of surgery, subcutaneous injections of testosterone (5 mg/kg) was given for seven days to get an induced BPH rat model. From 8th day onwards, after first testosterone injection, CAEF was given orally (100 mg/kg of body wt) in BPH induced group, while vehicle fed rats served as control. Animals were sacrificed after 4, 8, and 12 weeks of treatment and significant reduction in the prostate index was observed. Histological observations also revealed reduced epithelial thickness in the treated group of animals, which was quite similar to the healthy control group. Furthermore, the most crucial indicator of BPH is the increased level of PSA, which is observed to be reduced drastically in the CAEF treated group. The hormonal level of DHT and estradiol were also found to be suppressed in the treated group of animals. Enhanced pro-apoptotic Bax and reduced expression of anti-apoptotic Bcl-2 along with other proliferative markers indicated a possible role of this extract in the apoptotic pathway. Collectively, these results clearly demonstrate the potential of Chebulinic acid enriched fraction for an affordable health-care product for the management of BPH.

Keywords: Benign prostatic hyperplasia; chebulinic acid enriched fraction; PSA.

INVITED TALKS

IT-1

Cancer of Reproductive Organs: Strategies for Prevention, Early Diagnosis, and Effective Treatment

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Reproductive organ cancers affect both men and women, impacting individuals, families, and the healthcare system. These malignancies arise due to genetic, environmental, lifestyle, and hormonal factors. In India, breast cancer is the most common cancer among women, with an incidence rate of 25.8 per 100,000. Cervical cancer, once the most prevalent, has declined to 14.7 per 100,000 due to awareness and screening, while ovarian cancer ranks third at 7.2 per 100,000. Among men, prostate cancer is the most common reproductive cancer (9-10 per 100,000), whereas testicular cancer remains rare (1-2 per 100,000). Incidence varies regionally—urban areas report higher breast and prostate cancer rates due to lifestyle and awareness, whereas cervical and penile cancers are more common in rural areas due to limited healthcare access. Despite medical advancements improving treatment outcomes, prevention and early detection remain crucial. Lifestyle changes, vaccinations, and routine screenings can prevent or detect cancers at an early stage. Regular tests such as Pap smears (cervical cancer), mammograms (breast cancer), CA-125 (ovarian cancer), and PSA tests (prostate cancer) aid early diagnosis. Genetic counseling for high-risk individuals, particularly those with BRCA1/BRCA2 mutations, can help prevent cancer development. Imaging techniques like ultrasound, MRI, and CT scans improve cancer detection accuracy. Treatment choices depend on cancer type, stage, and patient condition. Surgical advancements, including laparoscopic and robotic-assisted procedures, have enhanced recovery and outcomes. Chemotherapy remains fundamental for advanced cancers, while targeted therapies, such as HER2 inhibitors for breast cancer, and immunotherapy are becoming more significant. Radiation therapy, employing advanced techniques like IMRT, IGRT, and BGRT, ensures precise targeting of cancer cells while preserving healthy tissues. Combating reproductive organ cancers requires a comprehensive approach encompassing prevention, early detection, and effective treatment. Promoting lifestyle modifications, regular screenings, vaccinations, and advanced therapies can significantly reduce the cancer burden. Continued research and public health initiatives are essential to improving outcomes and providing hope for affected individuals.

Keywords: Reproductive cancer; surgical advancements; immunotherapy; chemotherapy; radiation therapy.

IT-2

Impact of Radio Frequency Radiation (RFR) Emitted from Cell Phone on Human Semen Quality

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The male infertility has been considered a serious problem around the globe. Scientists have been working for many decades to determine the possible causes of male infertility. According to studies conducted both in-vitro and in-vivo, numerous factors are shown to be responsible for infertility in men. One of the important factors that has recently been reported to have an adverse impact is Radio Frequency Radiation (RFR) emitted from cell phones. RFR is a subset of electromagnetic fields and its frequency ranges from 3 KHz to 300 GHz. Due to increasing usage of cell phones in the country and decreasing cost of mobile phones, the levels of exposure to RFR have increased. Few studies have reported adverse effects of these radiation on semen parameters. But there is no systematic prospective study to prove the adverse effect of these radiation. Therefore a prospective study has been conducted to find out the impact of cell phones on the semen quality and hormonal profile of the men. After fulfilling the exclusion and inclusion criteria, 421 healthy male volunteer's aged 18-45 years were divided into three groups depending on duration of cell phone use. Group-1 highly exposed group, Group-2 moderately exposed group, Group-3 control group. Subjects were asked to visit the clinic every year for semen and blood sample collection for up to three years. Semen characteristics and blood testosterone, T4 and TSH levels were estimated. Semen volume, rapid forward linear progression motility, moderate linear progression motility, sperm concentration, sperm density, percentage of normal and live sperm decreased in Group-1 in comparison to Groups-2 & 3 and trend continued till 3rd year. Sperm head abnormalities were higher in Group-1 than the Groups -2 & 3 and trend continued till 3rd year. Slight decrease in levels of testosterone, significant increase in T4 and decrease in TSH were observed in Group-1 and a similar trend was noticed till 3rd year. Present data indicate that the increased duration of cell phone use is adversely influencing the semen quality and hormone levels in men which may lead to infertility.

Keywords: Male infertility; Radio Frequency Radiation (RFR); semen parameters.

IT-3

Role of Signalling Pathways In Osteogenic Differentiation of Canine Mesenchymal Stem Cells

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Mesenchymal Stem Cells (MSCs), the self-renewing cells with ability to differentiate into organized, functional network of cells, are capable of differentiating into ligament, bone, cartilage, neuronal, adipocytes and several other cells, they exhibit multi potential proliferation. Effective regenerative therapy for repairing bone defects requires ample knowledge of the signalling pathways responsible for the differentiation of MSCs. Signalling pathways, transcription factors and growth factors modulate the differentiation of MSCs into different cell lineages. Understanding the MSC differentiation signalling pathways can play a potential role in formulating a combined effective strategy for stem cell therapies. Cell lineage determination during MSCs differentiation is a highly orchestrated process involving diverse signalling pathways and distinct classes of regulatory molecules. To elucidate the signalling pathways that drives canine bone-marrow derived MSCs towards osteogenic lineage, this work was focused on BMP and Notch signalling. Bone morphogenetic protein (BMP) signalling positively influences the osteoblast lineage determination, whereas the Notch signalling may have a dimorphic action. Target genes of Runx2, Smad4 and γ-secretase were silenced by short hairpin RNA (shRNA) in canine MSCs. Evaluation of the effect of gene silencing on in-vitro osteogenic differentiation potential was done by quantitative polymerase chain reaction for different osteoblastic markers along with the staining proof for the extracellular deposition of calcium. Data suggested that the Runx2 plays an indispensable part in directing the canine mesenchymal stem cells towards osteogenic lineage. Also, Smad-mediated BMP signalling induced the osteoblast-specific gene expression, whereas the notch pathway negatively regulated the osteogenic differentiation of canine MSCs. The presentation will cover the role of both BMP independent and dependent pathways during osteogenesis.

Keywords: Bone morphogenetic protein (BMP); Mesenchymal Stem Cells (MSC); notch; osteogenic differentiation; shRNA.

IT-4

Prostate Cancer in the Post-GWAS Era

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In the post-genome-wide association study (GWAS) era, significant advancements have been made in understanding genetic risk factors for prostate cancer. My research focuses on specific single nucleotide polymorphisms (SNPs) and their roles in modulating prostate cancer risk and progression. A major area of investigation is SNPs impacting miRNA binding sites, which have demonstrated potential in altering gene expression post-transcriptionally, thereby influencing cancer susceptibility. Additionally, I have studied non-synonymous SNPs in the KLK3 gene, which encodes prostate-specific antigen (PSA). Variations in this gene can lead to structural changes that impact PSA levels, a critical biomarker in prostate cancer diagnosis and management. Further, my work has identified a MNLP (multi-nucleotide Polymorphism) within the promoter region of the IRX4 gene, which has been linked to increased prostate cancer risk. This SNP may disrupt normal transcriptional regulation, enhancing oncogenic processes by impacting not just the protein coding gene, but a long-coding RNA from the complementary strand. By characterising these genetic variants and their functional consequences, this research contributes to the development of precision medicine approaches that improve risk prediction and personalised treatment strategies in prostate cancer.

These findings are instrumental in advancing the understanding of the molecular mechanisms underlying prostate cancer, particularly in light of the complex genetic architecture revealed by post-GWAS studies.

Keywords: GWAS; miRNA; multi-nucleotide Polymorphism; Prostate Cancer

IT-5

ANKLE1 as a Novel Mutation Site in Breast and Ovarian Cancer Among Jammu and Kashmir Population and its Role in Cell DNA Damage and Repair Processes

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Breast and ovarian cancers are among the leading causes of cancer-related mortality among Indian women. Breast cancer is the most prevalent malignancy, while ovarian cancer exhibits the highest mortality among gynaecological cancers. The *ANKLE1* gene, a conserved member of the LEM protein family, plays a vital role in nuclear architecture, gene regulation, and DNA damage response, making it a potential candidate for cancer predisposition. The study aims to investigate the association of *ANKLE1* with breast and ovarian cancers in the Jammu and Kashmir population, North India and to elucidate its role in DNA damage repair mechanisms. Whole exome sequencing (WES) was performed on breast and ovarian cancer samples to identify potential genetic hotspots. Genotyping of the rs2363956 variant in breast cancer and ovarian cancer was performed in the Jammu and Kashmir population. Functional assays involved *ANKLE1* knockdown in MCF-7 (breast cancer) and SKOV-3 (ovarian cancer) cell lines, followed by evaluation of γH2AX foci under cisplatin-induced replication stress to assess DNA damage response. Genotyping of variant rs2363956 was found to be associated with breast and ovarian cancer risk among J & K people, North India. Functional studies revealed increased γH2AX foci in *ANKLE1* knockdown cells, indicating impaired DNA repair. Localization patterns further supported *ANKLE1's* critical role in maintaining genomic stability. In conclusion, the present study suggests that *ANKLE1* plays a significant role in breast and ovarian cancer pathogenesis in Indian women. Its role in DNA damage and repair highlights its potential as a target for therapeutic intervention and biomarker development in these malignancies.

Keywords: *ANKLE-1*; breast cancer; ovarian cancer; MCF-7, SKOV-3; DNA damage.

IT-6

Importance of Changes in the Gut Microbiota Milieu During Pregnancy and Beyond

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Pregnancy is a special physiological state of a woman. During this phase her morphology, physiology, endocrinology, nutrition, Immunology and many other systems change in a way to support the developing embryo. Along with these changes the gut-skin-brain axis of microbiota also changes to provide the fetus optimal conditions for growth and development. The development of the human gut microbiota begins before birth and proceeds in a systematic manner. The human microbiota consists of approximately 100 trillion organisms that mostly inhabit the digestive tract. The most important types of bacteria inhabiting the gastrointestinal tract include *Firmicutes, Bacteroidetes, Actinobacteria,* and *Proteobacteria.* During pregnancy, a number of metabolic, immune, and hormonal changes have an influence on the development of the fetus as well on gut microbiota. Excess of estrogen and progesterone produced by the placenta influence the mechanisms of regulation of the cerebral and intestinal axis and the immune activation of the intestinal mucosa. Modifications in the composition of the microbiome occur between the first and third trimesters of pregnancy. There is an increase in *Akkermansia, Bifidobacterium,* and *Firmicutes,* which has been associated with an increase in the need for energy storage, and an increase in *Proteobacteria* and *Actinobacteria*, which, due to their pro-inflammatory qualities have a protective effect on both the mother and the foetus. The maternal microbiota affects the growth of the offspring in the prenatal and postnatal period and is important in their later life. The microbiota of breast milk changes throughout the lactation period in the mother's gut. The composition of the microbiota is influenced by many factors, including the mother's health, the mode of delivery, and the feeding practices. The breast milk microbiota also evolves over the period of breastfeeding. Colostrum microbiota have a higher diversity than mature milk. In colostrum, *Staphylococcus*, lactic acid bacteria and *Streptococcus* are the most abundant. Breastfeeding shapes the gut microbiota in early life of the baby, both directly by exposure of the neonate to the milk microbiota and indirectly, via maternal milk factors that affect bacterial growth and metabolism such as human milk oligosaccharides, secretory *IgA*, and anti-microbial factors.

Keywords: Pregnancy; gut microbiota; breastfeeding

IT-7

Genomics of Common Reproductive Endocrine Disorders

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Genomic factors are greatly responsible for infertility, abortion, stillbirth, malformation, and cancer. Reproductive genetics is becoming an integral part of today's reproductive practice due to the increase in the burden of reproductive disorders, including endocrine. Genomics has a role in every discipline of medicine. The significant contribution of genomics is in predicting and preventing a disorder, thus decreasing its burden right from the planning of reproduction. This means the genomics objective is to discover the disease's genetic etiology. Exploration of genetic etiology helps predict and prevent diseases and guides treatment. Advances in molecular technology (Optical Genome Mapping, Next Generation Sequencing, and Microarray) have increased this drive and public expectations. Reproductive endocrine disorders requiring expert management from a reproductive genetic specialist are unexplained infertility, recurrent failure of assisted reproduction, premature ovarian failure, polycystic ovarian syndrome, endometriosis, azoospermia/oligospermia, disorder of sex development, etc. Genetics account for 15–30% of infertility. The genetic basis of infertility may result from chromosomal abnormalities, Yq microdeletion, CNVs, monogenic, etc defects. Genetics is becoming more important following the development of in vitro fertilization and intracytoplasmic sperm injection. These procedures lead to more genetic abnormality in offspring since they pass through the in vitro system and bypass physiological protective mechanisms. Once genomic screening technologies are used as part of predictive medicine practice, high-risk groups may be identified before the development of the disease, and appropriate measures may be started before the pathology is too late. Cases like Klinefelter syndrome, turner syndrome, Yq microdeletion, premature ovarian failure, etc., where pathology manifests after puberty, may benefit in the future through predictive genomic medicine practice.

Keywords: Reproductive genetics; genomics; reproductive endocrine disorders.

IT-8

Search For Ovarian Cancer Biomarkers: An Integrated Bioinformatics And Coordinated Network Analysis Reveals Clusters of Differentially Expressed Genes And Key Hub Genes

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Advancements in high-throughput genomic data and bioinformatics tools have significantly contributed to the identification of potential biomarkers, improving the precision of ovarian cancer (OvCa) diagnosis and prognosis. In this study, comparative analysis of normal and tumor samples was conducted using advanced bioinformatics tools. Differential expression analysis, based on fold-change statistics, was complemented by Gene Ontology (GO) and KEGG pathway enrichment analyses using DAVID 6.8. The Protein-Protein Interaction (PPI) network for differentially expressed genes (DEGs) was constructed using STRING, with Cytoscape 3.9.1, MCODE, and CytoHubba facilitating network visualization and module identification. Hub gene expression and overall survival were assessed using the KM plotter, while tumor staging was analyzed through GEPIA2. Additionally, hub gene protein expression was validated using immunostaining results from the Human Protein Atlas (HPA), and further examined for single nucleotide variations, methylation status, and pathway activity. qRT-PCR confirmed hub gene mRNA expression levels. A total of 607 DEGs were identified, comprising 248 upregulated and 359 downregulated genes, with PPI network analysis revealing 20 candidate genes. Among them, BUB1B, CCNA2, MAD2L1, PRC1, TRIP13, and ZWINT exhibited significant prognostic relevance in OvCa, with all except TRIP13 functionally linked to cell cycle regulation. BUB1B is a spindle checkpoint kinase inhibiting anaphase-promoting complex/cyclosome (APC/C) activity; CCNA2 regulates G1/S and G2/M transitions via CDK1/CDK2 interactions; MAD2L1 ensures kinetochore-spindle attachment and inhibits APC/C through CDC20 sequestration; PRC1 functions in cytokinesis and promotes cancer proliferation; TRIP13 interacts with thyroid hormone receptors and is involved in mitotic spindle assembly checkpoint activation; and ZWINT regulates kinetochore function through ZW10 interactions. Given their functional roles in tumorigenesis, targeting these hub genes could provide novel therapeutic strategies for OvCa treatment, necessitating further research into their clinical applications.

Keywords: Cancer Biomarkers; DEGs; Ovarian cancer

IT-9

PCOS-A Common Complex Endocrinopathy-Integrated Management by Yoga

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PCOS is a complex endocrinopathy characterized by a combination of reproductive and metabolic disorders. It affects 5-20% of reproductive-age women worldwide. Alterations in the metabolic pathways implicated in PCOS pathogenesis highlight the complex interplay between reproductive and metabolic systems. It is associated with insulin resistance, obesity, hirsutism, and infertility. Additionally, the long-term implications of PCOS extend beyond reproductive health, with increased risks for developing non-alcoholic fatty liver disease (NAFLD), cardiovascular diseases (CVD), type 2 diabetes (DM), Alzheimer's disease, and certain cancers, including ovarian and endometrial cancer. The current treatment options for PCOS are often pharmacological, with mixed results and potential side effects. PCOS is a complex condition, a lifestyle disease with long-term health implications, requiring a holistic mind body intervention for management and treatment. A total of 60 women with PCOS and 30 controls were recruited for the study, The women with PCOS underwent yoga therapy for 12 weeks and all parameters were assessed pre post yoga intervention. Clinical characteristics and biochemical profiles, including hormonal and lipid markers, were recorded. Metabolomics analysis was performed using a high-resolution Orbitrap Fusion Tribrid Mass Spectrometer to examine metabolic changes in PCOS patients compared to controls. Mitochondrial health was assessed by measuring mitochondrial DNA copy number (mtDNA-CN), COX-II, and NAD+ levels. Oxidative stress and lipid peroxidation markers, such as 4HNE, ROS, 8OHdG, COQ10, and total antioxidant capacity (TAC), were evaluated. ELISA was used to determine the levels of 4HNE, 8OHdG, TAC, COX-II, and NAD+, while ROS was measured using chemiluminescence. Furthermore, gene expression related to mitochondrial integrity (AMPK, SIRT1, TFAM, and NRF1) and mitochondrial respiratory chain transcripts (NDUFA3, SDHD, COX7C, and ATP5D) Indicators of aging, such as telomere length and inflammatory markers (TNF-α and IL-6) were analyzed using RT-qPCR. Also, the severity of depression and quality of life were evaluated using the Beck Depression Inventory-II (BDI-II) and WHO Quality of Life (WHO-QOL) questionnaires, respectively. Following 12 weeks of yoga, clinical improvements were observed in 51 of 60 patients with normalization of menstrual cycles, a reduction in the modified Ferriman-Gallwey (mFG) score in 16 out of 22 women with hirsutism. There were 25 infertile women in this group and 19 conceived. Significant reductions were noted in weight, BMI, and body measurements such as neck, hip, and abdominal circumference, as well as the waist-hip ratio. Endocrine parameters such as LH, LH/FSH ratio, AMH, progesterone, and testosterone levels showed significant decrease and FSH, estrogen, and SHBG levels showed significant increase. Lipid profiles improved, showing reduction in total cholesterol, triglycerides, LDL, and VLDL, with a significant increase in HDL. Metabolically, there was a downregulation in glucose, fructose, D-ribose, L-glutamic acid, xanthine, taurine, and 3,4-dihydroxybenzoate, while PI (18:0/20:4), gamma-glutamyl threonine, ascorbate, and succinate were upregulated. The findings revealed that the significantly enriched metabolic pathways included ketone body metabolism, fatty acid biosynthesis, beta-oxidation of very long chain fatty acids, carnitine

synthesis, oxidation of branched-chain fatty acids, phytanic acid peroxisomal oxidation, valine, leucine and isoleucine degradation, amino sugar metabolism, purine metabolism, galactose metabolism, lactose degradation, D-arginine and D-ornithine metabolism, mitochondrial electron transport chain, urea cycle, pentose phosphate pathway, folate metabolism, ammonia recycling, starch and sucrose metabolism, fructose and mannose degradation, citric acid cycle, gluconeogenesis, nicotinate and nicotinamide metabolism, aspartate metabolism, sphingolipid metabolism, histidine metabolism, glycine and serine metabolism, and bile acid biosynthesis. The yoga group also showed a significant increase in mitochondrial DNA copy number (mtDNA-CN), COX-II, and NAD+ levels, as well as upregulation of transcripts associated with maintaining mitochondrial integrity and improved respiratory chain activity. These changes indicated an improvement in mitochondrial health and aging. Additionally, there was improvement in telomere length, along with reduction in lipid peroxidation, inflammation, and oxidative stress markers. There was a reduction in severity of depression and an improvement in quality of life. This study shows that yoga intervention improves hormonal, metabolic, and clinical outcomes in women with PCOS. Reductions in glucose, fructose, and oxidative stress markers suggest better insulin sensitivity and mitochondrial function. BMI and body measurements also decreased, addressing obesity and cardiovascular risks. Yoga enhanced reproductive health, with improved ovulatory cycles and pregnancies. Overall, the study demonstrates that yoga could be an effective, holistic intervention for managing PCOS, offering improvements in both physical and psychological well-being, with implications for long-term health and fertility.

Keywords: Yoga; metabolomics; mitochondrial health; aging.

IT-10

Drug Regulations in Development of Reproductive Biomedicines

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Development of a new drug or Investigational New Drug (IND) related to reproductive health care is applied to fertility/infertility treatment, including assisted reproduction and contraception, treatment and prevention of Sexually Transmitted diseases (STDs), Cancer therapy and hormone therapies. Medical devices and nano materials are also used in the management of reproductive health care. Majority of the medicines being used in therapeutic application under reproductive health care are generic products, being in the market for many years and hence involve less regulation. Unapproved Medical devices, nanotechnology in medical devices and nano materials used in generic products are considered to be new in therapeutic application and thus covered under regulation as a new drug in regulatory point of view, since majority of the nanomaterials are yet to be approved for commercial application. Reproductive bio medicines that undergo recombinant technology or intervention of biological organisms, viz., cell lines, yeast, bacteria or viruses in the scale up process are considered to be new drug or IND fall under the category of Biomedical and Health Research, of New Drugs and Clinical Trial Rules, 2019, thus covered under regulation.Clearance from the Institutional Biosafety Committee (IBSC) and Review Committee for Genetic Manipulation (RCGM), both under the control of Department of Biotechnology, Ministry of Science and Technology, Government of India is mandatory for rDNA products. All the Nano pharmaceutical preparations shall be treated as New Drugs and the evaluation is done by Central Drugs Standard Control Organization (CDSCO), Ministry of Health and Family Welfare, Government of India, New Delhi. The evaluation of the Nano pharmaceuticals is being done under Category **I/II/III/IV** depending on the market standing of the product. However, limitations of new drug development in regulatory point of view do exist in standard manufacturing process under cGMP, assessments on quality and safety, validated test methods for the assessment of innovative medicine, standard methods for characterization, reference materials for testing, drug encapsulation and release efficiency in case of devises, bioaccumulation and detection in biological tissues in case of of nanomaterial, toxicity and suitable controls, which often become a challenge between innovation and Regulation. The developmental phases of such products in an industry perspective from lab to launch shall be discussed.

Keywords: Investigational new drug; nanopharmaceuticals; rDNA based medicines; regulatory guidelines.

IT-11

Revolutionizing Reproductive Health: The Role of AI in Optimizing Fertility and Maternal Care

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Artificial Intelligence (AI) is revolutionizing reproductive care by offering cutting-edge solutions to issues in women's health, fertility, and even maternal care. AI is quickly becoming an essential part of healthcare as it has the potential to make it much more efficient, cost effective, and patient friendly. In fertility management, AI tools are now able to optimize ovulation prediction, evaluate gamete quality, and tailor assisted reproductive technologies to improve clinical outcomes and allow patients to save both emotional and financial resources. Similarly, in maternal care, predictive analytics allow for quicker prevention and risk assessment for preeclampsia, gestational diabetes, and preterm birth. Automated predictive analytics and AI that goes into decision making tools has transformed both maternal and IVF prediction. Technologies such as machine learning, deep learning, and analytics of omics data have played a major factor in compounding these developments. Additionally, Infertility remains a significant challenge in India, causing immense social and economic strain on couples. In vitro fertilization (IVF) offers a solution, but success rates vary considerably. Determining the optimal day for embryo cryopreservation is not an easy feat, yet it can significantly impact live birth rates. By enhancing IVF predictability, including the optimal day for embryo cryopreservation, this project aims to significantly improve success rates for Indian patients. The strong performance metrics, such as high accuracy, ROC AUC, and R2 scores, highlight the robustness and reliability of the models. These models not only help couples by reducing the emotional and financial burden associated with infertility but also assist clinicians in figuring out the optimal day for cryopreservation, making the process easier and more efficient. This will foster a positive socio-economic impact on couples and families specifically in the Indian context.

Keywords: Artificial Intelligence (AI); Reproductive Health; Fertility Optimization; In vitro fertilization; Precision Medicine

IT-12

Complement Regulatory Protein Regulation in Human Papillomavirus-Induced Cell Carcinogenesis

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Innate immune responses including complement protein activation and complement protein regulation on host epithelial cells play a pivotal role in cancer development. We have previously demonstrated the role of complement regulatory proteins (CRPs) in endometrial cancer where we observed overexpression of CRPs in endometrial tumor tissues compared to benign tissues. CRPs are not only important for immune activation and/ or responses but also favourable targets for cancer therapy. High-risk Human papillomavirus (HR-HPV) infection in women remains a challenge worldwide due to high burden of cancer in women.This study aimed to evaluate the expression pattern of CRPs, CD46, CD59, and CD55 in HPV-positive (HPV+) & negative (HPV-) cervical cancer cell lines in search of a reliable differential biomarker. We analysed the expression of CRPs in HPV 16-positive SiHa cell line, HPV 18-positive HeLa cell line, and HPV-negative cell line C33a using quantitative RT-PCR, Western blotting, flow cytometry, and confocal microscopy. We observed a differential expression profile of CRPs in HPV- and HPV+ cervical cancer cell lines. The mRNA level of CD59 & CD55 showed a higher expression pattern in HPV+ cells when compared to HPV- cancer cells, However, flow cytometry-based experiments revealed that CD46 was preferentially expressed more in HPV 16-positive SiHa cells followed by HPV 18-positive HeLa cells when compared to HPV- C33a cells. Interestingly, confocal microscopy, revealed a higher level of CD59 expression in Hela cells when compared to either HPV 16-positive SiHa or HPV- C33a cells. In addition, HPV 18-positive HeLa cells expressed more CD55 expression, which was low or very weak in SiHa and C33a cells. Taken together, the study demonstrates for the first time the differential expression of CRPs in both HPV+ and HPV- cervical cancer cells, and their potential to serve as an early diagnostic marker for cervical carcinogenesis.

Keywords: Complement regulatory proteins; Human Papillomavirus; cervical carcinogenesis

IT-13

Factors Regulating Epithelial to Mesenchymal Transition (EMT) in Trophoblast Differentiation: Implications for Placental Pathologies

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Proper placental development is necessary for successful pregnancy. The main cellular constituents of the human placenta are the diverse populations of trophoblast cells. The trophectoderm layer of the blastocyst develops into mononuclear cytotrophoblast cells (CTBs) which later give rise to the invasive extravillous trophoblasts (EVTs) or the hormone producing syncytiotrophoblasts. These EVTs invade the maternal endometrium and remodel the spiral arterioles by replacing the endothelial cells. It has been documented that aberrant differentiation of the CTBs to EVTs results in inadequate placental invasion which can give rise to various placental pathologies including preeclampsia. Acquisition of invasive phenotype by EVTs indicates the involvement of epithelial to mesenchymal transition (EMT). EMT is marked by a decrease in epithelial marker gene E-cadherin (*CDH1*) and progressive increment in mesenchymal marker genes, like N-cadherin (*CDH2*), Vimentin (*VIM*) and Fibronectin (*FN1*). Using various approaches like bioinformatic analysis, in vitro trophoblast culture and use of preeclamptic placental tissue, our lab is trying to understand the precise EMT changes occurring in the trophoblast cells and the factors regulating it. Though some of the individual molecules regulating this EMT process have been discovered, the central molecular players or pathways controlling them are not clearly known yet. To identify these key molecules, a protein-protein interaction (PPI) network of the genes differentially expressed between CTBs and EVTs was generated. The hub genes identified from the PPI network corresponded to the functional annotation of the enriched hallmark pathways. Additionally, expression of the hub genes was evaluated in preeclamptic and normal placental tissues. We also analysed whether hypoxia is yet another factor regulating EMT in trophoblast cells as these cells are exposed to a hypoxic environment in the early stage placenta. Our data suggests that hypoxia induces EMT in trophoblast cells. Identification of these pathways and genes could prove beneficial for identifying useful therapeutic targets for treatment of placenta-related pathologies.

Keywords: Trophoblast; Epithelial-mesenchymal transition (EMT); Hypoxia; Hub genes

IT-14

Less is More in the Treatment of Breast Carcinoma

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The paradigm of breast carcinoma treatment has evolved significantly, embracing the principle that "less is more." Historically, radical surgical techniques, such as the Halsted mastectomy, were the gold standard, aiming for extensive disease removal. However, advancements in surgical oncology have facilitated the transition to breast-conserving surgeries (BCS), offering equivalent oncologic outcomes while reducing physical and psychological morbidity. Similarly, radiation therapy has undergone remarkable progress. Traditional protocols requiring 5-6 weeks of daily fractions have been replaced by hypofractionated schedules, enabling treatment completion in as few as 5 days with fast-forward techniques. Recent advances in imaging, contouring, and computerization have further refined these approaches. High-resolution imaging modalities such as multiparametric MRI, contrast-enhanced mammography, and PET-CT now provide precise tumor localization and characterization. These advancements allow better delineation of tumor margins and identification of critical structures, ensuring more accurate targeting during surgery and radiation therapy. In radiation oncology, state-of-the-art contouring tools and artificial intelligence (AI)-driven algorithms have revolutionized treatment planning. Automated contouring systems enhance consistency, reduce inter-observer variability, and save time, while adaptive planning ensures treatment personalization based on tumor and tissue response. Computerization and machine learning have also improved radiation delivery techniques such as intensity-modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT), optimizing dose distribution and sparing healthy tissues. These technologies collectively reduce treatment time, minimize side effects, and enhance patient outcomes.This shift towards precision medicine, enabled by technological advancements and a deeper understanding of tumor biology, underscores the principle of achieving optimal outcomes with minimal intervention. The "less is more" philosophy heralds a new era of patient-centered, efficient, and effective breast cancer care.

Keywords: Breast carcinoma; hypofractionation; breast-conserving surgery; imaging advances; AI contouring; precision medicine.

IT-15

Unfolding of Space-Time: Translation, Transmission, Transformation

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A constellation of puzzles of endometriosis suggests that that reproductive (space) age (time)-associated disease attributed to such unfolding space-time continuum riddle, seems plausible to inhabit is not fundamental but an approximation of something deeper, and that the concept will eventually be replaced by challenges as scientists' next job to take an attempt to partially unfold this riddle. Unfolding of space-time attributing the treatment of endometriosis in certain time periods to reframing the understanding of aetio-pathobiology for further exploring inflammatory, hormonal, metabolic, and pain pathways, eventually offering for drug repurposing in aligning with the mode-of-action for the subsequent drug development to aim at diminishing pain or outcome of pregnancy. To delineate the century old research on endometriosis leaves a huge research gap that offers a challenge against a consensus that is yet to come for diagnosing, treating, managing and economising the multi-system disorder despite the innovation in medical instruments needs deeper introspection. Three thought experiments: translation, transmission, transformation contribute to the ever complicating complex consulted from fifteen years of published literature. Translation paves the way for generating the basic understanding of endometriosis lesions including extra-pelvic sites in the ectopic region. Transmission reveals that the medical history has taught clinical researchers and gynaecologists on stem cell therapies to be reasonably approachable as therapeutic alternatives to avoid the elusive diagnosis. Transformation encounters the spots for delving into identifying disease subtypes to better understand for using non-invasive diagnostic methods and non-hormonal treatments alongside rather finding the treatment pathways as a time tested protocol. Put together, these interpretations tug at the weave of unfolding of space-time itself, stretching it until it comes out of the whack-a-mole problem. Hence, probing reality at an early stage requires anecdotal wisdom to carefully manage the complication in the entire reproductive age. The entire treasure trove lies in the menstrual cyclicity-below which no one can dream of gathering data. Takeaway message is that if no alternative can be made without the menstrual cycle, perhaps the unfolding of space-time does not exist.

Keywords: Endometriosis; translation; transmission; transformation; menstrual cycle.

IT-16

Adenosine Pathway: A Promising Therapeutic Target for Cancer Therapy

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Tumor cells release high levels of adenosine triphosphate (ATP) into an extracellular environment in response to cellular stress (tissue damage or immunogenic cell death) triggering downstream signaling cascades. Hydrolysis of ATP by ectonucleotidases, CD39 (ATP -> ADP -> AMP) and CD73 (AMP to Adenosine), leads to extracellular accumulation of adenosine which elicits immunosuppressive effects on tumor-infiltrating immune cells. Adenosine is produced inside tumors as a result of rapid cancer cell turnover as well as due to stress caused by certain anti-tumor interventions, such as chemotherapy and radiation. Chemotherapy regimens may contribute to immunosuppression by elevating intra-tumoral levels of ATP in the tumor microenvironment (TME) where the enzymes CD39 and CD73 convert ATP to adenosine. Additionally, prostatic acid phosphatase (PAP) is upregulated in prostate cancer, and via its ectonucleotidase activity leads to conversion of AMP to adenosine. Adenosine binds to G-protein coupled purinergic receptors A2a and A2b (A2aR and A2bR) expressed on immune cells, and inhibits critical components of the antitumor immune response. The A2aR upregulates immune checkpoints like cytotoxic T-lymphocyte-associated protein 4 (CTLA4) and programmed cell death-1 (PD-1) protein. Additionally, A2aR signaling impairs the activation, proliferation, and cytotoxic activity of effector T cells. Stimulation of A2bR suppresses dendritic cells and macrophages by signaling through mitogen-activated protein kinase (MAPK) pathway activation, and mediates unique functions, such as cancer cell proliferation, differentiation, and dendritic cell activation and function. A2aR blockade improves antigen presentation, T cell activation, regulatory T cell function, and NK cell activity which may lead to a more robust antitumor immune response. Modulation of adenosine pathway using selective CD39/CD73 antagonists and inhibitors of A2aR and A2bR is a promising therapeutic strategy for the treatment of certain cancers. Sipuleucel-T is an FDA-approved cellular immunotherapy available for prostate cancer. However, attempts with single-agent checkpoint inhibition (CPI) have not been very successful. Targeting the adenosine axis in combination with standard chemotherapy regimens, PD-1/programmed death ligand-1 (PD-L1) or immunotherapy may have a more profound effect on activating and inducing sustained antitumor immunity in metastatic castration resistant prostate cancer. Clinical trials with novel therapeutics that manipulate various components of the adenosine pathway (CD39/CD73 inhibitors; A2aR and/or A2bR antagonists) in combination with chemotherapy, CPIs, etc. are currently being investigated and will be discussed.

Keywords: Tumor cells; tumor microenvironment; immunotherapy

IT-17

Pollution and Health: Tomorrow's Children!

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Air pollution is the presence of one or more contaminants in the atmosphere, which is injurious to human health. Exposure to these pollutants leads to inflammation, oxidative stress and, immunosuppression in cells throughout our body. Thereby, generating a risk for developing stroke, ischaemic heart disease, chronic obstructive pulmonary disease, and infertility. There is also evidence linking pollution exposure with increased risk for adverse pregnancy outcomes (i.e. low-birth weight, small for gestational age), cancers, diabetes, cognitive impairment and neurological diseases. Major disease associations have been studied with carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2). Children, and pregnant women especially are high risk groups to develop the diseases. Other factors like genetics, comorbidities and nutrition also influence an individual's susceptibility to air pollution. Our group has performed studies to investigate the effect of the filtered fraction of diesel exhaust (predominantly comprising gases) on the regulatory mechanisms of the male reproductive function by assessing sperm parameters, histopathology of testis, levels of principal hormones of HPG axis along with concentrations of xenobiotic agent specific antioxidant enzyme (GST) that govern the homeostatic regulation of testicular milieu in adult male Wistar rats. We have also studied the effect of pollution on cardiovascular protective mechanisms. We are currently studying the transgenerational effect of WBE on first filial generation males. Also ongoing projects on the role of Vitamin C and E as putative antioxidants for protection from air pollution. Through our research we hope to better understand the bio-molecular mechanisms underlying the pathogenesis and the role of therapeutic interventions to protect the population from pollution related injury and disease.

Keywords: Air pollution; male reproductive function; antioxidant

IT-18

Effect of Zumba Exercise Training on Arterial Stiffness, Pulse Wave Velocity and Serum Homocysteine Levels Among Female Adults With PCOD

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Polycystic ovarian syndrome (PCOS) is a common endocrine disorder affecting 6-15% of women of reproductive age, characterized by symptoms such as menstrual irregularities, hyperandrogenism and infertility issues. It is linked to metabolic and cardiovascular risk factors, including insulin resistance and obesity, which increase the risk of cardiovascular disease (CVD). While physical exercise has shown promise in managing PCOS symptoms and mitigating cardiovascular risks, traditional exercise programs often suffer from low engagement. Zumba offers an enjoyable alternative that may improve adherence and provide cardiovascular benefits. Preliminary studies indicate that Zumba can enhance cardiovascular fitness and reduce metabolic risks; however, its specific impact on vascular health in PCOS needs further investigation. The study aimed to assess the impact of Zumba exercise training on important health indicators in women with PCOS, specifically targeting arterial stiffness and pulse wave velocity (PWV). The findings could help develop non-pharmacological management strategies to enhance health outcomes for this population. A total of 54 female adolescents aged 18-25 years participated in a 12-week structured exercise training program that included aerobic and resistance exercises. Pre- and post-intervention assessments were conducted to measure arterial stiffness using PWV, along with serum homocysteine levels measured through blood samples. Statistical analyses were performed to evaluate the changes in these parameters following the intervention. Post-exercise training, significant reductions in both arterial stiffness and PWV were observed ($p<0.01$). Additionally, serum homocysteine levels decreased significantly after the intervention ($p<0.05$). The results indicate a positive correlation between improved physical fitness from exercise training and reduced arterial stiffness as well as lower homocysteine concentrations. Regular exercise training significantly decreases arterial stiffness and serum homocysteine levels in female adolescents. This indicates that encouraging physical activity is crucial for improving cardiovascular health during this developmental stage and may help reduce future cardiovascular risks and infertility concerns in this group.

Keywords: PCOD; aerobic exercise training; serum homocysteine levels; arterial stiffness; pulse wave velocity.

IT-19

Translational Cancer Research, discovery & Innovations Challenges

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India is ushering into the next decade as a country of "cancer epidemic" with a growing number of cancer cases. While the expected number of incident cancer cases in 2020 was approximately 14 lakh, this is projected to double in the next two decades and the majority of them (50%–70%) are still among the preventable cancers. The problem of newer cancer treatment modalities are multifaceted with challenges arising not only out of the cancer burden but also from several other issues. Especially, translational cancer research faces many challenges, including, lack of coordination among research and clinical teams that may not be well connected. There may not be enough funds for programs and ideas at critical stages of research. Also, at times there may not be enough new ideas to design clinical trials. Moreover, cancer is biologically complex and diverse, which makes it difficult to research. There may be insufficient or non supportive infrastructure, including regulatory issues. Yet another aspect which needs attention is that there may be gaps between translational cancer research and the results of prevention strategies. However, we need to have a holistic perspective toward finding a long-term solution to these issues and the key to this lies in investment in terms of capital and time in cancer research and more so "Translational Cancer Research, discovery & innovations." The impact and whole perspective should be discussed in detail.

Keywords: Cancer epidemic; Translational cancer research; Clinical trials

IT-20

Interaction of Melatonin, Proteins, and Clock Genes in Polycystic Ovarian Syndrome rats : A New Insight For Novel Therapeutic Intervention of PCOS

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The present study investigates molecular and systemic interaction of various clock genes with proteins, melatonin, and reproductive hormones receptor to decipher the molecular mechanism of exogenous melatonin in rat model of polycystic ovarian syndrome. Twenty-four female Wistar rats were procured, with 12 subjected to constant light for 60 days, while the remaining 12 were divided into control and melatonin-treated groups, each comprising 6 rats. Confirmation of PCOS involved observing diestrus phase in vaginal smears and identifying more than two ovarian cysts in histological sections. Six PCOS rats received melatonin supplementation (200µg/100gm BW) for 21 days. Following sacrifice, serum was collected for hormonal analysis, and ovary and oviduct samples were preserved for RNA isolation and subsequent quantitative real-time PCR. Hormonal analysis indicated significant alterations, including elevated LH/FSH ratio, increased testosterone and cortisol levels, and decreased estradiol, progesterone, and melatonin levels ($P \leq 0.05$, $P \leq 0.01$, $P \leq 0.001$, respectively). PCR results revealed disrupted expression of clock genes (*Bmal1, Per1, Cry1*) in both ovary and oviduct tissues, with elevated *Bmal1*expression noted in PCOS rats. Melatonin receptor *Mt2* expression was reduced in the PCOS model, while no significant changes were observed in *Mt1* expression across experimental groups. Exogenous melatonin demonstrated therapeutic potential, restoring the expression of circadian clock genes and melatonin receptors in treated rats. This study highlights the detrimental effects of constant light exposure and the beneficial role of melatonin in regulating circadian rhythms and melatonin receptor expression in the female reproductive system.

Keywords: Clock genes; circadian rhythm regulation; melatonin receptor expression; polycystic ovarian syndrome.

IT-21

Regulation of Trophoblast Development by Long Non-coding RNAs

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Trophoblast stem (TS) cells are the developmental counterpart of embryonic stem cells in the context of extraembryonic development, albeit the molecular regulation of trophoblast self-renewal and differentiation are still an evolving field of research. Disruptions in trophoblast development lead to early pregnancy loss, intrauterine growth restriction (IUGR). Non-coding RNAs play important roles during development in diverse regulatory pathways across species. Aberrant expression of various lncRNAs (Malat1, Meg8, HELLP) leads to IUGR. The dynamics and mechanism of action of lncRNAs during trophoblast development remains unexplored. In this presentation, I will elaborate on a) identification and authentication of the compendium of differentially expressed "conserved" lncRNAs in mouse TS cells and differentiated trophoblast cells; and b) unraveling the regulatory mechanism(s) adopted by a differentially regulated lncRNAs, MALAT-1. Cis-acting function of MALAT-1 on the neighboring gene Frmd8 and leads to suppression of its expression resulting in inhibition of the sheddase, ADAM17 translocation to the membrane. This manifests in decrease in various protease inhibitor expressions. This implicates the plausible mechanism by which MALAT-1 promotes trophoblast invasion. These results highlight the importance of MALAT-1 in pregnancy-associated disorders characterized by invasion insufficiency.

Keywords: MALAT-1; ADAM-17; protease inhibitor; invasion; placenta

IT-22

Prospective Direct Genetic Markers for Postpartum Anestrus in Murrah Buffaloes

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Postpartum anestrus (PPA) is a significant reproductive issue impacting the economic sustainability of dairy buffalo farming. It is characterized by a prolonged postpartum anestrus interval (PPAI) exceeding 90 days. Both genetic and non-genetic factors contribute to this condition. An analysis of 38 non-genetic variables in Murrah buffaloes under village conditions identified body condition score, parity, shelter cleanliness, and male proximity as significant factors ($P<0.0005$) associated with PPAI. However, these factors explained only 20% of the variation in PPAI and can be addressed through improved management practices. Genetic factors offer long-term solutions, with marker-assisted selection programs benefiting from functional mutations within genes over population-wide markers such as linkage disequilibrium (LD) and linkage equilibrium (LE) markers for traits like PPA, which have low heritability. To explore this, we investigated a few candidate genes and genes involved in liver and adipose tissue networks during the early postpartum period. SNP analysis revealed significant associations of PPAI with variants in *LAMA2* (c.+54997 C to A), *MEP1B* (c.+2178 G to A in 3'UTR), *GnIH* (c.-1001 A to G), and *TRHDE* (c.+444 G to C). These SNPs are functional, potentially altering gene function. For instance, the *TRHDE* SNP (c.+444 C to G) changes glutamine to histidine, likely affecting the active site, leading to elevated TRH and reduced GnRH, key hormones for ovarian dynamics. Similarly, the *MEP1B* SNP influences miRNA binding (bta-miR-2420, bta-miR-2325b, and bta-miR-453), altering serum IGF1 regulation. These SNPs hold potential as direct markers for PPA. Validation in a population of 412 buffaloes confirmed the associations for *LAMA2* and *MEP1B*. Further validation of these markers are essential in other populations to implement in future marker assisted selection. Overall, combining genetic insights with effective management strategies can improve reproductive performance and economic returns in buffalo farming.

Keywords: Postpartum anestrus; murrah buffaloes; genetic markers; non-genetic markers.

IT-23

AI-Empowered Tissue Classification

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While flow cytometry has been available for researchers and clinicians for decades to perform functional analyses on single cells and determine cellular phenotypes of large cell populations in blood, technologies to perform a similar analysis *in situ* – ie. in the tissue, the actual localization of most immune responses – are relatively new. Our research teams at TissueGnostics and Queensland University of Technology have joined forces to combine TissueGnostics' existing tissue cytometry technology platform and established knowhow with innovative AI solutions to establish The Virtual Histopathologist. This represents a tissue cytometry platform that allows to quantify immune responses where they happen – in the tissue. Tissue Cytometry permits to determine the *in-situ* phenotype of individual cells as well as histological entities, like glands, vessels or tumor foci. Applications include but are not limited to the exploration of immune responses in situ and the tumor microenvironment and/or the spatial organization of cellular subpopulations. Earlier attempts to analyse single cells in tissue have mostly been subject to visual estimation, or – at best – to manual counting for decades. To better understand the function of inflammatory cells in tumor development, type and number of inflammatory cells and their proximity to glandular/tumor structures have to be analyzed i*n-situ* and correlated with disease state. Using TissueFAXS™ Cytometry the time-consuming and error-prone human evaluation of stained histological sections can be approached with an observer-independent and reproducible technology platform, offering a high degree of automation, paired with user interaction at relevant points of the analytical workflow. Machine & Deep Learning are essential methodologies in contemporary research in general and for image analysis in particular. We will present preliminary data from the Virtual Histopathologist project on prostate cancer classification.

The TissueFAXS Cytometry platform incorporates Machine & Deep Learning algorithms. It can do end-point assays as well as live-cell imaging and time-kinetic experiments to measure enzyme activity. It also promotes tissue cytometry to a new level of quality, where complex cellular interactions, intracellular expression profiles and signal transduction cascades can be addressed on the single-cell level but still in histological context, empowering precision diagnostics.

Keywords: AI; Cytometry; histopathology; *in-situ* phenotypes; Single Cells phenotype; Tissue classification

IT-24

Bridging the Gap Between Biologists and Data Scientists: Where are We Heading? Reflections From Our Case Studies

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Post COVID-19 times has ushered a fierce competition to deliver, be it vaccine or funding or publication. As researchers, we have a fair conception to be guided by reasons not emotions amid 'publish or perish' adage. On the other hand, multitasking research and publishing has become a noticeable goal, but combining these tasks over time has become the need of the hour. In today's reserved funding situation, many early/mid-career researchers face a daunting task to establish and develop their research programs, for example starting their own labs crowdsourcing or obtaining funds from their previous associations/host institutions and publishing it. But to what extent are we trying to preserve the fairness or integrity of science? I would like to draw your attention to 'Hippocratic Oath for Scientists', which would ensure the research vitality in the best interests of science to sustain excellence. Towards this, the talk would delve on how the three Cs, *viz.* Consistency, Continuity and Credibility augur well for a successful open organization. This would invariably bring successful Collaborations, Convergence, and importantly Control over mind to the fore. The growth of an individual or organization depends on fostering commitment to open culture, net neutrality and universal access to information in education and science fields. So, it is the Collaborative index (C-index) that matters. Are we ready?

The second part of my talk would be on the CA Prostate Consortium of India (CAPCI) that I founded. As Prostate Cancer (PCa) burgeones, our recent comprehensive bioinformatics analysis confirmed some characteristic known or unknown mutations from a WES study native to India. Although our study shows characteristic mutations in certain genes, an assay comprising multiple biomarkers that are differentially expressed could be attempted in the future. If this is successful, the number of biomarkers developed will depend on their validation in a large cohort of patients and the translation of these findings to clinical practice. From our study, we believe, it is decisive to understand the inherent genes and mutations responsible for PCa in India. Furthermore, an attempt was made to develop a conceptual framework for research particularly in propagating information on the causal genes and mutations responsible for PCa. Although the work was limited to a small number of samples studied, we deem this pilot work would have an impending role in understanding mutations that are of particular interest to Indian genealogy. We ask whether a small compendium of sequential data we have could infer pathogenic mutations. We will discuss our impending exome and transcriptome case studies in making. Taken Together, Are we bridging the gap between the stakeholders?

Keywords: Ethics; healthcare; prostate cancer; next-generations sequencing; exomes.

IT-25

Interplay of Ghrelin, Adiponectin and Leptin in PCOS

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PCOS is a heterogeneous disease, which is characterized by-oligo-/anovulation, hyperandrogenism and/or ovaries with multiple cysts. In the present work, three hormones' correlation with PCOS was peeped into, viz., Ghrelin, and adipokines like-adiponectin and leptin. Ghrelin is a renowned peptide, with its well-known association with appetite, metabolism, energy balance and weight regulation. Adiponectin, finds its place as the most abundant adipocytokine, mainly secreted by the visceral fat cells. Leptin is a fat cell-derived hormone that promotes a shift from carbohydrate to fat oxidation and regulates glucose homeostasis. In this study, blood samples of the patients coming to the O.P.D. of Sir Sunderlal Hospital, BHU, Varanasi were taken and the serum was isolated and these hormones were tested using the ELISA kits. Leptin levels were significantly higher in the PCOS group (mean=25.33 ng/mL, SD=5.99) compared to controls (mean=11.16 ng/mL, SD=3.24). Adiponectin levels in our study were significantly lower in the PCOS group (mean=2.93 mcg/mL, SD=1.73) compared to controls (mean=21.44 mcg/mL, SD=5.11). Ghrelin level was also lower in the patient with PCOS as compared to the controls. Ghrelin and adipokines, including leptin and adiponectin, play significant roles in metabolic processes and have been implicated in the pathophysiology of PCOS. In the present PCOS patients, leptin positively correlated with BMI, WHR, insulin, and insulin resistance, while ghrelin was associated with serum testosterone levels. By examining these adipokines, this study sought to elucidate potential biomarkers that could enhance our understanding of PCOS and aid in its management.

Keywords: Ghrelin; adiponectin; leptin; PCOS.

IT-26

Gut Microbiota-derived Trimethylamine N-Oxide: A Novel Target For the Treatment of Preeclampsia

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Pre-eclampsia (PE) is the most common complication of pregnancy and seriously threatens the health and safety of the mother and child. Studies have shown that an imbalance in gut microbiota can affect the progression of PE. Trimethylamine N-Oxide (TMAO) is an intestinal microbiota-derived metabolite that is thought to be involved in the occurrence of PE; however, its causal relationship and mechanism remain unclear. In this study, to assess the causal relationship between gut microbiota dysbiosis and PE, we transplanted fecal samples from patients with PE into mice as donors and matched healthy controls. Following induction of PE FMT from control animals with and without TMAO inhibitor 3,3-dimethyl-1-butanol (DMB), was administered to all the pregnant mice. The results of the FMT experiment revealed that mice that received fecal microbiota transplantation from patients with PE developed typical PE symptoms and increased oxidative stress and inflammatory damage, both of which were reversed by 3,3-Dimethyl-1-butanol (DMB), a TMAO inhibitor, which also improved pregnancy outcomes in the model mice. Similar results were obtained in the classical NG Nitroarginine methyl ester (L-NAME) induced PE mouse model. Mechanistically, TMAO promotes the progression of PE by regulating inflammatory and oxidative stress-related signaling pathways, affecting the migration and angiogenesis of vascular endothelial cells, as well as the migration and invasion of trophoblast cells. Results reveal the role and mechanism of gut microbiota and TMAO in the progression of PE, provide new ideas for exploring the pathogenesis and therapeutic targets of PE, and determine the potential application value of TMAO as a target for PE intervention.

Keywords: Pre-eclampsia; gut microbiota; TMAO; FMT; inflammation.

IT-27

Unlocking the Future of Fertility: Advancements in Genomic Testing for Reproductive Genetics Research

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Genomic testing is rapidly transforming reproductive medicine, offering significant opportunities for couples facing fertility challenges. By uncovering the genetic factors that influence fertility, these advanced technologies are providing multiple opportunities for the diagnosis and treatment of reproductive health disorders, namely, PCOS, endometriosis, recurrent implantation failures (RIFs), and recurrent pregnancy loss (RPL). Next-generation sequencing and whole-genome analysis have facilitated the identification of genetic mutations, chromosomal abnormalities, and inherited conditions that impact pregnancy outcomes. These advancements have enabled the identification of genetic risks, the customization of fertility treatments, and the provision of personalized care, ultimately improving the likelihood of successful pregnancy outcomes. Emphasizing the optimization of assisted reproductive technologies (ART), including in vitro fertilization (IVF), genomic testing has become an essential tool for couples seeking effective and targeted solutions. As genomic testing continues to evolve, it holds the potential to offer more precise, individualized treatments that reduce emotional and financial burdens while increasing the chances of ART outcomes and live birth rates. Emerging technologies will transform reproductive health research in India, offering new hope and creating innovative pathways to complete the family. The future of reproductive medicine is being shaped by genomic testing, marking a transformative shift in fertility treatment.

Keywords: Genomic testing; Reproductive medicine; Assisted reproductive technologies

IT-28

Regulation of Gene Expression by miR-34c and miR-449a During the Onset of Spermatogenesis in the Mouse Testis

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We observed dynamic changes in the expression levels of various miRNAs (miRNAs) in the mouse testes during the onset of the first wave of spermatogenesis. Two upregulated miRNAs among them, viz., miR-34c and miR-449a, invited our special attention as their aberrant expression levels have been linked with various pathological conditions in testes as well as in male infertility. The evolutionarily conserved miR-34 family members were reported to regulate various cellular processes like proliferation, differentiation, apoptosis and epithelial-mesenchymal transition. We revalidated the expression profiles of miR-34c and miR-449a during the postnatal development of testes using real time PCR. Using various bioinformatic tools, we filtered out the probable common targets of these two miRNAs from an miRNA-mRNA network created in our laboratory and their expression levels were investigated using real time PCR, western blot analysis and knock-down experiments. The results revealed a negative correlation in the expression pattern between microRNAs and its targets, specifically during the onset of the first ever mitotic-meiotic transition in the testes. Knock-down experiments in GC-1 spg cells confirmed that eleven out of the fourteen predicted target genes are bona fide targets of these microRNAs. These target genes are either regulators or downstream targets of important signalling pathways in testis. Thus, this study provides an insight into the mechanistic aspects of gene expression regulation by miR-34c and miR-449a programming germ cell development, differentiation and cell-cell interactions during the first wave of spermatogenesis in the mouse testis.

Keywords: Spermatogenesis; gene expression; microRNAs.

IT-29

Premature Ovarian Insufficiency (POI)

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Premature Ovarian Insufficiency (POI) is on the rise globally. It has been seen that its incidence was about 1% of the reproductive age group population but today in India, the incidence of POI is between 3.5 to 5%. What exactly is the reason for this increase is still not known but could be a combination of multiple factors like genetic, iatrogenic and environmental. What needs our attention is that this entity has multiple long-term consequences on the health of women and many of them also will have fertility issues. The management is tricky as it differs from age to age. Awareness regarding this and the option of Fertility preservation can play a huge role in this subset of women seeking fertility. Along with it, timely hormone replacement therapy till the age of natural menopause is a must, along with lifestyle modification can take care of the long-term health issues in these women. This lecture will discuss all these aspects in detail.

Keywords: Premature Ovarian Insufficiency (POI); fertility preservation; hormone replacement therapy.

IT-30

Sarcopenic Obesity and Elderly Health

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Sarcopenic obesity is a condition characterized by the coexistence of sarcopenia (loss of skeletal muscle mass and strength) and obesity (excess body fat), posing significant health risks in the elderly by impairing physical function, metabolic health, and overall quality of life. It results from aging-related muscle decline, physical inactivity, poor dietary habits, hormonal changes, and chronic inflammation. The condition leads to reduced mobility, increased risk of falls and fractures, higher prevalence of type 2 diabetes, cardiovascular diseases, metabolic syndrome, frailty, and elevated mortality rates. Management strategies include resistance and aerobic exercises to maintain muscle mass and reduce fat, adequate protein intake (1.2–1.5 g/kg/day), a balanced diet, medical interventions for underlying conditions, and lifestyle modifications promoting active aging. Early identification and targeted interventions are crucial for improving outcomes, requiring a multidisciplinary approach involving healthcare providers, nutritionists, and fitness professionals to mitigate disability, dependency, and chronic disease risks in aging populations.

Keywords: Dietary habits; Muscle decline; Sarcopenic Obesity; Type 2 Diabetes

IT-31

Management of Insulin Resistance in Infertility

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Obesity and insulin resistance negatively impact fertility through various mechanisms: The interaction between IR, hyperandrogenism and obesity leads to abnormal energy metabolism, impaired follicular development, abnormal oocyte quality, abnormal ovulation, impaired endometrial function and embryonic developmental arrest, increased risk of thrombosis, resulting in poor embryo quality, non-fertilization and increased risk of abortions, mitochondrial dysfunction, and apoptosis of granulosa cells. These factors result in reduced fecundity. For subfertility women, conception chances decrease by 5% for each unit increase in BMI above 29 kg/m². Main productive organelles in the oocyte cytoplasm, the main producers of ROS, and the first productive organisms exposed to oxidative stress, and are closely related to oocyte quality. IR can cause increased ROS production during oocyte maturation, causing an oxidative/antioxidative imbalance in the oocyte cytoplasm and reducing mitochondrial enzyme activity and its antioxidant capacity, which in turn impairs mitochondrial function. Insulin regulates energy homeostasis and is involved in gonadal steroidogenesis, inhibiting the production of sex hormone-binding globulin (SHBG). Insulin resistance and hyperinsulinemia are prevalent in obesity, leading to increased ovarian androgen synthesis and elevated free testosterone levels. Abnormal insulin signalling affects the hypothalamic–pituitary–gonadal axis, contributing to obesity-related subfertility. Mitochondrial Dispensing Interphase (MDI) therapy and stem cell therapy may help combat insulin resistance and enhance fertility success in affected patients. Pharmacological treatments, including metformin, have shown promise in restoring normal insulin levels and improving ovarian function. Additionally, in future emerging therapies targeting mitochondrial function may offer new avenues for addressing insulin resistance in the context of infertility. By addressing insulin resistance, healthcare providers can enhance reproductive outcomes and improve the quality of life for patients struggling with infertility.

Keywords: MDI; LH surge; corpus luteum; SHBG; gonadotropin-releasing hormone (GnRH); in vitro fertilization (IVF).

IT-32

Adolescent PCOS And Its Long Term Consequences

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Polycystic ovary syndrome (PCOS) frequently becomes manifest during adolescence, and is primarily characterized by ovulatory dysfunction and hyperandrogenism. This syndrome is heterogeneous clinically and biochemically and is associated with a spectrum of clinical features. The cause of PCOS is unknown. PCOS is a syndrome, not a disease, reflecting multiple potential aetiologies. Heredity may play a role and is usually associated with ovarian dysfunction, which causes menstrual disorders and hyperandrogenism. PCOS should be considered in any adolescent girl with a chief complaint of hirsutism or menstrual irregularity. Acanthosis nigricans, treatment-resistant acne, scalp hair loss, or hyperhidrosis may alternatively be the chief complaint, although these features are not always present. Obesity and clinical manifestations of insulin resistance are strongly associated with PCOS. Insulin resistance causes metabolic syndrome, sleep-disordered breathing (SDB), and hepatic steatosis and is an important factor in the pathogenesis of PCOS. The metabolic features of insulin resistance are common in adolescents with PCOS and are aggravated by obesity. The combination of insulin resistance and a failing pancreatic beta cell insulin response results in type 2 diabetes. PCOS in adolescents is associated with depression and anxiety as well as sleep disturbances. Distress with body appearance may contribute to these symptoms and sometimes results in disordered eating and rarely in gender dysphoria. Because of this clinical heterogeneity, it is sometimes challenging to diagnose PCOS. The diagnosis of PCOS has lifelong implications with increased risk for metabolic syndrome, type 2 diabetes mellitus, obstructive sleep apnoea, endometrial hyperplasia, and, possibly, cardiovascular disease and endometrial carcinoma. Diagnosis in adolescents is usually delayed as anovulatory cycles and associated menstrual irregularities are frequent in normal adolescents and hirsutism and acne are common during developmental phase. Recognizing and treating PCOS in adolescents is important for management of the symptoms of hyperandrogenism and abnormal menses (ovulatory dysfunction). In addition, these patients are at increased risk of developing endometrial hyperplasia and carcinoma, type 2 diabetes mellitus, metabolic syndrome, and, possibly, cardiovascular disease including hypertension and dyslipidemia.It requires an ongoing lifestyle management, emotional support and counselling, and awareness about the possibility of future infertility and/or endometrial carcinoma, early development of type 2 diabetes mellitus, dyslipidemia, hypertension, hepatic steatosis, and sleep-disordered breathing. Obesity is an aggravating factor for many of these long term issues, and diet and exercise are first-line treatment to address obesity in adolescents with PCOS. Correction of abnormal glucose tolerance and use of anti androgens also helps. Routine monitoring of blood pressure is recommended and is particularly important for those with obesity. The optimal duration of treatment has not been determined. However, treatment is continued until the patient is gynaecologically mature (five years following menarche), getting regular periods and has lost a substantial amount of excess weight.

Keywords: Polycystic ovary syndrome; Insulin resistance, Diabetes mellitus, Ovulatory dysfunction

IT-33

Green In Vitro Fertilization (IVF): Advancing Sustainability in Reproductive Medicine

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In the realm of reproductive health, in vitro fertilization (IVF) has emerged as a beacon of hope for couples facing infertility. However, as the demand for fertility treatments escalates, so does the need to address their environmental impact. This oration explores Green IVF—an innovative approach that prioritizes sustainability without compromising patient care. By examining the environmental challenges of traditional IVF and presenting actionable solutions, this discussion aims to inspire a shift toward eco-friendly reproductive technologies. Traditional IVF practices are resource-intensive, requiring significant amounts of energy, water, and consumables—many of which are single-use plastics. This results in a considerable carbon footprint and contributes to environmental degradation. Studies suggest that reproductive care accounts for a substantial portion of healthcare waste, including hazardous materials and plastics, posing long-term risks to ecosystems. Recognizing these challenges, the need for a paradigm shift in IVF practices is more pressing than ever. A key element of Green IVF is integrating renewable energy sources into fertility clinics. Harnessing solar, wind, or other sustainable energy options can drastically reduce reliance on fossil fuels. Additionally, energy-efficient laboratory technologies—such as advanced incubators that optimize temperature and resource use—further minimize energy consumption. These practices contribute to sustainability while lowering operational costs, making fertility services more accessible in the long run. Reducing plastic waste is another critical aspect of Green IVF. The medical community acknowledges the hazards of single-use plastics. Transitioning to biodegradable or reusable alternatives in laboratories, such as glass or silicone, can significantly alleviate this burden while maintaining safety and efficacy. Additionally, advancements in cryopreservation techniques offer transformative opportunities for enhancing IVF sustainability. Improved methods like vitrification and dry shipping not only increase embryo storage success rates but also streamline resource use during freezing and thawing processes. Patient education and engagement are vital to the Green IVF initiative. Patients should be informed about the environmental implications of their reproductive choices. Fertility clinics can facilitate this by integrating sustainability discussions into the patient experience, empowering individuals to make informed decisions that align with their values. Green IVF represents a significant evolution in reproductive medicine. By adopting renewable energy solutions, reducing plastic consumption, optimizing cryopreservation methods, and fostering patient engagement, we can create a sustainable framework for fertility care that benefits both individuals and the planet. This oration aims to catalyze dialogue among healthcare professionals, researchers, and patients, inspiring collaborative efforts to embrace sustainability in IVF practices. Together, we can pave the way for a responsible, compassionate approach to reproductive health that honors the well-being of future generations.

Keywords: Green *in vitro* fertilization; reproductive health; fertility.

IT-34

Infertility, Treatment and the Link to Cancer

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Ovarian, Breast, and Endometrial cancers are linked to various risk factors, including low parity, infertility, early menarche, and late menopause. The objective of this study is to evaluate the potential link between infertility and cancer in patients and to examine whether this association is due to genetic factors or the effects of treatments received. It is a retrospective, hospital-based study conducted at MHRI Hospital and Research Centre in Hyderabad from January 2019 to January 2024. The study included 105 women with endometrial cancer, 950 with ovarian cancer, and 60 with breast cancer, all of whom had a history of infertility. There were 135 patients. Our study enrolled 1,115 patients, diagnosed with ovarian (n=950), endometrial (n=105), and breast cancer (n=60). Among the cohort of Cancer patients, 135 patients reported a history of infertility, Of which 67 patients have undergone treatment with Clomiphene Citrate, ovulation induction with more than 6 cycles of which 32 (48%) conceived and 35(52%) patients did not conceive and 68 patients had undergone IVF treatment between 2-6 cycles, and of which 22 (32%) patients have successfully conceived and 46 (68%) patients did not conceive. Regarding IVF outcomes, 22 women successfully conceived following multiple cycles. This study revealed variability in reproductive outcomes, with ovulatory disorders, polycystic ovary syndrome (PCOS), and unexplained infertility identified as the most prevalent causes of infertility. The mean age at cancer diagnosis was 50-55 years for ovarian cancer, 44-49 years for breast cancer, and 55-60 years for endometrial cancer. Among the infertile patients, 10 had Male factor, 32 had ovulatory disorders, 33 had PCOS, 20 had Obesity, 16 had Endometriosis and 24 had unexplained infertility. This study highlights the complex interplay between infertility, fertility treatments, and cancer risk. A notable proportion of ovarian cancer patients reported a history of infertility, particularly those with ovulatory dysfunction, polycystic ovary syndrome (PCOS), and unexplained infertility, both of which may contribute to both infertility and an increased risk of cancer. While ovulation induction with Clomiphene Citrate and IVF yielded partial success in achieving pregnancy, infertility remained a persistent challenge for many, underscoring the variability in reproductive outcomes may be due to Genetic background. The findings suggest that prolonged infertility, particularly when associated with hormonal imbalances such as those seen in PCOS and ovulatory disorders, may elevate the risk of certain malignancies. Further research is required to explore the long-term effects of fertility treatments, particularly Clomiphene Citrate, on cancer risk. Additionally, studies should investigate the mechanisms by which infertility, especially in the context of hormonal dysregulation, may contribute to carcinogenesis, particularly in ovarian, endometrial, and breast cancers.

Keywords: Infertility: Cancer, Genetic factors, polycystic ovary syndrome,

IT-35

The Landscape of Immunoporosis and Bone Health in Post COVID-19 Era

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Acute respiratory distress syndrome (ARDS) is a severe lung injury resulting from bacterial sepsis, COVID-19, and other respiratory conditions like COPD, asthma, and cystic-fibrosis. Immune cell activation during ARDS triggers a "cytokine-storm", leading to multiple-organ-failure. Our research has already linked inflammatory immune cells and their associated cytokines (IL-17, TNF-α, IFN-γ, IL-6) in enhancing bone-loss, however, the impact of COVID-19 on bone-health was unexplored. To investigate this, we developed a high-dose LPS-induced ARDS mouse-model, mimicking COVID-19 pathophysiology, to investigate its effect on skeletal-homeostasis. Our results showed increased-osteoclastogenesis (TRAP) along with reduced-osteoblastogenesis (ALP/Alizarin) in ARDS mice. Furthermore, dysregulation of osteoblast differentiation-genes (RUNX2, Osteocalcin) and osteoclast differentiation-genes (RANKL, TRAP) corroborate our above findings. Of note, 3D-microarchitecture analysis revealed significant-deterioration in femoral and lumbar-bones of LPS-induced-ARDS mouse-model. Interestingly, flow cytometry data further indicated increased CD11b+LY6G+ neutrophils in BALF, lung, blood, and bone-marrow of ARDS-mice, with elevated inflammatory-cytokines (IL-1β, IL-6, IL-17, TNF-α). Moreover, we observed that NETs released from neutrophils of ARDS-mice also enhanced osteoclastogenesis. Remarkably, emerging research links dysbiosis of gut-microbiota (GM) with inflammatory bone-loss and COVID-19 severity. Notably, we observed that probiotics (*Lactobacillus rhamnosus*-LR) significantly reduced both the pathophysiology of ARDS and its associated skeletal-damage, indicated by reduced osteoclastogenesis in LR-administered ARDS-mice. Altogether our results for the first-time highlight the role of ARDS in bone-loss, along with the novel prophylactic-role of probiotic-LR in managing both ARDS and its long-term effect on bone-health. These findings thus suggest monitoring post-COVID-19 fracture risks in infected subjects in the long run.

Keywords: Acute respiratory distress syndrome (ARDS); osteoclastogenesis; osteoblastogenesis; dysbiosis of gut microbiota; *Lactobacillus rhamnosus.*

IT-36

Awareness and Impact of Genetic Testing & Prenatal Genetic Counseling in India

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Genetic disorders pose a significant health challenge in India, with chromosomal abnormalities ranking second only to congenital anomalies in terms of disease burden. Prenatal testing is the best strategy for identifying and managing these disorders. For decades, prenatal testing has been offered to evaluate pregnancies for genetic conditions. In recent years, the number of testing options and range of testing capabilities has dramatically increased. The appropriate timing of the test and the need for pre- and post-test counselling may not be updated among the primary care physicians. There is also a considerable degree of confusion regarding the prenatal screening test to be chosen in each case, due to the availability of a number of new and advanced screening techniques, because of the risks associated with invasive diagnostic testing, research has focused on the detection of genetic conditions through screening technologies such as cell-free DNA. Screening for aneuploidy, copy number variants, and monogenic disorders is clinically available using a sample of maternal blood, but limited data exist on the accuracy of some of these testing options. However, the awareness and understanding of prenatal screening tests among pregnant women in India remain understudied. At present, there is no nationwide consensus regarding the nature and timing of these prenatal-screening protocols. Due to the absence of any definite guidelines and the additional lacunae in the awareness regarding the appropriate prenatal screening in the country, the optimum benefits of these screening protocols are not reaching the population. As the breadth of prenatal genetic testing options continues to expand, patients, clinical providers, laboratories, and researchers need to find collaborative means to validate and introduce new testing technologies responsibly. Adequate validation of prenatal tests and effective integration of emerging technologies into prenatal care will become even more important once prenatal treatments for genetic conditions become available.

Keywords: Prenatal screening test; chromosomal abnormalities; counselling; awareness

IT-37

Biochanin-A and Phloretin Alleviates Cadmium-induced Testicular Injury via Ameliorating Oxidative Stress and Activating the Nrf2/HO-1 Pathways

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Heavy metal pollution of the environment has lately been connected to escalating ecological and global concerns for public health. Human exposure has also greatly grown as a result of an inevitable rise in their use in numerous industrial, agricultural, domestic, and technical applications. The most frequent and pervasive environmental toxin that has adverse health consequences is cadmium. It is hardly surprising that natural products have made a considerable contribution to the growth of human pharmaceutical collections over time. They are the main source of innovative scaffolds for developing powerful drugs to address a variety of health ailments. Hence, the objective of this study was to examine the salutary effects of biochanin-A (BCA) and phloretin (PHL) against cadmium-induced reproductive toxicity in male Swiss albino mice. Cadmium chloride (75 ppm) was given orally in conjunction with intraperitoneal administration of BCA and PHL (50 mg/kg) respectively for a period of two weeks. It was observed that the number of non-motile sperms was higher in the cadmium intoxicated group along with a decrease in organ (testis) weight and testis somatic index as compared to the control group. Several biochemical indices were assessed and the result showed that lipid peroxidation (LPO) levels were found to increase, together with the reduced levels of glutathione s-transferase (GST), superoxide dismutase (SOD), and catalase (CAT) in the cadmium intoxicated mice. The alterations in redox homeostasis were well corroborated with the DNA fragmentation assay and altered Nrf2/HO-1 signaling. BCA and PHL mitigated the effects of cadmium-induced oxidative stress by activating the Nrf2/ARE signaling pathway and thereby suggesting potential new therapeutic or prophylactic strategy against reproductive ailments.

Keywords: Heavy metal; cadmium; biochanin-A; phloretin; Nrf2/HO-1.

IT-38

Testicular Single Cell Transcriptomic Atlas: A Key to Idiopathic Male Infertility

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The alarming decline in sperm count has become a global concern. Male infertility is a multifaceted pathological condition with diverse manifestations, ranging from total absence of testicular sperm to poor sperm/semen quality. Around 50% of male infertility is idiopathic as it stems from unknown factors (mostly non-chromosomal, epigenetic and lifestyle related abnormalities/disorders), lacking distinct etiologies and therefore remains incurable/untreatable. Spermatogenesis is a multi-step cellular process where mitotically active diploid (2n) spermatogonia differentiate into haploid (n) spermatozoa via regulated meiotic programming. An impressive progress in high-throughput sequencing technologies like single-cell RNA-sequencing (Sc-RNA-seq) has revolutionized our empathy towards understanding the molecular complexities governing testicular physiology and elucidating mechanisms underlying testicular dysregulation/disorders. We have performed meta-analysis study from available Sc-RNA-seq dataset (viz., *GEO–GSE-182786, GSE-134144, GSE-124263* etc.) to investigate the age dependent transcriptional dynamics among heterogeneous testicular cells [multiple stages of developing germ cells (Gc), Sertoli cells (Sc), Peritubular cells (PTc) and Leydig cells (Lc) etc]. Our data reveal the unique molecular identity of the spermatogonial stem/progenitor cells to meiotic spermatocytes /spermatids with their specific micro-environment deciphering the diverse developmental origins of testicular disorders/male infertility. Furthermore, meta-analyses of Sc-RNA-seq data profiles generate distinct RNA fingerprints for each testicular cell-type (at single cell resolution) and therefore serves as an essential resource to identify novel/putative biomarkers associated with multiple forms of male infertility (e.g.- *Y-Chromosome microdeletions, cryptorchidism, Klinefelter Syndrome*) and non-obstructive azoospermia (like *Sertoli cell only syndrome*, *maturation arrest* and *hypospermatogenesis* etc). Such novel biomarkers may be potentially used to investigate/identify the molecular etiologies of such disorders. In summary, our preliminary meta-analysis of Sc-RNA-seq data comprehensively suggests the necessity of constructing a human testicular transcriptional atlas for determining the molecular signature of intra-testicular micro-environment in azoospermic conditions. This will be supportive towards developing diagnostic tools and/or therapeutic treatment for some forms of idiopathic male fertility in future.

Keywords: Male infertility; Sc-RNA-seq; spermatogenesis.

IT-39

Application of Metabolomics for Development of Next Generation Semen Extender for Livestock and Improving Fertility of Semen

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The post-thaw motility and fertility of cryopreserved sperm is disappointingly low as compared to fresh sperm and it varies across species. Even after about six decades of development of egg yolk-based semen extender and semen cryopreservation technique, we could not achieve the desired level of success in fertility/conception rate of animals as about 30-50% of spermatozoa die or lose motility after semen cryopreservation. Seminal plasma has several vital components that play critical roles for survival and fertility of sperm. However, during semen dilution for cryopreservation, these vital components of seminal plasma are also diluted posing threat to life and fertility of sperm. Practically, it is difficult to find a replacement for seminal plasma as several components/metabolites of seminal plasma remain unidentified. Thus, there is a desperate need to develop a suitable species-specific semen extender for livestock based on its seminal plasma metabolite composition. With the help of metabolomics and bioinformatics tools, now it appears feasible to identify metabolites of seminal plasma that confer fertility and freezability to sperm. In the current study, an attempt was made to develop a metabolite-based semen extender for cattle and buffaloes for improving fertility and freezability of semen. The seminal plasmas of cattle and buffaloes were subjected to both untargeted and targeted metabolomics analysis using mass spectrometry. Subsequently, BUFFASOL, a novel metabolite-based semen extender for buffaloes was developed (Patent No. 546467 dated 30.07.2024) and this semen extender improved the fertility of buffalo semen by 6% as compared to the traditional semen extender. Both untargeted and targeted metabolomics of seminal plasma from high fertile (HF) and low fertile (LF) bulls revealed at least seven potential biomarkers of fertility. Similarly, both untargeted and targeted metabolomics of seminal plasma from good freezer (GF) and poor freezer (PF) bulls revealed at least 11 potential biomarkers of freezability. Using the above identified metabolite markers of fertility and freezability, a metabolite-based novel semen extender for cattle is under progress [Funded by ICAR-NASF/MA-9015/22-23 and ICAR-NIANP].

Keywords: Buffalo; cattle; fertility; mass spectrometry; metabolites; metabolomics; sperm; semen.

IT-40

Reproductive Health Status of Female: A Piece of Original Study

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Reproductive health is an important issue in any woman's life. This includes the normal experience of menarche, menstruation (healthy, hygienic and happy), fertility, freedom of choosing contraceptives, pregnancy and say in deciding the family size. Keeping above issues as major objectives, the current study was planned in Bharatpur District (Rajasthan, India). A detailed Questionnaire was prepared including the parameters pertaining to the Menarche, Age of regular menstrual cycle, Age of marriage, Fertility, Use of contraceptives, Age of first pregnancy, Type of delivery, Number of abortions and Family size. 400 women (21-45 years old) were consented and included in our study. In conclusion, a strong need was felt for reproductive health literacy to lead a normal, healthy and happy reproductive life.

Keywords: Reproductive health; menstruation; fertility.

IT-41

From Bacteriolysis to Fertility: Testicular Lysozyme-Like Proteins in Gamete Recognition - Lysozyme Binding Protein as a Novel Contraceptive molecule

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Lysozymes are essential bacteriolytic proteins widely distributed across the animal kingdom. Through evolutionary processes of gene duplication and mutation, these proteins have diversified into several forms with specialized functions. In ruminants, multiple lysozyme-like genes are expressed across various tissues, with a distinct subset found in the testis. Our research investigates one such protein, Sperm Lysozyme-Like Protein 1 (SLLP1), which has evolved from its ancestral bacteriolytic function to play a crucial role in fertilization. To understand SLLP1's molecular properties, we expressed and purified the protein using *Pichia pastoris* expression system. Structural analysis revealed that SLLP1 maintains the characteristic features of c-type lysozymes, including four conserved disulfide bonds. However, key amino acid substitutions in the catalytic site render it enzymatically inactive. Despite this loss of catalytic activity, SLLP1 retains a binding pocket structurally similar to active lysozymes, suggesting a potential role in molecular recognition during fertilization.

Molecular interaction studies, supported by *in silico* analysis, revealed that SLLP1 likely interacts with ovastacin on the oocyte surface. This interaction appears critical not only for fertilization but also for early embryonic development, as evidenced by the reduced zygote formation and significantly decreased blastocyst development observed when buffalo oocytes were treated with recombinant SLLP1. We validated SLLP1's binding capabilities using lysozyme binding protein (LBP), a bacterial protein that naturally binds to lysozymes. Through a comprehensive series of binding studies including native-PAGE, fluorescence spectroscopy, and competitive binding assays, we demonstrated that SLLP1 effectively binds to LBP. This confirmed our hypothesis that SLLP1 retained its binding functionality despite the loss of catalytic activity. The physiological significance of SLLP1 in fertilization was established through multiple experimental approaches. *In vitro* fertilization studies using a goat model showed that treatment of sperm with LBP completely inhibited fertilization, indicating that SLLP1 and its paralogues on the sperm surface are essential for sperm-oocyte interaction. These findings were further substantiated by *in vivo* studies in mice, where deposition of LBP in the reproductive tract prior to mating resulted in significantly decreased live births. These comprehensive findings, spanning structural biology, biochemical analysis, and both *in vitro* and *in vivo* fertilization studies, demonstrate that SLLP1 and its paralogs, along with their oocyte receptors, represent potential targets for fertility regulation in animals. Further, LBP could serve as a potent contraceptive molecule for blocking binding of sperm to ovum resulting in a failure of fertilization.

Keywords: Contraceptive; Fertility regulators; Lysozyme binding protein; SLLP1

YOUNG SCIENTIST AWARD

YS-1

Ameliorative Potential of Melatonin in Ovarian Dysfunction from BPS Exposure: A Focus on Key Survival and Redox Pathways

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The rise in human infertility rates worldwide has been linked to the growing exposure to environmental pollutants such as bisphenols, phthalates and organophosphates. Among these, bisphenol S (BPS) has emerged as an endocrine-disrupting chemical found in everyday items like thermal paper, canned foods, baby bottles. In the present study, we documented the possible molecular mechanisms underlying BPS-induced ovarian dysfunction and the potential protective effects of melatonin in adult golden hamsters, Mesocricetus auratus. The study involved administering melatonin (3 mg/kg BW i.p. every other day) and BPS (150 mg/kg BW orally every day) to hamsters for a period of 28 days. The results showed that BPS disrupted hormonal status, impaired ovarian folliculogenesis and reduced levels of ovarian steroids along with their respective receptors (ER alpha, TR alpha and MT-1) as well as enhanced metabolic/oxidative stress and inflammatory load. However, melatonin supplementation to BPS-treated hamsters restored ovarian physiology evidenced by an enhanced folliculogenesis and steroidogenesis along with the key markers associated with redox balance and survival, including SIRT-1/FOXO-1/Nrf2 and PI3K/pAKT axis, while enhancing the ovarian antioxidant capacity. Moreover, melatonin treatment reduced inflammation, as indicated by decreased expression of ovarian NFkB/COX-2/iNOS as well as upregulated the expression of ovarian IR/GLUT-4, thereby mitigating BPS-induced inflammatory and metabolic disturbances. In summary, the study revealed the harmful effects of BPS on ovarian function, while melatonin administration protected ovaries from these detrimental changes suggesting that melatonin could be a potential preventive treatment option for safeguarding female reproductive health compromised by environmental toxins.

Keywords: Bisphenol S; ovary; melatonin; SIRT-1/FOXO-1/Nrf2/NFkB/COX-2/iNOS; IR/PI3K/pAKT/GLUT-4.

YS-2

Genomic, Epigenomic and Environmental Contributors in Male Infertility: A Hospital-Based Case Control Study on Hypospermatogenesis Patients

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Hypospermatogenesis, a histopathological subtype of primary testicular failure, is characterized by a reduced number of germ cells, leading to azoospermia or severe oligozoospermia. This exploratory study investigates genomic, epigenomic, and environmental factors in idiopathic cases, aiming to enhance understanding of reproductive toxicogenomics and improve patient counseling before assisted reproductive treatments. We prospectively recruited 200 azoospermic males with spermatogenic failure, selecting 50 idiopathic hypospermatogenesis patients for in-depth analysis. Clinical history, blood samples, semen analysis, and reproductive hormone evaluation were conducted. Known genetic causes were excluded using XY-FISH and Yq microdeletion analysis. Whole exome sequencing, DNA methylation microarray, small RNA sequencing, inductively coupled plasma-mass spectrometry, and ELISA were performed. Genomic analysis identified rare deleterious variants in CFTR, CYP21A2, SRD5A2, LHCGR, and AR genes in 7/42 cases. Small RNA sequencing revealed differentially expressed spermatogenic miRNAs, notably miR-379-5p, miR-449a, miR-181c, miR-34b-3p, and miR-122b-3p. DNA methylation analysis identified hypo-methylation in DNMT1, MTHFR, KATNAL2, INPP5A, and BRAF, and hemi-methylation in C19orf47, PFN4, and SERPINB9P1, while SAMD9 was hyper-methylated. Environmental analysis revealed significantly high blood levels of arsenic and cadmium in patients with deleterious SNPs in MT1A (rs11640851, rs8052394; 18/50), MT1E (rs138690474; 4/50), and MT4 (rs11643815; 5/50), which regulate heavy metal detoxification. Our findings indicate that epigenomic and environmental contributors to spermatogenic failure exceed genomic factors. This study highlights the significance of multi-omics approaches in understanding male infertility by integrating genomic, epigenomic, and environmental data to uncover the molecular mechanisms underlying idiopathic hypospermatogenesis.

Keywords: Male infertility; hypospermatogenesis; single nucleotide variants/polymorphisms.

YS-3

Unveiling the Impact of Environmental Pollutants on Male Fertility: Alterations in Sperm Proteome by Seminal Polyaromatic Hydrocarbons in Idiopathic Male Infertility

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Oxidative stress (OS) is advocated to be one of the principal causes in 80% of idiopathic male infertility (IMI) patients where exposure to redox active environmental toxicants (e.g., polyaromatic hydrocarbons: PAHs) may play a role. Albeit, presence of PAHs in urine is correlated with abnormal seminogram, their occurrence in semen and the molecular mechanism(s) involved in PAH mediated sperm dysfunction is poorly understood. Being redox active, PAHs are known to induce OS which is opined as one of the major factors in the etiology of IMI. Toxic effects of PAH are mediated by ligand activated transcription factor, Aryl hydrocarbon receptor (AhR) while oxidative predominance in a cell evokes heat shock response. With this background, the present study is designed to analyse the level of PAH in the ejaculate of idiopathic infertile men and its relationship with induced OS. Seminal PAH exposome was measured by HPLC in 43 fertile donors and 60 IMI patients. Receiver operator characteristic curve was applied to find out the cut off limits. Western blot was used to analyse the oxidative modifications of proteins (i.e 4-hydroxynonenal adduct and nitrosylation) along with AhR and HSP90β. The concentration of PAH in the semen of IMI patients was significantly higher with the exclusive presence of benzo(A)pyrene above cut-off level in all patients. Induction of OS was evidenced by marked augmentation in 4-hydroxynonenal and nitrosylation, and a decline in total antioxidant defense in the spermatozoa of IMI patients. The increased GSH/GSSG ratio in patients may be an adaptive response to metabolize the xenobiotics via conjugation. The over-expression of AhR and HSP90β (as it co-localizes with AhR) were found to be overexpressed. The present findings surmise the adverse impact of environment borne PAHs exposure on sperm function in idiopathic infertility which are largely ignored in regular infertility assessment.

Keywords: Idiopathic male infertility; polyaromatic hydrocarbons; receiver operator characteristic curve; oxidative stress; 4-hydroxynonenal; protein-nitrosylation.

YS-4

Multi-Omics Strategies For Elucidation of Pathophysiology of Bacterial Vaginosis

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Bacterial vaginosis (BV) is common during a woman's reproductive years and is characterized by diminished indigenous lactobacilli and simultaneous overgrowth of vaginal pathobionts. Current understanding of BV pathogenesis is largely restricted due to its elusive etiology, variations in community composition and lack of accurate diagnostic tools. The present study aimed to elucidate the potential of multi-omics strategies in understanding BV. V3-V4 16S rRNA gene sequencing and proton (^{1}H)nuclear magnetic resonance (NMR) spectroscopy were performed on vaginal swabs obtained form 40 women with BV (mean age=30.5 years, Nugent score $\geq$7) and 40 healthy controls (mean age=30.0 years, Nugent score$\leq$3). Sequencing was performed on the Illumina MiSeq instrument to generate 0.2 million, 250 base pair (bp) paired end reads that were classified using the RDP classifier. 1D ^{1}H-NMR spectra were processed using VnmrJ and Chenomx NMR Suite was used for assignment and quantification of metabolites. Wilcoxon Rank-Sum test was performed to identify omics-based markers for BV. Integrated omics analysis was done using MetagenoNets while metabolic-pathways were identified using MetaboAnalyst. Finally, a machine learning (ML) classification-model was built and evaluated for its predictive performance. BV was characterized by abundant Fannyhessea, Eggerthellaceae, Sneathia, Dialister, Finegoldia, Gemella, acetate and formate while controls had significantly higher lactobacilli, corynebacteria, limosilocatocilli with elevated maltose and lactate. Women with abnormal discharge, odour, dysuria or dyspareunia consistently had higher *Dialister* spp. but diminished lactobacilli or *Gardnerella* spp. Pathway analysis identified 4 potential targeted pathways (impact>0.1 and p<0.01)-glycolysis/gluconeogenesis, glyoxylate/dicarboxylate metabolism, pyruvate metabolism and butanoate metabolism. A classification-model was built using 8 features-acetate, *Dialister micraerophilus*, Eggerthellaceae, *Finegoldia magna*, Lactobacillus, *Mycoplasma hominis*, Peptoniphilus, *Prevotella bivia*, *Prevotella timonensis* and Sneathia with AUC (area under curve) of 1.00. Omics-based strategies offer deeper insights into BV's complex etiology, variability and potential targets for accurate diagnosis.

Keywords: Bacterial vaginosis; multi-omics strategies; machine learning.

YS-5

Capacitation Induced AKAP3 Degradation, Promotes Sp17 Movement Towards Sperm Head, Enhances Sperm Zona-Pellucida Binding

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Prior to fertilization, spermatozoa undergo an essential maturation process called capacitation, which is vital for their ability to fertilize an egg. This process involves a series of biochemical and structural changes that occur after the sperm leave the male reproductive system and enter the female reproductive tract. Sperm contain A-kinase anchoring protein 3 (AKAP3) regulated capacitation, which are scaffold proteins that anchor PKA, Sp17 protein and several other proteins. In this study, it was found that high fertile bulls spermatozoa contains significantly (<0.05) higher abundance of AKAP3 and Sp17 protein in comparison to the low fertile bulls spermatozoa. In this study, we show that AKAP3 is degraded in deferential fertility bull spermatozoa when incubated under capacitation conditions, the degradation rate is variable in both groups of bulls. The degradation of AKAP3 was significantly accelerated by PI3 kinase inhibitor without inducing capacitation whereas, degradation significantly inhibited by erbstatin, when capacitation was induced. As AKAP3 binds to the Sp17 protein, AKAP3 degradation releases the Sp17 protein from the tail, after release which migrates towards the head of the spermatozoa. Accumulation of at the spermatozoa head Sp17 forms a ring shaped structure. We are the first who have reported this phenomenon for the first time. Migration of Sp17 towards the sperm head enhances sperm zona-pellucida binding. It was found that the migration of Sp17 towards the sperm head was significantly higher in HF bulls compared to the LF bull spermatozoa. Moreover, high fertile bull spermatozoa exhibits higher sperm zona-pellucida binding. Therefore, we conclude that AKAP3 degradation is regulated by capacitation, which releases the Sp17 protein and enhances sperm zona-pellucida binding.

Keywords: Capacitation; fertilization; proteins; spermatozoa; zona-pellucida.

YS-6

Sperm Proteomics Reveals Alterations in Fertility-Associated Protein Abundance Following FMD Vaccination in Sahiwal Bulls

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Breeding bulls used for artificial insemination require immunoprotection against bacterial and viral diseases. However, mandatory vaccinations can temporarily reduce semen quality for one to two months, a significant stressor affecting production at semen stations. The etiology of this decline remains unclear, despite documented post-vaccination phenotypic alterations in spermatozoa. The molecular alterations induced by vaccination are insufficiently characterized. Therefore, the study was designed with the objective of elucidating the sperm protein alterations to clarify the mechanisms behind the temporary reduction in semen quality post-immunization. This study, conducted at the Artificial Breeding Research Centre, ICAR-NDRI, Karnal, Haryana. Five Sahiwal bulls received a single dose of Raksha OVAC trivalent FMD vaccine @ 2 ml via deep I/m. Sperm samples were collected in two phases: before vaccination (14 days prior) and after vaccination (on the 5th, 12th, 21st, 35th, 50th, and 62nd days post-vaccination), with two ejaculates taken from each bull on each sampling day. LC-MS/MS technique was used to study the protein profile of spermatozoa to determine their differential abundance before and after FMD vaccination. Following vaccination, alterations in fertility-related proteins were observed: energy metabolism related proteins (PGPM, BPGM, MRI), motility-related proteins (SLC25A41), and sperm membrane integrity-related proteins (AGPAT3, CHDH, GBA2) showed significant downregulation up to 35 days post-vaccination. Conversely, proteins involved in acrosome reaction and sperm-egg fusion (NT5E, P4H8, EZR, CLIC1, CFL1) were notably upregulated during this period. Functional annotation revealed that oxidative phosphorylation and mitochondrial electron transport, crucial processes involving mitochondrial proteins, were downregulated, while glycolytic and pyruvate metabolic processes, key pathways involving cytoplasmic proteins, were upregulated. These changes suggest that vaccination induces stress responses in spermatozoa, prompting significant adaptations in metabolic pathways. Such alterations may adversely affect sperm function, motility, and overall fertility by altering ATP production pathways and compromising mitochondrial function under vaccination stress conditions.

Keywords: Breeding bulls; sperm proteins; semen quality; vaccination

YS-7

Transcriptome Profiling of Testis from High Salt Diet fed Mice Reveals Altered Immune Homeostasis Causing Testicular Dysfunction

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Previous studies have shown adverse impact of High-salt diet (HSD) on sperm function and male fertility. However, the molecular mechanism is not well understood. The present study aimed to know the effect of HSD on testicular gene expression to understand the molecular basis underlying such detrimental changes. For this, male BALB/c mice were fed a high-salt diet for forty-five days, and then along with the control group they were assessed for sperm parameters, and testosterone levels. Further, testicular transcriptome analysis was done and the expression of genes encoding for steroidogenesis was verified. Compared to the control group the mice fed with HSD showed significant alterations in sperm parameters-motility, count, and vitality, including morphological changes, in addition, there was also a significant decrease in the testosterone level. Transcriptome analysis of testes of HSD fed mice identified 331 differentially expressed genes with p-value < 0.05, log2 [FC] > 2. Among top DEGs, genes related to Spermatogonial progenitors, oxidative stress, inflammation, and immune response were upregulated, and genes related to germ cell development, spermatid development, and immune tolerance were down-regulated. GO analysis and KEGG pathway analysis showed processes and pathways associated with stem cell development, blood testis barrier (BTB), cell motility, testicular RAAS, energy metabolism, insulin resistance, and immune response to be preferentially enriched. Moreover, the genes related to steroidogenesis showed decreased expression, and on verifying it through Q-PCR analysis, testosterone biosynthesis genes like- Star, Cyp11a1, Cyp17a1, and 17βHSD showed similar results. Analysing the altered testicular gene expression, the study presumes that oxidative stress caused by HSD changed the immune-homeostasis environment of testis which resulted in impaired spermatogenesis. Further, the decrease in steroidogenesis and deregulated energy metabolism are also the factors associated with testicular dysfunction. The study reveals the significant role of diet in regulating testicular function and male fertility.

Keywords: Sperm function; testosterone; transcriptome; spermatogenesis; male fertility.

YS-8

Male Circulatory Phthalate Levels in Fertile and iRPL Couples and Their Correlation with Semen Parameters, Sperm DNA Fragmentation and Methylation

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Recurrent pregnancy loss (RPL) is the spontaneous loss of two or more pregnancies before 20th weeks of gestation. ~50% RPL cases are still deemed idiopathic (iRPL). Phthalates are known Endocrine Disruptors and are ubiquitously present in our environment. They are known to affect spermatogenesis, leading to poor sperm and embryo quality. The role of circulatory phthalates in male factor RPL pathology has not been investigated. Hence, we aimed to explore any association of increased phthalate exposure in both partners of iRPL couples as compared to fertile couples. This is a case-control study with the Control group (fertile couples; n=50 couples) and the iRPL group ($\geq$ 2 first trimester RPL; n=70 couples). Levels of parent phthalates DEHP, DEP; and their metabolites MEHP ,MEP were estimated in blood serum by LC - MS /MS method .We observed that in iRPL men ,serum MEP levels were significantly higher .A subset of iRPL men also had higher DEHP ,MEHP ,DEP levels . In iRPL women ,serum MEHP and DEP were found to be significantly higher .We carried out correlation analysis of male phthalate levels with semen parameters .We noted significant negative correlation of MEP with sperm motility and MEHP with sperm morphology .We estimated sperm DNA fragmentation index by TUNEL assay and 5-mC levels by ELISA .Male serum MEP levels were significantly correlated with sperm DFI and 5-mC levels. The metabolic enzymes UGT1A1 and CP11A1 were also estimated in blood serum of male partners by ELISA method. Both enzymes were found to be significantly lower in the iRPL group. Upon correlation analysis, DEP and MEP were contrastingly associated with UGT1A1 levels and MEP was found to be negatively correlated with CP11A1 levels. This study showed that higher phthalate levels are associated with iRPL and with poor semen parameters, higher sperm DNA fragmentation, lower sperm 5-mC levels and alterations in metabolic enzymes.

Keywords: Idiopathic recurrent pregnancy loss; phthalates endocrine disruptors; semen parameters; sperm DNA fragmentation; sperm methylation.

YS-9

Supplementation of Low-Density Lipoprotein (LDL) the Tris Based Semen Extender Improves the Post Thaw Semen Quality in Boer Buck

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Goat semen contains phospholipase A2 and SUB III enzymes, which react with egg yolk to form sperm-toxic compounds, limiting its use in semen extenders. While low egg yolk levels and seminal plasma removal have been explored to improve post-thaw semen quality, both approaches have limitations. Since low-density lipoprotein (LDL) in egg yolk protects sperm from cryo-injuries, this study evaluated the effect of LDL supplementation in a Tris-based extender on Boer goat semen cryopreservation. LDL was extracted from hen egg yolk and used in the experiment. Six healthy breeding Boer bucks (2–3 years old) from the DUVASU Goat Research and Training Center were used. Semen was collected twice weekly using an artificial vagina, and samples with >85% live sperm, >80% progressive motility, and <2% abnormalities were selected. The semen was divided into seven groups: C (control, 10% egg yolk), T-1 (20% egg yolk after seminal plasma removal), T-2 (8% LDL replacing egg yolk), T-3 (2.5% LDL + 10% egg yolk), T-4 (5% LDL + 10% egg yolk), T-5 (7.5% LDL + 10% egg yolk), and T-6 (10% LDL + 10% egg yolk). Diluted semen was equilibrated at 4°C for 4 hours, cryopreserved, and stored at -196°C for 7 days before evaluation. Post-thaw analysis revealed that T-3 and T-4 had significantly ($p \leq 0.05$) higher live sperm percentages than other groups. T-3 exhibited the highest total and progressive motility, mitochondrial transmembrane potential, and intact acrosome sperm count. Path velocities (VCL, VAP, VSL) were significantly higher in T-2, T-3, and T-4, while T-3 and T-4 showed superior kinematic parameters (LIN, STR, ALH) and membrane fluidity. T-3 had the lowest DNA fragmentation index (DFI) and apoptotic cell population. Antioxidant enzyme analysis showed significantly higher SOD levels in T-3 and T-2, while catalase activity was highest in T-3, T-4, and T-2. Malondialdehyde (MDA) levels were lowest in T-3, followed by T-4 and T-2, indicating reduced oxidative stress. The percentage of ROS-negative viable sperm was significantly higher in T-3 and T-2. In conclusion, supplementation with 2.5% LDL in a Tris-based extender with 10% egg yolk (T-3) significantly improves post-thaw semen quality in goats, making it a viable option for semen cryopreservation.

Keywords: Semen extender; low density lipoprotein; Boer bucks; egg yolk

YS-10

Histological Changes in Epididymis of Male Albino Rats Treated with Apamarga Kshara Extract of Achyranthes aspera

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The plant *Achyranthes aspera* Linn belongs to the family Amaranthaceae, locally known as Aghada or Chirchita and in Sanskrit it is called as Apamarga is a well-known medicinal herb plant found as a weed throughout India. This study examined the effect of Apamarga Kshara (Drug) extract of the whole plant of *Achyranthes aspera* on Epididymis of male albino rats. The rats were allocated into four groups and orally administered Apamarga kshara extract at a dose of 1g/kg/day for periods of 7, 14, and 21 days, and normal saline was administered to the control group rats. On the 8th, 15th and 22nd days of the autopsy, the treated and control group animals were sacrificed, Epididymis were dissected out and their weights were recorded. The oral intake of Apamarga kshara extract of *Achyranthes aspera* in the treatment group resulted in slight reduction in the weight of epididymis. Histological Microscopic evaluation revealed epididymis showed significant reduction in epithelial height, Slight degenerative and structural alterations with minimal sperm were seen in 7 and 14 days treated group, cribriform change notice in the lumen with devoid of spermatozoa in 21 days treated group as compared to the control group. It can be concluded that the antifertility effect of Apamarga kshara observed in this study impacted the structural and functional integrity of the epididymis.

Keywords: *Achyranthes aspera*; histology; epididymis; spermatozoa; male rats

YS-11

Genomic Instability, Immune Response, and Therapeutic Approaches in HPV-Associated Cervical Cancer

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Cancer is a disease characterised by genomic instability arising from structural alterations and point mutations, contributing to tumour progression. Cervical cancer is the second most common cancer among women in India, primarily caused by Human papillomavirus (HPV). According to the 2023 Indian HPV factsheet, HPV-related cancers had a crude incidence of 123,907 and a mortality rate of 77,348. Nearly all cervical cancers and a significant proportion of anogenital and oropharyngeal cancers are linked to HPV infection. The immune system relies on immune surveillance to detect and eliminate cancer cells. T-cell activation, essential for this process, involves two signals: the engagement of the MHC-peptide complex and co-stimulatory molecules (CD28) binding to ligands (CD80/CD86) on antigen-presenting cells, prompting T-cell proliferation and cytokine release. Cytokines modulate immune responses, and increased Th1-type cytokines aid in HPV clearance. However, polymorphisms in cytokine genes can alter cytokine levels, impacting susceptibility to HPV infection and cervical cancer progression. Our previous research focused on single nucleotide polymorphisms (SNPs) in co-stimulatory molecule ligands (CD86) and cytokines among histo-pathologically confirmed cervical cancer cases, HPV-infected women, and Healthy uninfected controls. Analysis of vaginal swabs of control samples indicated higher bacterial vaginosis prevalence in women using intrauterine devices. Contrary to expectations, candidiasis was less prevalent. Notably, contraceptive use was low (23.2%) in the studied population, with tubal ligation being the most common. Genotyping revealed two significant SNPs (IL-6 -174G/C and TGFβ 25G/A) associated with cervical cancer. In IL-6 -174G/C, the 'C' allele allowed the transcription factor NF1 to bind, suppressing IL-6 expression. IL-6 levels correlate with disease progression and could serve as a prognostic marker. HPV prophylactic vaccines successfully prevent about 90% of HPV infections worldwide in HPV naïve individuals. However, the vaccines have little scope for the patients who are already infected. So, the current work extended this research, focusing on therapeutic vaccines targeting HLA Class I-restricted HPV16/18 epitopes. Computational docking and immunogenicity assessments identified neoepitopes inducing CD8+T-cell responses, bridging computational predictions and therapeutic potential for HPV-related cervical cancer.

Keywords: CD86; cytokines; immunotherapeutic; Human papillomavirus (HPV); docking; HLA; CD8+T cells.

YS-12

Decoding Metabolomic Shifts from Pre-Ovulation to Ovulation

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The Oviduct plays a vital role in reproduction by supporting oocyte maturation, sperm transport, fertilization, and early embryonic development. The biochemical composition of oviductal fluid (OF) varies throughout the estrous cycle, with the preovulatory (PreOV) and ovulatory (OV) phases being critical for fertilization. Understanding the metabolic landscape during these phases offers insights into biochemical conditions supporting oocyte maturation and sperm behavior, including motility and capacitation. Identifying metabolites linked to successful fertilization could enable targeted interventions to enhance ART outcomes and improve conception rates. To investigate the metabolomic profiles of oviductal fluid OF samples were obtained by flushing the oviducts of female Wistar rats with regular estrous cycles during the PreOV and OV phases. The OF was then subjected to phase separation using a metabolite, protein, and lipid extraction protocol (M-PLEx), resulting in the separation of hydrophilic and hydrophobic fractions. The hydrophilic fraction was analyzed using HILIC, while the hydrophobic fraction was resolved using RPLC, and detected by LC-MS/MS in both positive and negative ionization mode. A total of 2,500 metabolites were detected in OF samples during the PreOV and OV phases. Notable differences were identified in 525 metabolites, with significant alterations in levels between the two phases ($p < 0.01$; fold change > 1.5). An in-depth investigation into their functions revealed that some serve as odorant receptor agonists which were increased during ovulation, while some others have been reported to play a role in sperm functions such as capacitation and chemotaxis. Understanding the specific mechanisms by which these metabolites influence reproductive processes could provide valuable insights into fertility regulation. These findings contribute valuable insights into the metabolome of oviductal fluid during the PreOV and OV phases, offering important implications for understanding fertility and advancing ARTs.

Keywords: Oviduct fluid; pre-ovulatory; ovulatory; ART.

ORAL PRESENTATIONS

OP-1

Expression Analysis of Oxidative Stress Related Genes and Associated miRNAs in Idiopathic Recurrent Pregnancy Loss

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Recurrent Pregnancy loss (RPL) affects 0.5-3% of couples planning to conceive. After complete clinical examination, 40% cases remain unexplained, and termed as idiopathic RPL (iRPL). Recent research has linked sperm DNA fragmentation and oxidative stress to iRPL. miRNAs regulate various biological processes by inhibiting specific gene expression. Specific maternal miRNAs associated with RPL have been reported, but such studies lack paternal miRNAs in iRPL cases. The exploratory studies targeting mRNA-miRNA pairs can help to infer their role in pathophysiology of iRPL. This study aims to evaluate expression levels of oxidative stress related genes (CLU and GPX4) and selected miRNAs (miR-6817-3p, miR-9851-5p and miR-188-3p) by quantitative RT-PCR to understand their role in iRPL. The study participants were recruited from Dept. of Obstetrics and Gynecology, AIIMS New Delhi. In total, 20 semen samples were collected (n=10, each for control and iRPL). Expression analysis was performed by quantitative RT-PCR using the ΔΔCt method. Bioinformatics analysis was performed for PPI networks, functional GO annotations and enriched pathways. The expression levels of CLU and GPX4 were found downregulated by 2.94 and 2.04 fold and in hsa-miR-6817-3p, hsa-miR-9851-5p and hsa-miR-188-3p were found downregulated by 10, 25 and 20 fold respectively in iRPL compared to controls. Bioinformatics analysis disclosed interaction network partners of genes and their close association with various metabolic pathways. Since CLU and GPX4 were found downregulated, it was expected that concerned miRNAs would be overexpressed at cellular level. Contrary to this, miRNAs expression was also found downregulated. It is possible that miRNAs are showing secondary compensatory response to modified levels of mRNA at the level of transcription. These findings highlight new avenues for inquiry and offer a fresh perspective to understand regulation of oxidative stress responsive genes and their regulation by different miRNAs in iRPL.

Keywords: Recurrent pregnancy loss; microRNAs; RT-PCR; oxidative stress; DNA fragmentation.

OP-2

Lactobacillus acidophilus Derived Extracellular Vesicles (EVs) Ameliorate Dexamethasone-Induced Inhibition of Osteoblastogenesis

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Glucocorticoids are widely used anti-inflammatory steroid medications for treating various conditions, including rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), colitis, cancer, and COVID-19. However, prolonged use of glucocorticoids is known to increase the risk of osteoporosis. Glucocorticoid-induced osteoporosis (GIOP) is the leading cause of secondary and iatrogenic osteoporosis. While the role of probiotics in modulating bone health has been established, their potential in alleviating GIOP remains largely unexplored. One mechanism by which probiotics may influence bone health is through the release of extracellular vesicles. Thus, we investigated the potential of extracellular vesicles derived from *Lactobacillus acidophilus* (LA-EVs) in modulating osteoblastogenesis in dexamethasone-treated murine bone marrow mesenchymal stem cells (BMSCs). The objective of this study was to investigate the potential of *Lactobacillus acidophilus* derived extracellular vesicles (LA-EVs) in promoting osteoblastogenesis in dexamethasone-treated BMSCs. Extracellular vesicles were isolated from *Lactobacillus acidophilus* culture medium (MRS Broth) by differential ultracentrifugation and characterized by Nanoparticle tracking analysis (NTA) and Transmission electron microscopy (TEM). Effect of DEX and LA-EVs on the cell viability of MC3T3-E1 was evaluated via MTT assay. For osteoblastogenesis, murine BMSCs were cultured in osteoblastogenic medium and treated with DEX; DEX + LA-EVs. ALP and ARS staining were performed to evaluate osteoblastogenesis. DEX treatment significantly decreased the cell viability of MC3T3-E1 in a dose dependent manner while no significant changes in cell viability was observed in LA-EVs treated cells. Moreover, Osteoblastogenesis was significantly decreased in DEX treated BMSCs. Interestingly, in the presence of LA-EVs, osteoblastogenesis was significantly enhanced in DEX treated BMSCs as indicated by ALP, ARS staining and ARS quantification of osteoblast cells. Taken together, our results for the first time establish the osteoprotective potential of probiotic LA-EVs in preventing GIOP via modulating the effects of Dexamethasone on bone forming (osteoblasts) cells. Our results thereby propose probiotic EVs as a viable therapy for the management and treatment of GIOP.

Keywords: *Lactobacillus acidophillus*; extracellular vesicles; probiotics; bone health; osteoporosis.

OP-3

Bisphenol S Induced Testicular Dysfunctions: Protective Actions of Melatonin

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Bisphenol S (BPS) was chosen in place of bisphenol A (BPA) as it was less prone to leach monomers into food and drink given that BPS is typically more heat-tolerant and photo resistant than BPA. Similar to BPA, BPS exhibits complex endocrine-disrupting properties. Hence we investigated the impact of BPS on testicular functions and protective actions of melatonin in adult male mice. We documented that BPS exposure alters hormonal profile (reduced thyroid hormone profile and testosterone; elevated insulin levels) and testicular histoarchitecture. Further, BPS treatment reduces sperm quality, elevated testicular oxidative load and disrupts metabolic homeostasis. However, melatonin treatment improved hormonal and histological parameters, upregulating the expression of key testicular redox, proliferative and metabolic markers. Melatonin treatment enhanced testicular antioxidant status and reduced apoptosis. In conclusion, our study documented that bisphenol S alters testicular redox and metabolic parameters that may negatively affect male reproductive health while melatonin administration ameliorates testicular oxidative/inflammatory and energy homeostasis.

Keywords: Bisphenol S; testes; redox status; fertility; melatonin.

OP-4

Role of Melatonin in PCOS Induced Oxidative Stress and Metabolic Alterations

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Polycystic ovarian syndrome (PCOS) is a common endocrinological and reproductive disorder affecting women of the reproductive age. It is characterized by hormonal and ovulatory disturbances and often accompanied by metabolic syndrome. It may also lead to uterine dysfunctions resulting in uterine cancers. Melatonin is an indoleamine and a multi-potent molecule which acts as a powerful antioxidant and is involved in therapeutics of disorders related to metabolic syndrome. Our objective was to study the role of melatonin in PCOS induced ovarian and uterine alterations. PCOS was induced using letrozole leading to multiple cysts in the ovary, hyperandrogenism and anovulation in the golden hamster, Mesocricetus auratus. Uterine hyperplasia in the PCOS hamsters along with insulin resistant state was observed. There was increased proliferation and oxidative stress and metabolic alterations in the uterine tissues. These were ameliorated with the melatonin treatment to the PCOS hamsters. Letrozole induced PCOS condition in the hamsters leading to altered hormonal profile, anovulation, and insulin resistance. This led to increased proliferation in the uterine tissue and hyperplasia. The increased oxidative stress in the uterus caused inflammation along with altered glucose homeostasis. Melatonin decreased oxidative stress and improved hormonal and metabolic variables. We suggest melatonin to have beneficial effects in the ovarian, uterine, hormonal, and metabolic disturbances and may prove to improve PCOS led disorders.

Keywords: PCOS; melatonin; oxidative stress; metabolism.

OP-5

Contribution of Endometrial Stem Cells in Deep Infiltrating Endometriosis and Ovarian Endometrioma: A Comprehensive Analysis of Endometrial Epithelial Progenitor/Stem Cells, Mesenchymal Stem Cells and Side Populations

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Endometriosis (EM) is chronic estrogen-dependent disorder in which endometrial-like tissues grow outside of uterus mainly as Ovarian Endometriosis (OMA), Superficial Peritoneal Endometriosis (SUP), and Deep Infiltrating Endometriosis (DIE) and manifest intolerable pelvic pain, dysmenorrhea, and dyspareunia in women. Treatment strategies fail to halt the recurrence of EMs. To understand the etiology of endometriosis "stem cell origin theory" speculated that different populations of endometrial stem cells (ESCs)- Epithelial Progenitor Cells (eEPCs), Mesenchymal Stem Cells (eMSCs), and Side Population (SP) shaded during menstruation and seeded as endometriotic lesions. This study investigates which types of ESCs have a major contribution to the ectopic and eutopic endometrium in endometriosis (with/without comorbidity). The study included (i) ectopic (DIE, OMA) and eutopic endometrium (EU) from women with endometriosis (Group1, n=5), (ii) DIE, OMA, and EU from women with endometriosis and with co-morbidity of adenomyosis and/or uterine fibroid (Group2, n=14), (iii) endometrium from women with adenomyosis and/or uterine fibroid and without endometriosis (Control, n=5). Single-cell suspensions of tissue samples were subjected to 4 panels of multicolor flow cytometry- eMSCs (SUSD2), pericyte eMSCs (CD146, CD140b), SP (ABCG2), and eEPCs (N-cadherin, SSEA-1) panel. In Group1- OMA has significantly higher relative frequency of deep eEPCs compared to DIE and junctional eEPC are more prominent in the DIE and eutopic endometrium. However, in Group2- significantly higher relative frequency of eMSCs were present in endometrium compared to DIE, and pericyte eMSCs were predominant in OMA. Expression of typical MSC markers upon SUSD2+ eMSCs revealed parent population positivity varies among ectopic tissues suggesting an altered eMSCs phenotype in ectopic subtypes. The SP was significantly higher in OMA compared to DIE in Group2. This study demonstrated the distinguished stem cell composition present in Group1 and Group2 women which were predominantly dominated by eEPCs, and eMSCs respectively.

Keywords: Endometriosis; adenomyosis; uterine fibroid; endometrial stem cells; flow cytometry.

OP-6

AI-Driven Innovations in Prostate Cancer: Shaping the Future of Diagnosis and Care

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Prostate cancer (PCa) is a leading cause of cancer in men, with significant global impact. Early detection and accurate risk assessment are vital for improving patient outcomes, but challenges persist in diagnosis, treatment decisions, and disease monitoring. Recent advancements in artificial intelligence (AI), particularly machine learning (ML) and deep learning (DL), are enhancing the management of prostate cancer by offering more accurate, efficient, and personalized care. AI has shown promise in improving diagnostic accuracy, treatment planning, and prognostication, and is being applied in early detection, imaging analysis, biomarker identification, and treatment optimization. AI-driven models, especially those utilizing advanced imaging techniques like multiparametric magnetic resonance imaging (mpMRI), have demonstrated high potential in detecting clinically significant prostate tumors. By automating image interpretation, AI reduces observer variability, leading to more reliable diagnoses. AI is also being used to predict malignancy in biopsy samples, offering timely and accurate results. Furthermore, AI models integrate genomics and clinical data to improve risk stratification and predict disease progression, helping identify high-risk patients who may benefit from aggressive treatments. AI is advancing personalized medicine in prostate cancer by tailoring therapies based on individual genetic and clinical profiles, predicting responses to treatments like hormone therapy or immunotherapy. It also aids in monitoring tumor progression and detecting recurrence, enabling more timely interventions. However, challenges remain, such as data quality, the need for diverse datasets, and ensuring transparency in AI decisions. Ethical issues, including patient privacy and algorithmic bias, require careful consideration. In conclusion, AI has the potential to transform prostate cancer diagnosis, treatment, and monitoring, but further research and validation are necessary to maximize its benefits in clinical practice

Keywords: Artificial Intelligence; AI; Diagnosis; Imaging; mpMRI; Prostate Cancer;

OP-7

Evaluating Gliclazide as a Safer Alternative Treatment for Castration-Resistant Prostate Cancer via lncRNA-Mediated Androgen Receptor Interactions

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Prostate cancer, the second most prevalent type of cancer globally, necessitates focused efforts in both diagnosis and treatment. While numerous molecules such as ERG, ATM, PTEN, RB1, testosterone, and androgen receptors are implicated in the progression of metastatic castration-resistant prostate cancer (CRPC), the regulation of CRPC becomes independent of testosterone. This study investigates this transition through bioinformatic analysis, revealing critical interactions between testosterone and androgen receptors facilitated by long non-coding RNAs (lncRNAs) PRNCR1 and PCGEM1. The *in silico* analysis supports a link between testosterone and the androgen receptor through the interaction of PRNCR1 and PCGEM1. Furthermore, the study employs computer-aided drug design to evaluate the potential repurposing of anti-diabetic drugs for prostate cancer treatment. Comparative binding energy analyses identified Gliclazide as a very promising candidate to effectively disrupt the critical protein interactions mediated by PRNCR1 and PCGEM1. These findings not only elucidate the molecular mechanisms underlying CRPC progression but also propose a novel therapeutic approach by repurposing anti-diabetic drugs for prostate cancer treatment and thus suggest a relatively less harmful treatment for more effective treatments of patients as an alternative to conventional therapies.

Keywords: Androgen Receptor; Castration-resistant Prostate Cancer; Computer-aided Drug Designing; Gliclazide; Prostate Cancer; Repurposing

POSTER PRESENTATIONS

PS-1001

Effects of Increasing Estrogen: Androgen Ratio on Mouse Primary Prostate Cells

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The prostate, the largest accessory gland in the male reproductive system, secretes factors which are essential for sperm viability and function. It consists of two compartments, the epithelium and the stroma, whose interactions are essential for glandular function and homeostasis. Sex steroids, particularly Estrogen and Dihydrotestosterone (DHT), regulate the growth, differentiation, proliferation and function, and disruptions in their levels can exacerbate prostatic disease. Primary cells are an excellent model to study these interactions since they closely recapitulate the diverse genetic and morphological characteristics of the organ. Given the difficulties in acquiring human samples, animal models like mice serve as an excellent model since they exhibit structurally identical genomes and similar cellular architecture. This study aimed to investigate the effects of age dependent estrogen: androgen ratio alterations on the mice primary prostate cells. 12–14 weeks old C57BL/6 male mice were euthanized and their urogenital system was dissected. Prostate lobes were separated and processed into a single cell suspension. The cell separation was done using Percoll gradient, and characterized to determine the cell type via immunostaining. The stromal cells were cultured under increasing concentration of E2 with fixed concentrations of DHT, and their proliferation was checked using MTT assay. Additionally, the stromal and epithelial cells were co-cultured under normal and 2:1 E2: DHT ratio (20 pM E2 and 10 nM DHT) with proliferation measured using Calcein AM staining. The primary cells were successfully isolated and separated. Increasing E2:DHT ratios induced significant proliferation in stromal cells. Both stromal and epithelial cells showed significant proliferation at 2:1 E2:DHT ratio, thus highlighting the influence of sex steroids on cell interactions and proliferation. Our findings indicate that ageing associated hormonal alterations significantly alters the prostate cell physiology, potentially contributing to initiation of BPH and prostate cancer. Further research is required to investigate underlying mechanisms.

Keywords: Primary cell culture; sex steroids; prostate aging; stromal–epithelial interactions; mouse model

PS-1002

Impact of Lifestyle Factors on Semen Parameters: An Observational Study

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Over the years, sperm quality has declined alarmingly with 1 in 20 men currently facing reduced fertility. Lifestyle factors, including age, nutrition, weight, exercise, psychological stress, environmental and occupational exposures, have an influence on fertility. Current study aimed to investigate the relationship between lifestyle (sedentary/ non-sedentary) and sperm quality. A case-control study involving 20 patients was conducted, focusing on individuals who underwent semen analysis and met the inclusion criteria. Semen analysis parameters were assessed, and compared with factors like age, BMI, and the presence of healthy or overweight conditions. Statistical analysis was performed using the Mann-Whitney U test. The findings highlight that the average age of the patients in this study was 34.20 years, with an average BMI of 30.65. Also sperm count, motility, and morphology showed varied outcomes, with median sperm counts reflecting conditions such as OAT syndrome. There was notable significant difference in sperm counts between the healthy and overweight groups, with men in the higher BMI range predominantly showing oligozoospermia. However, no statistically significant differences were observed in sperm motility between the two groups. These results emphasize the complex relationship between lifestyle and reproductive health, suggesting that even individuals with healthy BMI and non sedentary lifestyles can experience fertility challenges potential stressors such as work-related anxiety, sleep deprivation, poor dietary habits, or unidentified factors. Moreover, individuals with unhealthy lifestyles, including sedentary habits, obesity, or poor lifestyle choices, are more likely to face infertility, underlining the growing interest in understanding the role of lifestyle in infertility development.

Keywords: Male infertility; lifestyle; BMI; oligozoospermia

PS-1003

Bridging Genetic and Immunotherapeutic Intersections of Ovarian and Colorectal Cancer: The Promise of CAR-T Cell Therapy

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Ovarian cancer (OC) and colorectal cancer (CRC) are among the most challenging malignancies due to their high mortality and frequent late‐stage diagnoses. While traditionally considered distinct, growing evidence highlights a genetic and molecular connection between these cancers, particularly in cases involving inherited gene mutations. Hereditary syndromes such as Lynch syndrome, characterized by mutations in mismatch repair (MMR) genes, significantly increase the risk of both OC and CRC. This shared genetic predisposition underlines the importance of integrated approaches to cancer risk assessment, early detection, and targeted therapies. Chimeric antigen receptor T (CAR‐T) cell therapy has emerged as a promising immunotherapeutic strategy for both OC and CRC. In ovarian cancer, CAR‐T cells targeting tumor‐associated antigens have shown potential in preclinical and clinical trials, with the ability to target cancer stem cells (CSCs) and enhance treatment outcomes. Similarly, in colorectal cancer, novel CAR‐T cell designs, such as those targeting NKG2D ligands, demonstrate dose‐dependent cytotoxicity, increased cytokine secretion, and robust tumor suppression in experimental models. Despite these advances, shared challenges persist, including immune evasion, cytokine‐release syndrome, and "on‐target, off‐tumor" toxicities. This review highlights the intersection of OC and CRC, exploring their genetic and molecular links while discussing the promise of CAR‐T cell therapy in addressing both malignancies. By leveraging insights from immunotherapy and genetic risk factors, future research can improve therapeutic strategies and survival outcomes for patients affected by these closely related cancers.

Keywords: Colorectal cancer; ovarian cancer; CAR‐T cell therapy

PS-1004

Exploring the Role of Zinc, Fructose, and Pumpkin Seeds in Male Reproductive Health: A Scientific Investigation Across Doses

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This study evaluated the impacts of combined supplementation of zinc, fructose, and pumpkin seeds at doses of 100, 150, and 200 mg/kg on hematological, hormonal, and reproductive parameters in a dose–dependent manner. The research aimed to explore the physiological and reproductive benefits of these bioactive components and their potential synergistic effects. Adult male Wistar rats were divided into four groups: a control group and three treatment groups receiving 100, 150, and 200 mg/kg of the zinc–fructose–pumpkin seed combination for eight weeks. Hematological parameters were assessed through a complete blood count (CBC), including hemoglobin, hematocrit, RBC count, and indices such as MCV, MCH, and MCHC. Hormonal analysis included testosterone, luteinizing hormone (LH), follicle stimulating hormone (FSH), and other metabolic markers. Semen analysis evaluated parameters such as sperm concentration, motility, morphology, and viability. Histopathological studies of testicular, renal, pancreatic, cardiac, and pulmonary tissues were conducted to assess structural changes. The treatment demonstrated dose–dependent improvements across all parameters. Hemoglobin increased from 14.2 g/dL (control) to 16.8 g/dL (200 mg/kg), with parallel improvements in hematocrit (40% to 50%) and RBC count (8.2 to 9.8 x10^6/µL). Hormonal analysis showed elevated testosterone (4.0 to 7.5 ng/mL) and LH levels (1.8 to 2.8 mIU/mL), indicating enhanced reproductive function. Semen analysis revealed increased sperm concentration (40 to 85 million/mL), progressive motility (55% to 85%), and normal morphology (75% to 90%). Histopathology indicated increased spermatogenesis, Leydig cell hypertrophy, and improved metabolic and cardiac efficiency without significant damage. The combined supplementation of zinc, fructose, and pumpkin seeds positively impacts hematological, hormonal, and reproductive health, particularly at higher doses. These findings suggest therapeutic potential for addressing anemia, hormonal imbalances, and male infertility. Further studies are recommended to confirm these benefits in clinical settings.

Keywords: Zinc; fructose and pumpkin seed supplementation; anemia; hormonal imbalance; male infertility

PS-1005

Antimicrobial Resistance in Reproductive Health: The Impact of ESKAPE Pathogens on Maternal and Neonatal Health

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AMR in reproductive health is a serious issue that has to be addressed with concerted efforts from the public, legislators, and medical experts. ESKAPE a set of six bacteria that are resistant to many drugs and are known to avoid the effects of antibiotics*: Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Enterobacter species,* since they can cause nosocomial infections and because of their well-known resistance mechanisms ESKAPE pathogens make treatment plans more difficult for diseases that are frequently linked to reproductive health. Pregnant women are more susceptible to urinary tract infections, which are frequently caused by *Staphylococcus aureus* and *Klebsiella pneumoniae*. Because of these bacteria' growing resistance, treatment regimens need to be reevaluated because traditional antibiotics could no longer be effective. These bacteria can cause serious infections that harm the health of both the mother and the newborn, infections during pregnancy may lead to negative consequences for the fetus, including gestational hypertension, pelvic inflammatory disease and pregnancy problems, in order to avoid issues like preterm labor and low birth weight, it is crucial to treat bacterial illnesses such urinary tract infections throughout pregnancy. Treatment failures linked to AMR in these infections can result in longer hospital stays and more serious health problems for both mothers and babies. Given that maternal illnesses like sepsis can have high rates of morbidity and death, the participation of ESKAPE bacteria in these infections is especially worrisome. The health of mothers and children may suffer as a result of treatment failures brought on by the growing incidence of resistant strains.

Keywords: Antimicrobial resistance (AMR); gestational hypertension; nosocomial pathogens; maternal morbidity; urinary tract infections (UTIs)

PS-1006

Exploring Yoga's Impact: Mitigating Cancer Susceptibility in Infertile Men through Yoga-Primed Serum

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Infertility impacts around 15% of couples worldwide, with male infertility associated with a heightened risk of gonadal and extra-gonadal malignancies. Contributing factors encompass oxidative stress (OS), oxidative DNA damage (ODD), reduced telomere length (TL), and genome-wide hypomethylation, which undermine genomic integrity and disrupt the regulation of tumor suppressor genes and oncogenes. As infertility is influenced by psychosomatic factors such as lifestyle, psychological stress, and social habits, mind-body interventions like yoga offer a promising alternative approach. This single-arm interventional trial assessed the impact of a 12-week yoga program on cancer biomarkers and semen quality in 40 primary infertile men (mean age: 34 ± 2.5 years). Semen and blood samples obtained before and after yoga were assessed for seminal oxidative stress (ROS, 8-OHdG), sperm DNA fragmentation index (DFI), global methylation (5mC), hydroxymethylation (5hmC), telomere length (TL), and serum myokines. A post-yoga serum was utilized to examine its effects on prostate cancer cell lines (PC-3, LNCaP) on proliferation, apoptosis, migration, and invasion. Yoga significantly improved seminal parameters, including sperm count and progressive motility. Post-yoga serum reduced cancer cell viability by 21% compared to pre-yoga serum and increased apoptotic cells ($P < 0.007$) in PC-3 and LNCaP lines. Cell invasion and migration decreased significantly ($P < 0.005$). Yoga also decreased seminal ROS, sperm DFI, and 8-OHdG ($P < 0.001$), while increasing 5mC levels and TL ($P < 0.004$). Conversely, 5hmC levels decreased. In conclusion, yoga improves genomic integrity, enhances DNA repair mechanisms, and may reduce cancer susceptibility in infertile men, providing valuable insights into the shared mechanisms underlying infertility and associated cancer risk.

Keywords: Yoga; genome integrity; infertility; yoga-primed serum; prostate cancer cell lines

PS-1007

Sleep and Circadian Rhythm Association in Infertile Males with Sperm Head Defects

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Infertility is a medical condition affecting the male or female reproductive system, characterized by the inability to achieve pregnancy after 12 months or more of regular, unprotected sexual intercourse. Male infertility often results from defects in sperm parameters. Teratozoospermia is a condition where sperm has structural defects, particularly the sperm head, containing the DNA and acrosomal enzymes essential for fertilization, can play a critical role. Lifestyle changes are a significant contributing factor to male infertility. Studies have shown that sleep patterns influence semen quality. Sleep is closely regulated by the circadian rhythm. Disruptions to the sleep can impair circadian rhythm and spermatogenesis. The sperm acrosome contains numerous proteins vital for fertilization, including the protease acrosin. Acrosin activity is critical for the penetration of the egg's protective layers during fertilization. Alterations in acrosin activity can significantly reduce fertilization success, potentially contributing to male infertility. Studies have shown that low acrosin activity is responsible for male infertility and in animal models it has been reported that acrosin activity is being regulated by clock genes involved in circadian rhythm but similar studies for human sperm are lacking. Hence this study aimed to assess sleep quality, Circadian rhythm association with acrosin activity in infertile males with sperm head defects. Two groups were studied (10–15 infertile males with teratozoospermia and 10–15 fertile controls, aged 25–40 years). Fresh semen samples were collected after 2–7 days of abstinence and analyzed according to WHO guidelines. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. Genomic RNA and RT-qPCR was performed to analyze CLOCK and BMAL1 gene expression. Acrosin activity was assessed using BAPNA substrate with color intensity measured at 405–410 nm using a microplate reader. Results of this study will help determine the possible relation between sleep, circadian genes and acrosin activity in infertile males.

Keywords: Circadian rhythm; sleep; acrosin; CLOCK

PS-1008

Cytotoxic and Genotoxic Effects of Nicotine and Protective Action of Quercetin on Antral Follicles of Goat *(Capra hircus)*

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Smoking among women of reproductive age has been more common over the past few decades. Cigarette smoking is linked to worse reproductive health, a higher chance of IVF failures, and decreased fecundity rates. One of the principle components of cigarettes is nicotine, which has diverse effects at stages of reproductive function including folliculogenesis, steroidogenesis, endometrial receptivity, endometrial angiogenesis, hormonal imbalance, and uterine blood flow. Thus, the goal of the current study was to assess the biochemical and cytotoxic effects of nicotine at 0.1, 1, and 10 mM as well as the protective effects of quercetin (10µM, 50µM, and 100µM), an antioxidant molecule, on the ovarian antral follicles of goat. The results showed histomorphological alterations including pyknotic nuclei, vacuolization, crescent-shaped nuclei, empty spaces, and several others. In a time-and dose-dependent manner, the fluorescence assay (EB/AO) differential labeling has demonstrated enhanced cell death/apoptosis as the concentration of Nicotine increases. Nicotine treatment significantly increased oxidative stress, as evidenced by decreased total antioxidant capacity (FRAP levels) and increased lipid peroxidation (MDA levels). The levels of the antioxidant enzymes also decreased following treatment with nicotine. A natural flavonoid called quercetin effectively reduces the oxidative stress and apoptosis caused by nicotine. Our results also showed that the co-administration of quercetin restored the degree of enzymatic activity. Thus, we may conclude our research that quercetin can be utilized to lessen the harmful impacts of nicotine on the female reproductive system.

Keywords: Nicotine; quercetin; apoptosis; oxidative stress

PS-1009

Kisspeptin Exerts Anti-Apoptotic Effect on *In-vitro* Cultured Preantral Follicles in Sheep

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To test the hypothesis that kisspeptin may suppress the apoptosis of ovarian preantral follicles developed *in vivo* and cultured *in vitro* by influencing the expression of anti-apoptotic (Bcl-xl) and pro-apoptotic (p53, BAK) genes was studied. RT-qPCR analysis revealed that all stages of follicles developed *in vivo* and cultured *in vitro* in TCM 199B (Group 1), TCM 199B + Kp (Group II) and Standard medium + Kp media (Group III) expressed the Bcl-xl, p53 and BAK genes in their follicular cells as well as in oocytes. In PFs' cultured in group I the Bcl-xl, p53 and BAK genes expression levels were significantly different in both cumulus cells and oocytes compared to corresponding *in vivo* grown ovarian follicles, indicating that TCM 199B media alone was unable to ape the *in vivo* situation. Compared to *in vivo* developed follicles, the pattern of anti-apoptotic (Bcl-xl) and pro-apoptotic (p53, BAK) genes expression in oocytes of follicles cultured in group II was increased and decreased respectively but failed to do so with regard to pattern of Bcl-xl, p53 genes expression in cumulus cells of cultured ovarian follicles. In group III follicles the anti-apoptotic (Bcl-xl) and pro-apoptotic (p53, BAK) genes expression pattern was significantly increased and decreased respectively in both follicular cells and oocytes especially at later developmental stages compared to corresponding *in vivo* grown follicles. It is concluded that the kisspeptin supplementation along with other growth factors and hormones was able to attenuate the apoptosis process in sheep ovarian follicles by modulating the apoptosis related genes expression.

Keywords: Kisspeptin; apoptosis; *in vitro* culture; ovarian follicles; sheep

PS-1010

Primary Amenorrhea: Unlocking the Mystery of Missing Cycles

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Primary amenorrhea (PA), defined as the absence of menarche by age 15 or three years post the larche, is a key clinical indicator of potential abnormalities in the hypothalamic–pituitary ovarian (HPO) axis, genetic defects, or structural anomalies. Common etiologies include hypogonadotropic hypogonadism, Turner syndrome, Müllerian anomalies, and androgen insensitivity syndrome (AIS). Functional hypothalamic amenorrhea, often triggered by stress, caloric restriction, or excessive exercise, represents a reversible cause characterized by disrupted gonadotropin–releasing hormone (GnRH) secretion. The diagnostic process of PA requires a multidisciplinary approach encompassing a thorough clinical history, physical examination, hormonal profiling, pelvic ultrasonography, and karyotyping where appropriate. The management strategies are aimed at the underlying cause, restoring normal endocrine function, initiation of pubertal development, and prevention of complications such as osteoporosis. For hypogonadism, estrogen replacement therapy is crucial, but surgery may correct structural abnormalities. In this case of CAIS, management challenges are highlighted by timing of gonadectomy to prevent malignancy, options for surveillance, and hormone replacement therapy. Furthermore, the psychological effect of the diagnosis also requires psychological counselling and support.

Keywords: Primary amenorrhea; hypothalamic–pituitary–ovarian axis; hypogonadism; estrogen replacement therapy; delayed puberty

PS-1011

Segmentation of Cattle Blastocysts Images Using Image Processing Algorithms

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In cattle and buffalo breeding, embryo quality assessment, particularly blastocyst grading, is for reproductive success in cattle. Traditional manual grading is time-consuming and prone to errors. To automate this, blastocyst images were collected, containing multiple blastocysts per frame.A series of noise reduction and filtering techniques were applied to enhance image quality. Non-Local Means Denoising, Bilateral Filtering, and Gaussian Blurring were utilized to reduce noise and smooth the images. Histograms were plotted for both the original and processed images to analyze pixel intensity distributions. Various edge detection techniques, including Sobel, Laplacian, and Canny, were employed to highlight different features within the images. For advanced segmentation, Felzenszwalb's graph-based algorithm was applied, and the segmented regions were colorized to create a preliminary segmentation mask. This mask was refined using Otsu's thresholding and morphological operations. The Watershed algorithm was then used to further segment the images. Contour detection was applied to identify potential shapes within the segmented image. Finally, a color map was generated for each segment, with the segmented regions colored accordingly. The segmented images were cropped into individual blastocysts, which were graded based on specific criteria related to their quality and features.

Keywords: cattle; AI; blastocyst; image

PS-1012

Higher Levels of Circular RNA, Hsa_circ_0085494 in Prostate Cancer Patients with Metastasis

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Prostate cancer, a prevalent cancer in men, is on the rise among urban Indian population. Diagnostic and therapeutic options available for prostate cancer patients are limited. Therefore, identification of new biomarkers and therapeutic alternatives in prostate tissue carcinogenesis is of great importance. Circular RNAs (circRNAs) are highly stable, single stranded closed RNA molecules that specifically bind to microRNAs and subsequently inhibit their functions. Expression of circRNAs is dysregulated in several cancers including prostate cancer. Studies have shown that circRNA hsa_circ_0085494 is highly expressed in prostate cancer tissues when compared to the normal tissue. However, whether this circular RNA plays a role in progression of the cancer to the metastatic stage is not known. The aim of our current work is to measure the expression of hsa_circ_0085494 in patients with primary and metastatic prostate cancer as well as in prostate cancer cell lines. Serum and tissue samples from patients with primary and metastatic stage prostate cancer were collected after obtaining informed consent. Androgen–independent prostate cancer cell line, PC–3, androgen–dependent prostate cancer cell line, 22Rv1, and normal prostate epithelial cell line, RWPE–1 were also used for the study. Total RNA was isolated from patient tissue and serum samples as well as from cell lines. The expression of circRNA hsa_circ_0085494 was measured using qRT–PCR using specific primers. Expression of circular RNA hsa_circ_0085494 in tissue and serum samples was higher in the 'metastatic group' when compared to the 'primary cancer group'. Interestingly, however, this trend was not seen in the prostate cancer cell lines. 22Rv1 cells showed significantly lower expression of hsa_circ_0085494 when compared to RWPE–1 while PC–3 had similar expression. Higher levels of circular RNA, hsa_circ_0085494 in metastatic prostate cancer patients suggests a possible role of this circRNA in prostate cancer metastasis.

Keywords: Prostate cancer; circular RNA; metastasis; primary cancer

PS-1013

Zinc Modulates the Stromal Cell-mediated Acinar Morphogenesis of Normal Prostatic Epithelium

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The stromal–epithelial interaction plays a crucial role in the development and homeostasis of many organs including the prostate, an accessory gland of the male reproductive system. Moreover, the development and physiology of the prostate gland largely depend on the local milieu of the sex–steroids (androgens and estrogen), and its alteration with advancing age is shown to be associated with prostatic diseases (hyperplasia and cancer). In the present study, we investigated the role of sex–steroids in conditioning the stromal fibroblast cells to modulate the acinar morphogenesis of the prostate, with and without exogenous zinc, the most prevalent micronutrient in the prostate. Prostate epithelial cells were grown in 3D overlay culture to check the effects of the conditioned media from the stromal cell–culture. Further, the role of zinc on the morphogenesis of prostatic acini was studied. A significant increase in the dysmorphic and branching structures was observed under the influence of hormonally induced stroma, however, in combination with zinc, a relative increase of the acinar structures took place. Considering the photomicrographs of epithelial cells grown in 2D under the similar aforementioned conditions, we hypothesize that the local hormonal environment and zinc modulates the prostatic acinar morphogenesis by an essential selection of the cell identity. Further studies are required to explore the molecular machinery underlying this process.

Keywords: Prostate; 3D culture; acinar morphogenesis; stromal–epithelial interaction; zinc; sex–steroids

PS-1014

Effect of Structured Yoga on Metabolic, Hormonal and Reproductive Health in PCOS

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PCOS is a complex endocrinopathy characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology. It affects 5–20% of women of reproductive age worldwide, making it a critical public health concern. Its pathogenesis involves oxidative stress (OS), mitochondrial dysfunction, inflammation, and immune system dysfunction, increasing risks for dyslipidemia, fatty liver disease, cardiovascular diseases (CVD), and type 2 diabetes (T2DM). Pharmacological treatments often yield inconsistent results with side effects, highlighting the need for alternative approaches. PCOS is a lifestyle disease that can be best managed by lifestyle modification like yoga. The objective of this study was to explore the effect of yoga on molecular, metabolic, and clinical health in women with PCOS.This case–control study with intervention involved 80 women (40 diagnosed with PCOS, 40 age and BMI matched healthy women). PCOS women underwent 12–week yoga practice (5 days/week, 1 hour/day) including physical postures (asanas), regulated breathing (pranayama), and meditation (dhyana) under a trained therapist. Clinical characteristics and laboratory biochemical (hormonal & lipid profile) data were recorded, followed by a metabolome analysis using LCMS. Additionally, mitochondrial health (integrity and respiratory chain transcript), metabolic regulation, and inflammatory transcript were assessed. Furthermore, depression severity and quality of life (QoL) were evaluated. Descriptive statistics are described as means and standard deviations. The paired–sample t–test was applied to assess changes in the outcome variables. We have observed significant improvement in anthropometric, clinical parameters, hormonal, metabolome, and lipid profiles. The metabolome analysis showed significant differentially expressed metabolites involved in the TCA cycle, mitochondrial ETC, pentose phosphate pathway, pyrimidine, and tryptophan metabolism that address key factors of pathogenesis in PCOS. Clinical improvements were observed in 33 out of 40 patients with menstrual regularity, a reduction in 12 out of 20 women with hirsutism, and conception in 8 out of 20 women. Significant improvements were also noted in mitochondrial health, metabolic regulation, and inflammatory transcript. Also, reduction in comorbid depression severity and improves QoL.Yoga showed a positive effect on OS, mitochondrial dysfunction, and inflammation. Furthermore clinical improvements in reproductive health, with improved ovulatory cycles and pregnancies. In the long term lowers the risks for dyslipidemia, fatty liver disease, CVD, and T2DM. Overall, the study demonstrates that yoga work as a polypill could be an effective, holistic intervention for addressing endocrine, metabolic, and reproductive aspects of PCOS, offering improvements in both physical and psychological well–being, with amelioration of long–term health.

Keywords: PCOS; yoga; metabolomics;mitochondrial health; quality of life (QoL)

PS-1015

Elucidating the Bioactive SHBG Inhibitors to Increase Free Testosterone Levels for Male Fertility: An *In silico* Approach

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Male infertility is on the rise and becoming a global concern affecting many couples of reproductive age group. Male infertility is characterized by low levels of free testosterone (FT). Sex hormone-binding globulin (SHBG) is a key protein that binds to testosterone, making it unavailable for biological activity. High levels of SHBG can lead to reduced free testosterone, thus affecting male fertility. The current study is based on exploring the potential of bioactive compounds from routine food items to inhibit SHBG for enhancing free testosterone levels. By using an *in silico* approach for screening various bioactive compounds from common food items, molecular docking studies were done to predict the binding affinities of these compounds with SHBG, mainly concentrating on those that showed high binding energies and favourable interactions. These compounds were further evaluated for their binding properties using the molecular simulation and visualization software such as Discovery Studio and AutoDock to assess the stability of these compounds within the SHBG binding pockets. This study gives an insight into the natural modulators of SHBG and also gives a means for the male infertility issues that can be handled through dietary means to increase the testosterone bioavailability.

Keywords: male infertility; SHBG; testosterone; bioactive compounds; molecular docking

PS-1016

A Comprehensive Study of Cervical Cancer and Associated Factor Among Women - A Case Study

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Cancer is one of the most significant global health challenges owing to its widespread prevalence, diverse forms, and complex etiology. According to the World Health Organization (WHO), cancer is one of the leading causes of morbidity and mortality worldwide. Cervical cancer is a significant public health concern, particularly in low– and middle–income countries, where awareness, screening, and treatment options are often limited. Cultural, socioeconomic, and health care factors in rural regions such as Vidarbha can influence women's access to information and medical services related to cervical cancer. This study emphasizes the necessity of targeted research to better understand the epidemiological patterns, risk factors, and challenges faced by these populations in diagnosing and addressing cervical cancer. This Study explored the epidemiological trends, associated risk factors, and obstacles related to the diagnosis and awareness of cervical cancer in rural areas of Vidarbha. The study concentrated on data obtained from the Rashtrasant Tukadoji Cancer Hospital & Research Center in Nagpur as well as discussions with several patients. Our data showed that 89.32% of patients with cervical cancer were over 40 years of age, with 34.69% aged 40–50. There is a strong association between HPV types 16 and 18 infections and cancer development, aligned with the global standards. While married individuals are more likely to be screened, 52.84% of diagnoses occur at advanced stages, with stage III being the most prevalent. Low levels of education are associated with decreased awareness and limited access to preventive healthcare services, particularly in rural areas, where sociocultural and economic factors play significant roles. The implementation of accessible HPV vaccination programs, promotion of increased awareness regarding cervical cancer, and targeted educational outreach initiatives aimed at underserved rural populations. Early diagnosis and prompt treatment are critical because many forms of cancer, including cervical cancer, can be successfully managed if identified at an early stage.

Keywords: Cervical cancer; epidemiology; risk factor; awareness

PS-1017

Analysis of Anti-cancer Activity of Orientin and Bilobalide on Prostate Cancer Cells

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Prostate cancer is the second most prevalent cancer in men and ranks as the fifth leading cause of cancer–related deaths worldwide. The prevalence varies, ranging from 5% to 10% in men aged 40, but increases significantly to 80% in men aged 70–80. Certain factors, such as age, race, family history and germline mutations have been recognized as potential risk factors. Current treatment options for prostate cancer include surgery, radiation therapy, hormone therapy, and chemotherapy. However, these options have limitations in terms of efficacy, potential side effects, and the development of resistance over time. Phytochemicals, which are naturally occurring bioactive compounds in plants, have been studied extensively for their potential health benefits, including their anti-cancer properties. Orientin and Bilobalide are the two phytochemicals known to exhibit antioxidative and antiproliferative properties, and previous research has explored their cytotoxic effects on breast carcinoma, colorectal carcinoma, gastric carcinoma, and hepatic carcinoma. This study aimed to investigate the anti-cancer effects of these phytochemicals specifically in prostate cancer cell lines. The prostate epithelial cell lines RWPE1, PC 3 and 22rv1 were cultured in their respective media. Cells were treated with different doses of phytochemicals −Orientin and Bilobalide for variable time points. Doxorubicin was taken as positive control. After treatment, cell viability and proliferation were assessed using MTT assay and IC50 values were calculated. The mechanism responsible for cytotoxic activity of these phytochemicals, was elucidated by examining their potential impact on cell proliferation, apoptosis, necrosis, and autophagy through Brdu proliferation assay, Caspase 3/7 activity assay, LDH release assay, and LC3b western blot respectively. Results of this study will help analyze the anti-cancer effect and the mechanism underlying the cytotoxicity of Orientin and Bilobalide on prostate cancer cells.

Keywords: Prostate cancer; orientin; bilobalide; antioxidants; anti cancer effect

PS-1018

Evaluation of Cell Surface Markers to Enrich Circulating Endometrial Cells from Peripheral Blood of Endometriotic Women

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Endometriosis is an estrogen-dependent gynaecological disorder identified by the presence of tissue outside the uterus that resembles the endometrium causing pelvic pain and infertility. Approximately, 10–15% of the women of the reproductive age group are affected and remain undiagnosed at the earlier stages due to lack of reliable clinical signs and symptoms. Currently, invasive laparoscopic surgery remains the gold standard method for diagnosis and although numerous biomolecules have been identified from eutopic endometrium, serum, peritoneal fluid and urine, yet no biomarkers till date shows adequate specificity or sensitivity. Recently, liquid biopsy has emerged as a great source of information for various biomolecules that lead to the detection and isolation of circulating tumor cells (CTCs) for cancer patients enabling a potential non-invasive diagnosis, and following the same idea, presence of Circulating Endometrial Cells (CECs) have also been detected from peripheral blood of endometriotic patients. Hence, in this study we evaluated the presence of CECs in patient (n=10) and control (n=8) groups, which were effectively isolated using their surface-specific markers through MACS (magnetic activated cell sorting) technology which is based on immunomagnetic beads to capture endometrial stromal cells from blood. MACS was used for the positive selection of PBMCs (peripheral blood mononuclear cells) using microbeads anti human-CD45 and the stromal cell populations were enriched using anti human-CD10 and anti human-CD105 from the blood. Further, the enrichment was confirmed by the immunofluorescence (IF) and the results were compared within patient and control groups. Our study showed the presence of CECs in peripheral blood of women with endometriosis as well as in controls and established the potential of MACS technique for isolating CECs even with very small numbers of cells. However, there still remains a crucial need for the identification and validation of cell specific markers and antibodies for endometrial stromal cells to enhance accuracy and reliability in diagnosis.

Keywords: Endometriosis; CECs; MACS; immunofluorescence.

PS-1019

Role of Nutritional Deficiencies in Reproductive Health: Impacts and Interventions

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Nutritional deficiencies pose a big threat to reproductive health, influencing a variety of disorders that affect both men and women. Essential nutrients, including vitamins, minerals, and macronutrients, play essential roles in sustaining hormonal balance, ovarian function, and gamete quality. Deficiencies in key micronutrients such as iron, zinc, and folic acid are strongly associated with infertility, recurrent miscarriages, and complications during pregnancy. For instance, iron may impair the functions of ovulations, whereas the lack of folic acid results in neural defects at infancy. Zinc involved in spermatogenesis as well as in the morphogenesis of the embryo has also proven harmful in its deficiencies. Childhood deficiency of nutrients also has long-term implications because nutritional deprivation during childhood affects reproductive development in physical maturity. Lack of adequate antenatal and postnatal nutrition may lead to disruption of ovarian follicle formation, retarding or advancing the initiation of puberty and lower ovarian reserve. For instance, vitamin D deficiency results in polycystic ovary syndrome or PCOS, decreased ovarian reserve, and damaged sperm motility and morphology. It impacts individual fertility but in turn results in big challenges in society, such as a declining birth rate, which poses health care challenges. This study explores the significance of nutritional deficiencies on reproductive health, focusing on how early-life nutrient deprivation affects the endocrine system, potentially leading to long-term reproductive challenges. It examines diet patterns, supplementation, and their results in improving fertility. Personalised nutrition plans, combined with public health steps such as education, awareness campaigns and micronutrient fortification programs, are to be taken as effective measures to limit these risks. The overall results indicate the necessity to involve clinicians, dietitians, and public health experts in all-round measures so that challenges can be addressed at both individual and community level. Access to quality diets from early childhood could significantly improve fertility and overall reproductive health worldwide.

Keywords: Nutritional deficiencies; reproductive disorders; early-life nutrition; fertility; dietary interventions

PS-1020

Biophotonic Technique of Fourier Transform Infrared (FTIR) Spectroscopy as a Novel Tool for Indigenous Pig Semen Profiling and Characterization

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Majority of the conventional methods to assess farm animal semen quality are based on general sperm characteristics. Standardization of these methods is usually difficult with results often conflicting as they depend on technique and conditions in which they are performed. In this context, a spectroscopic method for pig sperm evaluation and characterization using Fourier Transform Infrared (FTIR) Spectroscopy is presented. Attenuated Total Reflection (ATR) was used as the sampling technique which enables samples to be examined directly without any preparation. Studies on sample processing and standardization for semen profiling and characterization of pig semen were undertaken using ATR–FTIR Spectrometer (Shimadzu IRTracer–100). This technique allows non–perturbative, label–free extraction of information for diagnosis and the determination of sperm cell functionality. Both neat and processed semen samples of indigenous Agonda Goan pigs, Large White Yorkshire and Goya Crossbred pigs were used in the study. Results of study indicate that optimal spectra for indigenous pig semen could be obtained with 2cm–1 spectral resolution, 40 as scan number (n) and Happ–Genzel function as method for apodization. Important spectral regions measured were Fingerprint region (500–1,500 cm–1) for nucleic acids, sugars and Amide I/II region (1,500–1,700 cm–1) for proteins. Mid–infrared 4000–400 cm–1 (wavelengths 2.5 to 25 µm) transmission spectrum of pig sperm is found to be optimal and fast. In indigenous Agonda Goan pig semen, a distinctive pattern could be identified in the amide I/II region which corresponds to unique sperm proteins. The method can be effectively used for detailed characterization of pig semen and for determination of composition and structure of porcine spermatozoa.

Keywords: FTIR Spectroscopy; Agonda Goan Pig; pig semen; semen Profiling

PS-1021

Two Generation Reproductive and Developmental Toxicity Following Subchronic Exposure of Wistar Rats to Polyethylene Terephthalate Microplastics (PET MPs)

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This study investigated the two-generation reproductive and developmental toxicity of polyethylene terephthalate microplastics (PET MPs) in Wistar rats following subchronic exposure. The background of this research lies in the increasing concern about the potential health risks associated with microplastic pollution, particularly PET MPs, which are widely used in packaging and consumer products. The objective of this study was to evaluate the effects of PET MPs on reproductive performance, fertility, and developmental outcomes in Wistar rats across two generations. Groups of 12 male and 12 female Wistar rats were given PET MPs at 0, 300, 700 and 1000 mg/kg/day by oral gavage throughout the study period. The PET MPs is administered to parental (P) males for 70 days to elicit any adverse effects on spermatogenesis and females for 10 weeks which includes several complete oestrous cycles. The PET MPs was administered to parental (P) animals during mating, during the resulting pregnancies and through the weaning of their F1 offsprings. At weaning the administration of the PET MPs is continued to Fl offspring during their growth into adulthood, mating and production of an F2 generation, until the F2 generation is weaned. No PET MPs related clinical signs or effects on body weight or food consumption were observed in any generation. There were no changes in neurological examination such as home cage, handling, open field, sensory reactivity measurements, hindlimbs foot splay, grip strength performance and post-natal developmental changes such as pinna detachment, incisor eruption, eye opening, testes descent, preputial separation, and vaginal opening in F1 and F2 generations, or water filled multiple T-maze in the F1 generation for learning and memory test. No PET MPs related changes in estrous cyclicity, copulation index, gestation length, pup sex ratio, pup viability. The PET MPs exposure significantly affected reproductive performance, including reduced fertility, as well as developmental toxicity, including increased pup mortality and decreased pup weight. Notably, these effects were more pronounced in the second generation, indicating a potential transgenerational impact of PET MPs exposure. In conclusion, this study provides evidence of the two-generation reproductive and developmental toxicity of PET MPs in Wistar rats following subchronic exposure. The findings of this study have implications for human health risk assessment and highlight the need for further research on the potential health effects of microplastic pollution.

Keywords: Polyethylene Terephthalate Microplastics (PET MPs); transgenerational impact; reproductive performance

PS-1022

Therapeutic Effects of Chronic *Tribulus terrestris* Exposure on Reproductive Health and Behaviour in Adult Zebrafish

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Tribulus terrestris (family *Zygophyllaceae*), commonly known as puncture vine, has been used in Indian and Chinese traditional medicine for treating various conditions, including infertility. Infertility, defined as the inability to conceive after one year of unprotected intercourse, affects 8–12% of couples globally. *T. terrestris* has demonstrated potential to modulate hormonal levels, enhancing testosterone production and ovarian functions. The present study aimed to investigate the physicochemical properties of commercially procured *T. terrestris* extract tablets, assess their behavioural effects and evaluate the histological changes in the gonads of adult zebrafish (*Danio rerio*) following chronic exposure. A fish embryo toxicity test (FET) was conducted for dose estimation. Adult zebrafish were then orally exposed to standardized doses of *T. terrestris* for 21 days. Post-exposure, behavioural patterns were observed, and gonadal histological analysis was done. The finding exhibits positive effects of *Tribulus terrestris* on gonadal function in zebrafish. Male zebrafish showed enhanced spermatogenesis and Sertoli cell activity, attributed to increased GnRH and LH stimulation. Female zebrafish demonstrated improved ovarian structures. Behavioural tests revealed that *T. terrestris* reduced anxiety and exhibited a calming effect on zebrafish. Protodioscin, a bioactive compound in *T. terrestris*, was identified as a key mediator of these effects. Hence, the study concludes the therapeutic potential of *T. terrestris* in improving reproductive health and modulating gonadal function, supporting its traditional use in treating infertility. Its anxiolytic effects further expand its potential therapeutic applications. Future studies in higher organisms and clinical trials are recommended to validate and expand upon these results.

Keywords: *Tribulus terrestris*; infertility; zebrafish model; gonadal function; protodioscin

PS-1023

A Lifestyle Disorder: Regulation of Body Functioning of Men, Associated with Diabetes Mellitus and Infertility

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Diabetes mellitus (DM) is a significant public health issue, with the number of cases increasing rapidly. T2DM adversely affects various physiological systems, including reproductive health, leading to conditions such as male sexual dysfunction and subfertility. There is a notable rise in the number of diabetic men of reproductive age, with diabetes strongly associated with fertility loss. Blood glucose levels and insulin significantly influence sperm production and hence, insulin resistance or insufficiency in diabetic individuals hinders spermatogenesis. With the global diabetes burden increasing (537 million cases in 2021), the prevalence of diabetes among men of reproductive age is also expected to rise. Poor nutrition and sedentary lifestyles along with other lifestyle disorders have also gained recognition as very major determinants of the recent escalation of diabetes worldwide. In its current literature, diabetes mellitus has been extensively reported regarding systemic effects, however in reference to male reproductive system remains quite underreported. In view of this highly undervalued issue, the following poster aims at representing a correlation between the causation, progression, and damage related to diabetes mellitus by other life style disorders. We aim to focus on how lifestyle-induced diabetes may cause metabolic disruptions that impair hormonal balance, semen quality, and fertility. Understanding these correlations is crucial not only for advancing clinical research but also for public awareness of broader consequences of lifestyle choices.

Keywords: Lifestyle; diabetes mellitus; semen quality; infertility

PS-1024

Effect of Mobile Telephony on Male Reproductive Health: A Review

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Mobile telephony is not a very old phenomenon, it functions based on Electro–Magnetic –Radiation (EMR). Mobile telephony has eased communication. Almost ninety percent of work is done using mobile telephony. Therefore; use and users of mobile telephony are increasing rapidly and significantly daily. Recently, some published research studies show that mobile telephony affects the human health and reproductive system too. Percentage of Cancer and tumor cases have also enhanced significantly all over the world. In animals it is well established that Electro–Magnetic–Radiation (EMR) affects male reproductive system and fertility. Articles being published recently also suggested that over–use of mobile telephony affects the semen profile of humans. But contrary to this, some researchers have claimed that mobile telephony does not adversely affect the human male reproductive system. Therefore; this article reviews all important published research studies on the effect of mobile telephony on male reproductive system and future direction to fight this invisible environmental pollution (if it is really affecting).

Keywords: Electromagnetic radiation; mobile telephony; male reproductive system

PS-1025

Differential Expression of Exosomal miRNAs in Endometriosis: A Step Towards Identifying Diagnostic Biomarker

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Endometriosis is a chronic estrogen-dependent disorder where endometrial tissue presents the exterior of the uterine cavity that affects 10% of women of reproductive age. There is no less-invasive technique for the diagnosis of endometriosis till now, laparoscopy is the only accepted gold standard method for the diagnosis of endometriosis. Exosomes are cell-derived molecules that contain proteins or nucleic acids and play a vital role in the pathophysiology of various disorders. So, in our study, we aim to identify exosomal miRNAs as diagnostic endometriosis biomarkers. The objective of this study was to identify differentially expressed exosomal miRNAs in endometriosis. The NIRRCH Human Ethics Committee has approved the study, (Approval no 480/2022), samples were collected from Nalini Specialty Hospital Mumbai. Exosomes were isolated from serum samples and characterized by nanoparticle tracking analysis, transmission electron microscopy, and western blotting. Differential expression was carried out using small RNAseq and validation using dPCR and qPCR analysis. NTA showed a size range of 60-150 nm, similar to the reported size range of exosomes. TEM revealed a disc-like oval structure with rough shape and size and the edges were clear with a concentrated central area. The exosome marker protein HSP70, CD9, and CD63 have been demonstrated in protein lysate. Small RNA sequencing analysis has shown a total of 57 miRNAs differentially expressed between patients and control. Of these 57 miRNAs, 32 were downregulated and 24 upregulated. Out of all differentially expressed miRNAs, 4 miRNAs have been selected for further validation using dPCR and qPCR. The dPCR analysis showed the mean copy number of miR-223, miR-181, and miR-145 are 0.055, 2.11, and 1.24 copies/µl respectively. Further, fold change analysis revealed that the miR-181 had the highest fold change (FC: 2.99) compared to other two miRNAs. Again, 3 miRNAs (miR-125b-5p miR-150-3p, and miR-210-3p) were analyzed using qPCR. Among these three miRNAs, only miR-210 showed the highest fold change in patients (FC: 1.711). Again, the diagnostic potential of these two differentially expressed miRNAs have been calculated using the ROC curve. The AUC of miR-181c-5p was found to be AUC 0.7361 (95% CI 0.5431-0.9291, p= 0.0308) and miR-210-3p had shown an AUC of 0.6447 (95% CI 0.4365-0.1063, p= 0.1808). These analyses were carried out in a limited sample size, however, larger samples are needed to further validate the diagnostic potential. These differentially expressed exosomal miRNAs can be used as a diagnostic biomarker for endometriosis.

Keywords: Endometriosis; exosomal miRNA; digital PCR; quantitative RT-qPCR

PS-1026

Investigating the Effect of L-NAME Induced Hypertension on the Reproductive System of Male Rats

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Hypertension, a common lifestyle disorder in men of reproductive age, is associated with impaired sexual function and fertility. Observational studies in humans have linked hypertension to reduced fertility. Nω-Nitro-L-Arginine Methyl Ester i.e. L-NAME is used for the induction of hypertension in rat models. L-NAME, a competitive inhibitor of nitric oxide synthase, impairs nitric oxide (NO) production, leading to endothelial dysfunction, disrupted pressure natriuresis, activation of the renin–angiotensin system, and increased oxidative stress, ultimately causing hypertension. Present study investigated the effects of paternal L–NAME exposure on the reproductive health of the F0 generation and its subsequent impact on the F1 generation in rats. Male were divided into three groups: Groups I and II were treated with L–NAME at doses of 10 and 20 mg/kg/day, respectively, for a 21–day period, while Group III served as a control. After 60 days of treatment cessation, males were paired with normotensive females. In treated males, reduced sperm count, abnormal sperm morphology, disturbed hormonal balance, and defects in spermatogenesis were observed. Analysis of epididymal spermatozoa revealed disturbances in global DNA methylation in hypertensive males compared to control. Histological analysis revealed sloughing of germ cells and spermatid failure. In a subsequent experiment, F1 offspring of hypertensive males and normotensive females were evaluated after weaning and at 12 weeks of age. The F1 generation exhibited reduced sperm count, increased abnormal sperm morphology, altered hormone levels, and impaired spermatogenesis compared to controls. Testicular histopathology showed germ cell sloughing and spermatid failure. Testosterone levels, NO levels, and Sertoli cell structure were also affected. This study demonstrates that L–NAME–induced hypertension in males can cause germline changes with adverse reproductive effects transmitted to the next generation. These findings highlight the long–term reproductive risks associated with hypertension and suggest that such effects may be epigenetically inherited, posing significant public health implications.

Keywords: L–NAME; hypertension; spermatogenesis; nitric oxide; testis

PS-1027

ATR-FTIR Spectroscopy Reveals Structural Changes in Amide I and Amide II Regions in Women with PCOS

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The etiology of Polycystic Ovary Syndrome (PCOS) is complex and frequently mis−or undiagnosed, which may enhance morbidity and reduce the quality of life. Attenuated total reflection−Fourier transform infrared (ATR−FTIR) spectroscopy examines the structural fingerprints of the biochemical compounds and can provide distinct FTIR spectra of the PCOS cases and controls. The present study recruited 61 PCOS cases and 38 control women. The student's t−test was used to compare BMI, WHR, and lipid profile. The FTIR spectral region was compared among both groups using the Mann−Whitney U test and multivariate analysis involved principal component analysis (PCA) and hierarchical cluster analysis (HCA). FTIR spectra of different phenotypes of PCOS were also analyzed using multivariate analysis. In univariate analysis, PCOS women had significantly higher WHR ($p=0.007$), BMI ($p=0.04$), triglycerides ($p=0.04$), and VLDL ($p=0.02$) than the controls. The spectral regions of amide I (1700−1600 cm^{-1}) and amide II (1580−1480 cm^{-1}), were significantly greater in the PCOS group than in the controls ($p<0.01$ and $p<0.001$, respectively). The PCA and HCA revealed a distinct molecular fingerprint for phenotype A (PCOM+OA+HA) and phenotype B (HA+OA). Our study postulated that the spectral regions of amide I and amide II can distinguish between PCOS cases and control women and it may be used for the diagnosis of cases.

Keywords: FTIR; HCA; PCOS; phenotypes; PCA

PS-1028

Exploring the Efficacy of Meditation in Alleviating Dysmenorrhea: A Prospective Study

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Dysmenorrhea is commonly characterized by severe menstrual pain and associated mood disturbances, which can significantly impact quality of life. Dysmenorrhea is caused by increased secretion of prostaglandin F2α (PGF2α) and prostaglandin E2 (PGE2) in the uterus during endometrial sloughing. These prostaglandins are involved in increasing myometrial contractions and vasoconstriction. Additionally, vasopressin may contribute by enhancing uterine contractility and causing ischemic pain through vasoconstriction. Yoga and meditation harmonize mind and body, reducing anxiety, depression, and pain while improving psychological well-being and alleviating primary dysmenorrhea. The primary objective of this prospective, single-arm, controlled study is to investigate the therapeutic effect of Heartfulness Meditation on 30 student participants experiencing moderate to severe dysmenorrhea. To measure dysmenorrhea severity, participants will complete the Menstrual Distress Questionnaire (MEDI-Q), Numerical Pain Rating Scale (NRS), and Brief Mood Introspection Scale (BMIS) both before and after the 12-week intervention. Ethical considerations include ensuring participant anonymity, voluntary participation, and informed consent. The primary outcome will be the reduction in pain intensity and related emotional distress, evaluated through changes in Menstrual Distress Questionnaire (MEDI-Q), Numerical Pain Rating Scale (NRS), and Brief Mood Introspection Scale (BMIS) scores following the intervention. Secondary outcomes will focus on enhancements in overall well-being and quality of life. This study highlights the efficacy of Heartfulness Meditation as a non-invasive and accessible approach to alleviate dysmenorrhea symptoms while promoting emotional well-being. By reducing sympathetic activity, meditation may reduce menstrual inflammation and potentially contribute to hormone regulation, offering a holistic benefit to individuals experiencing dysmenorrhea. Meditation has been shown to reduce stress, inflammation and improve overall well-being. Since stress can influence hormonal balance, a regular meditation practice may indirectly help to maintain hormonal equilibrium.

Keywords: Dysmenorrhea; menstrual distress; quality of life; heartfulness meditation

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PS-1029

Isolation and Characterization of Uncultured Endometrial Cell Population from Endometrial Biopsy

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Endometriosis is an inflammatory disorder characterized by ectopic implantation and growth of the endometrial glands and stroma. The prevalence of endometriosis is about 10% of females in reproductive age, making it one of the major causes of infertility in females. Although studies pertaining to isolation and characterization of the endometriotic cell population have been published, corresponding studies for isolation and characterization of the cells without culturing them have not been yet described as it is well studied that culturing of the cells might lead to alteration in the gene expression. Moreover, there is a dearth of reliable mRNA gene datasets in literature discussing gene expression scenarios in ectopic and eutopic cell populations in the uncultured state. In our study, endometrial biopsies from reproductive age women were obtained and tissue disintegration was performed followed by antibody labelling to distinguish vimentin positive stromal and cytokeratin positive epithelial cells. Up to one million live stromal and epithelial cells were sorted by Fluorescence–Activated Cell Sorting. Further, molecular based studies for differential expression analysis of genes in the patient and control groups can be performed which might eventually pave the way for closer to natural state characterization of the cell population.

Keywords: Endometrial biopsy; uncultured cells; FACS; messenger RNA

PS-1030

Genetic Markers and Breast Cancer Management: A Path to Personalized Medicine in Rural Rajasthan

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Breast cancer remains a significant public health challenge, affecting approximately recorded 2.3 million new cases and 685,000 deaths in 2020. Alarmingly, projections suggest that by 2040, there could be over 3 million new cases and 1 million deaths in 24 rural villages within a 60 km radius of NIMS Hospital, Tala Mod, Jaipur, Rajasthan, North India 303121. Understanding the genetic underpinnings of this disease is critical for developing effective prevention and treatment strategies. To focus on the role of genetic markers in breast cancer management, point to improve patient satisfaction and outcomes while contributing to a healthier future for Rajasthan. The review identifies that mutations in BRCA1 and BRCA2 genes significantly increase the risk of breast cancer, with carriers facing a lifetime risk exceeding 80%. Additional genetic variants, such as those in the PALB2 and CHEK2 genes, also contribute to susceptibility. These markers facilitate early identification of at-risk individuals, enabling proactive management strategies such as increased surveillance and preventive surgeries. Furthermore, genetic profiling plays a crucial role in guiding genetic markers that are transforming the landscape of breast cancer management by enabling personalized medicine approaches. This systematic review design summarizes the current knowledge of genetic markers associated with breast cancer and emphasizes the pivotal role of genetic markers such as BRCA1, BRCA2, PALB2, and CHEK2 in breast cancer risk assessment, prevention, and personalized treatment. The identification of these markers not only enhances early detection and surveillance efforts but also informs tailored intervention strategies that can significantly improve patient outcomes.

Keywords: BRCA1; BRCA2; genetic markers; PALB2; CHEK2

PS-1031

Impact of Oxidative Stress on Testicular Toxicity Induced by α-Terpineol in Sprague-Dawley (SD) Rats

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α-Terpineol, a monoterpene found in various essential oils, has been reported to exhibit testicular toxicity. However, the underlying mechanisms remain unclear. This study aims to evaluate the effects of α-terpineol on testicular toxicity in Sprague-Dawley rats, with a focus on oxidative stress markers and Immunohistochemistry changes. Thirty two adult male Sprague-Dawley rats were randomly divided into four groups of eight rats each. α-T was administered by oral gavage at doses of 75, 150 and 300 mg/kg body weight for 28 consecutive days. Rats in the control group received corn oil alone. After 30 days, all rats were sacrificed, and the testes were collected to assess oxidative stress markers such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione (GSH), malondialdehyde (MDA) tests were conducted to evaluate testicular damage. Histological changes, nuclear factor (erythroid-derived 2)-like-2 factors (Nrf2) immune-expression was assessed. Results obtained showed a significant decrease in the activity level of SOD, CAT, GPx and GSH and a significant elevation in the level of MDA at 150 and 300 mg/kg when compared to the control group of rats. These findings suggest that oxidative stress plays a pivotal role in α-terpineol-induced testicular toxicity, with higher doses leading to more severe testicular damage. Histopathological examination revealed degenerative changes, including germ cell depletion and tubular atrophy, in α-terpineol-treated rats. Immunohistochemical detection of Nrf2 protein showed prominent expression in Leydig cells. In conclusion, our study demonstrates that oxidative stress plays a crucial role in α-terpineol-mediated testicular toxicity in rats. The findings suggest that α-terpineol induces oxidative stress, leading to testicular damage and dysfunction. These results have important implications for the safe use of α-terpineol-containing products and highlight the need for further research on the toxicological effects of this compound.

Keywords: α-Terpineol; oxidative stress markers; testicular toxicity

PS-1032

Wnt Signaling Regulates Germ Cell Differentiation via Retinoic Acid and HOXB1

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HOXB1, which is primarily known as a segment polarity gene, has never been explored in the context of spermatogenesis. The objective of this study is to find out the interaction and regulatory mechanism of HOXB1 during Wnt signaling mediated differentiation of germ cells. We seek to investigate its upstream and downstream targets to better understand the role of Wnt signaling in regulating differentiation during spermatogenesis. We observed an increase in HOXB1 expression in gonads of mice at various postnatal developmental stages. We used retinoic acid as an activator of HOXB1 expression. We analyzed an increase in expression of HOXB1 and pGSK3β protein levels, alongside a decrease in GSK-3β expression *in-vitro* in GC2 cells, which stabilizes the β-catenin expression. Furthermore, *in-vivo* administration of RA to mice via intraperitoneal injections yielded similar results to those obtained from *in-vitro* analysis. These investigations reveal the activation of Wnt-β catenin signaling as a consequence of HOXB1 activation. *In-vivo* RA administration to mice resulted in a significant reduction of testicular weight and sperm concentration. Histological analysis confirmed the disintegration of seminiferous tubules within the testicular sections. Subsequent analysis was conducted to analyze the differentiation marker c-KIT and meiosis marker SYCP3 in RA-treated *in-vitro* GC2 cells as well as *in-vivo* in mice. We observed an increased protein expression of cKIT and SYCP3. Additionally, the mRNA expression of SYCP1, SYCP2 and SYCP3 were similarly found to be increased. HOXB1 elevates differentiation and meiosis in germ cells. In conclusion, the over-expression of HOXB1 induced by RA resulted in continuous activation of the Wnt signaling pathway. This continuous activation caused aberrant differentiation and meiosis.

Keywords: HOXB1; spermatogenesis; Wnt signaling.

PS-1033

WMicroRNAs Expressed in the Pancreatic Islets Linked with Gestational Diabetes Mellitus

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HGestational diabetes mellitus (GDM) is a major public health problem, affecting 5–7% of all pregnant women during pregnancy. The clinical manifestations of GDM vary from asymptomatic conditions to severe hyperglycemia, presenting risks for both the mother and the fetus. Both genetic and environmental factors play a role in the development of GDM. However, investigations into the functions of small RNAs in the etiology of GDM is limited. Therefore, the aim of the study was to assess the role of islet associated miRNAs in the pathogenesis of GDM. Adult female mice (C57BL/KsJ–Lepdb/+ (db/+) aged 6–8 weeks were used as models for GDM. We observed hyperglycemia in the GDM animals compared to the control animals (C57BL/6) during different intervals of gestation period. A non-significant gradual decrease in serum insulin was noticed in the GDM mice in the pregnancy period. Further, islets of Langerhans cells of GDM and control animals were subjected to miRNA sequencing. An average of 895 miRNAs was identified during small RNA sequence analysis. We demonstrated the presence of 44 unique miRNAs in the GDM animals compared to the control group. 16 miRNAs were up-regulated and 7 miRNAs were down-regulated in the GDM group compared to the control. Gene ontology and pathway analysis were also performed. The study identified numerous differentially expressed miRNAs in the GDM animals that regulate islet β cell viability, function and the pathogenesis of GDM.

Keywords: db/+ mouse; gestational diabetes; islet of langerhans; miRNA; sequencing

PS-1034

Comparative Analysis of Herbal Drug against Treatment of Male Infertility and Associated Conditions

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The World Health Organization (WHO) states that millions of individuals of reproductive age are impacted by infertility. Epidemiological studies estimate that 186 million people and 48 million couples globally are infertile. The objective of this study was to perform systematic review to explore the use of materials derived from biologically active plants in the area of male fertility as well as to assess the effects of medicinal herbs on male infertility. In order to find pertinent articles published in journals indexed in the Information Sciences Institute, Science Direct, PubMed, Scopus, and Scientific Information Databases, we used the following search terms in this review: herbal medicine, traditional medicine, traditional therapies, sperm, testosterone, testicles, and Iran. We used and searched articles that were released in the years 2001–2023. The papers that qualified were then examined. From the databases, we gathered and examined fifty publications. Finally, 20 studies recruiting a total of 1519 individuals were reviewed. These studies compared the effects of eleven different medicinal plants, i.e. ginseng, saffron, *Nigella sativa*, palm pollen, ADOFON, TOPALAF, sesame, and *Mucuna pruriens*, on male fertility with those of placebo. All studies confirmed the beneficial effects of medicinal plants on the improvement of sperm and reproductive parameters and thus male infertility. The existing RCTs (randomized controlled trials) indicated the positive effects of medicinal plants on male fertility. Therefore, in order to develop a novel approach to the treatment of male infertility, further clinical trials are warranted to determine the maximum dosage and duration of treatment with herbal medicines and evaluate any potential side effects of such interventions.

Keywords: Sperm production; testosterone; herb; traditional medicine; testicles

PS-1035

Effect of Nano-Curcumin on Tobacco Smoke-Exposed Histopathological and Ultrastructural Testicular Changes in Adult Wistar Rats

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Infertility is a significant challenge affecting many couples, with male infertility contributing to about 40% of cases. Cigarette Smoking is a prevalent lifestyle factor linked to decreased male fertility, as nicotine and its metabolites can penetrate the blood–testis barrier. It can potentially disrupt the process of spermatogenesis. Curcumin, a component of turmeric, protects against nicotine–induced damage. However, the potential of nanoparticles like nanocurcumin to mitigate such damage has not been fully explored. This study was designed to investigate the effect of nanocurcumin on histopathological and ultrastructural changes in the testes of rats exposed to tobacco smoke. 28 Adult Wistar rats were divided into four groups: a positive control group, a negative control group, a tobacco smoke–exposed group (~ 0.5 or 1 mg nicotine/ kg), and a tobacco–smoke exposed group treated with nanocurcumin (daily oral doses) for 12 weeks. Histopathological and ultrastructural examination performed on the testes of tobacco smoke exposed rats revealed deterioration of the testes, including disorganized seminiferous tubules, loss of germ cells, and sertoli cell degeneration. Nanocurcumin treatment partially repaired smoke–induced damage, suggesting a protective effect for male fertility. Hence, the findings suggest that nanocurcumin could be developed as a treatment strategy for male infertility, particularly in individuals with a history of smoking, a known risk factor for impaired fertility.

Keywords: Male infertility; tobacco smoke; nanocurcumin; testicular histopathology; wistar rat

PS-1036

Analyses of Differential Gene Expression of Cowpea Virus and Breast Cancer Sample

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Breast cancer is a type of cancer which starts to originate in breast tissues. It is one of the major causes of the highest percentage of cancer related deaths. It is one of the most prevalent cancers globally and it can occur in both women and men, although it is much more common in women. Breast cancer can arise in various parts of the breast, including the ducts, lobules, or connective tissue. Breast cancer causes approximately 685,000 deaths annually across the world. The exact cause of breast cancer is not fully understood, but risk factors include genetic mutations, hormonal influences, family history, and lifestyle factors like obesity, alcohol use, and physical inactivity. Cowpea mosaic virus has become one of the most extensively studied plant viruses. Over the past 15 to 20 years, research has transitioned from exploring its genetics and structure to investigating its potential applications in treatment of various diseases. Its genome consists of two single–stranded, positive–sense RNA molecules (RNA–1 and RNA–2). Previous evidence suggests that Cowpea Mosaic virus (CMPV) can treat breast cancer by triggering the immune system to attack cancer cells but the molecular players behind it is not known yet. This work focuses on integrating, comparing and analysing the differential gene expression of cowpea mosaic virus and breast cancer cell which helps to depict the common mechanism by which this virus can treat breast cancer. This bioinformatics study used various tools available on Galaxy server. Analysis of differential gene expression of CMPV and cancer samples has been possible by use of tools such as Trimmomatic, Concatenation by strand, FastQC, Map with BWA–MEM, Feature counts, Annotate my ID, Limma.

Keywords: Bioinformatics; breast cancer; cowpea mosaic virus; differential gene expression; Galaxy server

PS-1037

Extracellular Adenosine Signalling Pathway in Syncytiotrophoblast Formation

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Trophoblast fusion is a crucial stage in the development of multinucleated syncytiotrophoblast (STB) that forms placenta. A healthy giant multinucleated STB in the placenta is vital for successful pregnancy. Reports suggest that adenosine and ATP plasma levels are elevated in preeclampsia, as compared with normal pregnant women. Plasma adenosine level is also reported to increase during normal gestation. In cellular milieu extracellular ATP is inflammatory in nature while adenosine has an immunosuppressive role. This possibly suggests the critical balance of cell extracellular ATP and adenosine is essential for healthy placenta development. Taking this into account in present study we hypothesize to explore the role of extracellular adenosine in STB reshaping. Under in-vitro conditions, fusion of the human choriocarcinoma cell-line mimics *in-vivo* syncytialization of placental villous cytotrophoblast cells. Cultured BeWo cells were committed to the placentogensesis pathway by treating them with forskolin to form giant multinucleated STB. Under culture condition cell exogenous adenosine boosts the STB formation process. Antagonists targeting CD39, CD73 modulate STB formation via preventing ATP dephosphorylated intermediate molecules. Further scavenging cell extracellular adenosine by targeting adenosine deaminase (ADA) enzyme, STB formation accentuates by maintaining cell extracellular adenosine pool. Overall this suggests CD39, CD73 and ADA activity have a critical role in maintaining normal STB formation leading to healthy pregnancy. Using genetic knock-down approach and antagonist targeting adenosine receptors A2B; suppress STB formation suggesting the role of cell extracellular adenosine and its receptors during placenta development. Contemporary to this exogenous adenosine does not modulate trophoblast differentiation process in contrast to cells differentiated with only forskolin and resulting to the formation of STB, suggesting possible role of exogenous adenosine modulation at trophoblast fusion stage during STB syncytialization pathway. Overall our study suggests a possible role of purinergic signaling pathway by maintaining delicate balance of ATP and adenosine molecule regulating STB formation during healthy gestation.

Keywords: placenta development;purinergic signalling; syncytiotrophoblast; trophoblast

PS-1038

A Retrospective Study on the Oocyte Quality in PCOD Patients Undergoing ICSI

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PCOD is one of the major causes of female infertility and is on the rise in India, where about one-third of women suffer from the condition. It has been claimed that oocyte maturation is disturbed in PCOD patients, which eventually alters the outcome of ICSI, a technique used in assisted reproductive technology. This study evaluates the number of mature, immature oocytes, fertilization rate and also compares the quality of PCOD and non PCOD oocytes in ICSI. This retrospective observational study was performed at Apollo fertility, Belapur on the data from 128 patients (64 with PCOD and 64 non PCOD).The patients with 10 or more small (2 to 8mm) cysts in the ovary (transvaginal ultrasound) were referred to as PCOD during the early follicular phase. Patients that did not follow the criteria were referred to as non PCOD. The mean value along with the standard deviation of variables was compared using an independent t test. Findings indicate statistical significant difference in immature oocytes while fertilization rate showed statistically no significant difference in PCOD and non PCOD group respectively. There was no significant difference in extra-cytoplasmic anomalies. While in intracytoplasmic anomalies there was significant difference in granular cytoplasm in PCOD and non PCOD respectively. Therefore, it is concluded that although the oocyte quality is more compromised in PCOD than non PCOD with regards to cytoplasmic dysmorphism but fertilization rate is not statistically significant.

Keywords: Infertility; PCOD; oocyte maturity; cytoplasmic dysmorphism; fertilization rate

PS-1039

Hormonal Imbalance Induced by Low Dose of Bisphenol F Affect Spermatogenesis

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This study investigated the role of Bisphenol F (BPF) in inducing hormonal imbalance despite its low concentration. Wistar albino male rats were divided into groups based on doses of BPF (0 (Group I), 100 (Group II), 500 (Group III), and 1000 (Group IV)µg/ kg body weight/day) administered for 45 days. An additional Group V was added to assess simultaneous ameliorating effect of Vitamin E while administering 1000 µg/ kg body weight/day of BPF for 45 days. Only Group IV showed a significant decrease in FSH (4%), estrogen (8%), and testosterone (16%). When vitamin E was administered concurrently, the levels of FSH and testosterone varied the least. Strikingly, a significant decline in the level of estrogen was noted. Thus, decline in the level of estrogen under influence of BPF accounts for a separate mechanism linking to reproductive insufficiency in males. In conclusion, by interfering with spermatogenesis, BPF plays a substantial function in the male reproductive system; however, the effects of low doses are comparatively moderate.

Keywords: Bisphenol F; hormone imbalance; spermatogenesis

PS-1040

Hospital Based Study on Polycystic Ovarian Syndrome (PCOS) Amongst the Women in Eastern Uttar Pradesh, India

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Polycystic Ovarian Syndrome (PCOS) is a vicious endocrinopathy, affecting both the reproductive as well as the metabolic state of the body. With a prevalence of about 8–21% in reproductive-age females, it comes up with a set of few cardinal symptoms, viz., menstrual disturbance, hyperandrogenism and polycystic ovarian morphology (PCOM). Objective of the present study was to describe the epidemiology and correlation with a clinical and hormonal profile of PCOS in a population of India. It is a retrospective population-based study. It's basically a questionnaire based study conducted on the subjects suffering from PCOS, unveiling the lifestyle details, along with their dietary habits and certain anthropometric biomarkers. All the subjects were of Indian ethnicity from Bihar and Eastern Uttar Pradesh, the two states of Northern India. The patients were characterized in terms of their clinically diagnosed characteristics (Rotterdam criteria, 2003) and their socio-demographic status. Mostly, the patients belonged to 18–25 years of age (~70%), followed by the age group ranging from 26–40 years. Amenorrhoea (symptom), blood glucose (fasting and PP), serum LH (Luteinizing Hormone) and FSH (Follicle Stimulating Hormone) were significantly associated with PCOS. It was observed that there are numerous factors associated with this syndrome, however, studies regarding further characterization may help us to understand the additional factors that may significantly affect the prevalence of PCOS in the Eastern U.P., India, to promote its early diagnosis and amelioration.

Keywords: Polycystic ovarian syndrome; amenorrhoea; hyperandrogenism

PS-1041

Advantages of Nanotechnology in Management of Infertility

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In reproductive healthcare, particularly in management of infertility, nano-materials and nanotechnology have a tremendous impact in improving therapeutics, treatment, imaging, and diagnosis. The technology is useful in conception, contraception, assisted reproduction, treatment of postmenopausal syndromes and in the treatment of Sexually Transmitted Infections. In Assisted Reproduction, gold, silver, carbon and magnetic nano materials are used in Preimplantation Genetic Screening (PGS) and Preimplantation Genetic Diagnosis (PGD) for a faster, easier, specific and sensitive method development. Silica nanoparticles, magnetic iron nanoparticles, and poly (vinyl alcohol) coated iron oxide nanoparticles have been shown to enhance the delivery of nucleic acids to produce genetically modified embryos via gene transfer in bovine spermatozoa. In bovine oocyte culture, nanoencapsulated melatonin in in vitro maturation medium (IVM) showed decreased apoptosis, decreased Reactive Oxygen Species (ROS), increased cleavage and increased blastocyst production rate. Nanoencapsulated tretinoin in Lipid Core Nanocapsules (LNC) also showed higher cleavage and blastocyst, decreased ROS of bovine oocytes in IVM. IVM medium, supplemented with melatonin loaded LNC, showed increased embryo quality and blastocyst hatching. Nanotechnology in reproductive medicine, particularly in assisted reproduction, is approaching commercial application. However, the nanotoxicity may be detrimental to embryo development and embryo quality, as these nanomaterials can cross the placental barrier and can cause anatomical defects in the foetuses. Particularly, silver nanomaterials and carbon nanotubes can cause damage in live fetuses and increase fetal resorption.

Keywords: Reproductive healthcare; nanotechnology; nanomaterials; reactive oxygen species

PS-1042

Epigallocatechin-3-gallate (EGCG) Ameliorates the effect of Cypermethrin Exposure on Rats Spermatogenesis and Steroidogenesis

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Endocrine Disruptor Chemical exposure during the perinatal period may affect the reproductive functions of the offspring. However, antioxidants enhance the defence mechanism to protect against reproductive toxicity. EGCG is one of the potent antioxidants which acts as a protecting agent against testicular toxicity. The present study aims to evaluate the ameliorative potential of EGCG supplementation on male reproductive functions in CYP exposed perinatal rat model. From gestation day (GD) 6 to postnatal day (PND) 22, pregnant dams (F0) were gavaged with corn oil or CYP (25 mg/kg/ bw/day. After PND 50, the corn oil and CYP exposed F1 male rats were further gavaged with either saline or EGCG (10 mg/kg bw/day) for 60 days. The body weight, reproductive organs weight, sperm count, motility and testicular histopathology was evaluated after completion of EGCG treatment. Different types of testicular cells were studied by flow-cytometry, gene expression of cell-type specific markers by qRT-PCR to assess the effect of EGCG. Observations suggest the body weight, reproductive organs weight, sperm parameters of CYP exposed F1 male offspring were significantly affected as compared to the control. The sperm parameters were found comparable to the control group upon 60 days EGCG supplementation. An increase in the number of cells in the elongating and elongated spermatid population in the EGCG group as compared to only the CYP group was observed by Flow cytometry. Altered mRNA expression of Steroidogenesis genes (*Star*, *Cyp11a1*, *Cyp17a1*, *HSD3b3, Cyp19a, ERα and AR)* and spermatogenesis genes (*Acrv1*, *Amh, Ccnb1, Pcna, Sycp1, Ccna1) of CYP group* displayed restoration upon EGCG supplementation. The improvement in testicular damage and sperm parameters in CYP exposed F1 offspring after EGCG supplementation indicates the beneficial role of EGCG supplementation on male reproductive functions.

Keywords: Epigallocatechin-3-gallate; Testicular toxicity; Male reproductive functions

PS-1043

Teratogenic Impact of Alpha(α)-terpineol on HOXD13 and GDF11 Gene Expression in Wistar Rat Embryos

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Exposure to environmental toxicants during embryonic development can have detrimental effects on fetal growth and maturation. One such compound of concern is alpha terpineol, a monoterpene alcohol commonly used in fragrances and personal care products, that has been reported to possess teratogenic effects, but its impact on embryonic development and gene expression remains unclear. This study aimed to investigate the developmental effects of α-terpineol on HOXD13 and GDF11 gene expression in Wistar rat fetuses, crucial regulators of morphogenesis and organogenesis. Twenty-four Pregnant Wistar rats were orally administered with α-terpineol (0, 75, 150, and 300 mg/kg body weight) from gestational days 5-17. On gestational day 20, all dams underwent caesarean section and euthanasia, and their fetuses were evaluated for external, visceral, and skeletal abnormalities. HOXD13 and GDF11 gene expression were assessed using qRT-PCR. α-Terpineol exposure resulted in significant decrease in body weights of pregnant dams in the groups exposed to 150 and 300 mg/kg of alpha terpineol on gestational days 18 and 20, despite no differences in feed consumption and embryonic malformations, including vertebrae malformations, intrauterine, craniofacial abnormalities, limb buds and skeleton deformities. HOXD13 and GDF11 gene expression were significantly downregulated in α-terpineol-treated fetuses, with a marked decrease in protein expression in the craniofacial and limb buds. This study demonstrates that α-terpineol exposure during embryogenesis disrupts HOXD13 and GDF11 gene expression, leading to morphological abnormalities in Wistar rat embryos. These findings suggest that α-terpineol may interfere with crucial developmental pathways, highlighting the potential risks of this compound during pregnancy. Transcriptomic analysis further revealed significant disruptions in the expression of genes governing critical developmental processes, including pathways related to skeletal development, cellular differentiation, and organogenesis. These findings underscore the need for further investigation into the developmental toxicity of alpha terpineol and its potential implications for human health.

Keywords: Alpha terpineol; developmental toxicity; transcriptomics; HOXD13 gene; GDF11 gene; organogenesis.

PS-1044

Recombinant Expression, Characterization and Functional Assessment of B-Defensin 126 Protein of Buffalo Spermatozoa

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A low conception rate despite using morphologically normal spermatozoa during insemination is a common reproductive challenge that confines buffalo productivity. β-defensins are epididymal sperm surface-binding proteins that participate in sperm surface remodeling events implicating in survival and performance of spermatozoa in the female reproductive tract. The β-defensin family comprises a well–known group of secretory proteins with diverse pleiotropic functions, including roles in sperm maturation, motility, immune evasion, penetration of cervical mucus, and binding to oviduct epithelial cells, all crucial for reproduction. To better understand the role of buffalo β-defensin126 (BuBD126) in reproduction, an in-silico analysis of the gene was conducted, referencing other β-defensin types from human and buffalo. All the sequences were retrieved from the NCBI and multiple sequence alignment was performed. The physiological properties, patterns of disulfide bridges, and multiple signature patterns of the BuBD126 gene were analyzed. Further, BuBD126 was cloned and expressed in a prokaryotic expression system. Sequence alignment revealed conserved GXC motifs and six cysteine residues, consistent with other beta–defensin sequence types, which maintained the molecular framework and the structural core vital to their biological functions. BuBD126 gene was found to have different patterns of disulfide bridges and multiple signature patterns which might render them specialized functions related to reproduction and antimicrobial properties. BuBD126 was successfully expressed in an *E.coli* (BL21DE3) host, purified by Ni–NTA chromatography, and then confirmed by western blot using anti–His antibody. Western blot analysis of r–BuBD126 showed that BuBD126 exists as a dimer which is likely to have important functional implications for the role of buffalo reproduction. Importantly, r–BuBD126 showed antimicrobial activity against *E.coli*. In conclusion, BuBD126 of buffalo sperm origin was in–silico characterized, and the recombinant expression of the BuBD126 was successfully achieved with retention of its functional property.

Keywords: β-defensins; Spermatozoa; Antimicrobial properties

PS-1045

Bioinformatics Based Identification of Novel Non-Coding lncRNA Signatures in Prostate Cancer

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Prostate cancer (PCa) is the second most common cancer globally and third most common among men in India. Globally, around 1 million PCa cases are diagnosed each year, resulting in over 300,000 fatalities. According to Population Based Cancer Registries (PBCR), PCa is one of the leading causes of cancer deaths in numerous cities across India. PCa pathogenesis is controlled by genetic, epigenetic, and environmental factors, and its progression is characterized by complex molecular abnormalities. It is becoming increasingly clear that many genetic alterations in cancer occur inside areas that do not code for proteins. However, these areas are frequently transcribed as long non-coding RNAs (lncRNA). The recent use of next-generation has identified hundreds of lncRNA whose aberrant expression is linked to many cancer types. Notably, these lncRNA play important roles in gene regulation, influencing several aspects of cellular homeostasis such as proliferation, survival, migration and genomic integrity. In this current study, we focus on predicting potential interactions between PCa associated lncRNAs and PCa casual proteins. Two novel lncRNAs LINC00662 and SCARNA10 were selected (from our previous study) based on their differential expression in cancer tissues compared to normal tissues. We employed different computational tools such as RNA-Protein interaction prediction (RPI-Seq), NPInter, HDOCK to study their interaction. Some of the results we obtained suggest a strong correlation between these two novel lncRNAs and few of the PCa causal proteins which might indicate their role in cancer-related pathways such as androgen receptor signaling, cell proliferation, and metastasis. We anticipate lncRNA–protein interaction methods to check the bone fidelity of these candidates and firmly believe this will pave a way towards discovery of biomarkers and development of novel therapies.

Keywords: Cancer; genetic mutation; prostate cancer; long non-coding; RNA; H-Docking

PS-1046

Deciphering the Role of Panobinostat in Reproductive Competence Using *C. elegans* as Model System

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The role of epigenetics in reproduction has been well documented in several studies. Of all the histone modifications, histone acetylation is considered to be a highly dynamic process which can be easily targeted using drugs such as HDAC inhibitors. Histone deacetylase inhibitors (HDACis) are a class of chemical compounds which inhibit the activity of histone deacetylase enzymes thereby increasing the acetylation of lysine residues on histone proteins as well as non-histone proteins. Previous studies have highlighted their role in facilitating embryo development following somatic cell nuclear transfer and in improving the developmental competence of cloned embryos. However, their effect, if any, has not been well explored at organism level. So, we proposed that *in-vivo* studies using genome-wide modulators such as HDACis can prove to be beneficial for identification of molecular mechanisms regulating reproduction. We have chosen *Caenorhabditis elegans* as a model organism for this study as it shares many conserved molecular pathways with humans. Microtitre plate based bacterial clearing assay was performed to select sub-lethal doses of HDAC inhibitors. Selected drug (HDACi) doses were used for further experiments and brood assay was performed on L4 worms exposed to HDAC inhibitors such as Panobinostat (125uM) for 48 hrs. Our study demonstrated significant increase in fold change in absorbance levels in drug treated worms pointing towards either increased number of progeny or increased consumption of food. Brood assay results also showed significant increase in number. Studies at molecular and cellular level of HDACis on worms exhibited increased protein expression of acetylated histone proteins and improved reproductive competency in drug treated worms owing to better oocyte quality in worms exposed to HDACis. Further studies at transcriptome level can help to provide insights in a mechanistic fashion which may be valuable to improve reproductive health in near future.

Keywords: Epigenetics; histone acetylation; HDAC inhibitors

PS-1047

7-keto-Lithocholic acid (7-keto-LCA), a Secondary Bile Acid Mitigates Postmenopausal Osteoporosis

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Osteoporosis is an inflammatory bone loss disease characterized by lower bone mineral density (BMD), and diminished bone strength which exacerbates fragility fractures. The role of gut microbiome in modulating bone health has already been established by our group along with others. However, the role of gut-associated metabolites such as secondary bile acids on bone health has not been fully explored. 7-keto lithocholic acid is one of the major secondary bile acids produced by the gut microbiota.7-ketoLCA acts as a ligand for FXR and TGR5 receptors which are highly represented on both innate immune cells and bone cells. Thus, it makes 7-ketoLCA bile acids a potential therapeutic candidate in inflammatory bone loss. In the present study we hypothesize to unravel the role of 7-ketoLCA on bone remodelling in mice models. For osteoclastogenesis, murine BM cells were cultured in the presence of RANKL and M-CSF for 4 days and characterized by TRAP staining and F-actin. For osteoblastogenesis, BM cells were cultured for 14 and 21 days in osteogenic media and characterized by ALP and alizarin red staining respectively. For postmenopausal osteoporotic model, mice (C57/BL6, female, 12 weeks) were randomly divided into three groups (Control, ovariectomized-OVX and OVX+7-ketoLCA). The ovaries were removed in OVX and OVX+7-ketoLCA groups. 7-ketoLCA dissolved in drinking water was administered orally to the OVX+7-ketoLCA group (1 mg/mouse) for 90 days. On day 90, mice were sacrificed and bone (u-CT, BMD), and BM (ex vivo culture for osteoclasts and osteoblasts, qPCR) were harvested and analysed. Interestingly, we observed that 7-ketoLCA significantly inhibits osteoclastogenesis *ex vivo*. Our *in vivo* results further confirmed that 7-ketoLCA enhances bone health in the PMO model in mice. u-CT assessment of both femur and tibia bones showed loss of bone microarchitecture in OVX mice compared with control and 7-ketoLCA-treated groups. 7-ketoLCA supplementation significantly enhanced the BMD, bone volume per tissue volume, trabecular number, trabecular thickness and decreased trabecular separation. Moreover, our *ex vivo* osteoclast cultures from the bone marrow of the 7-ketoLCA treated group reflected attenuated osteoclastogenesis in comparison to the Ovx-induced mice group. Altogether, both our *in vitro* and *in vivo* data clearly establish the therapeutic potential of 7-ketoLCA in enhancing bone health in the PMO model. Our results for the first time establish that 7-ketoLCA inhibits osteoclastogenesis and ameliorates bone loss in the PMO mice model. The findings of our study offer a new avenue in harnessing the osteo protective potential of 7-ketoLCA (a secondary bile acid) in improving bone health in various inflammatory bone pathologies including RA and osteoporosis.

Keywords: GAMs; 7-ketoLCA; postmenopausal osteoporosis; osteoclast; bone health

PS-1048

Menopausal Symptoms, Awareness and Management in Women of Eastern Rajasthan

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Menopause is the essential phase of every woman's life. It gradually relieves the women from the reproductive phase. Scientific definition of menopause given by WHO is irregular occurrence of menstrual cycle or discontinuation of cycle for a year which finally leads to the complete cessation of the cycle is called Menopause. General age of menopause occurrence is ranged from 45–55 years but great variation has been occurring in this age range of menopause. Current study is part of multi-center's study which includes 320 women who were in menopausal age from all different strata of the society. Their menopausal symptoms, knowledge pertaining to the menopause and its management was assessed through the well-defined questionnaire. Broad categories of parameters include: personal details, dietary status, hematological parameters, Menopausal Symptoms, Hormone Replacement Therapy, Sexual Life, Management of menopause and liberation from child bearing, menstruation and use of contraceptives. The broad general age of menopause in the studied group is 40–50. Four women experienced early menopause during their mid-thirties. General symptoms were hot flush, mood swing, loss of libido, dryness of vagina, anxiety, confusion in concentrating, aching, breast tenderness, gastrointestinal distress, depression, weight gain, hair loss or thinning, burning tongue or mouth, bad taste etc. Majority of these women did not seek the advice of qualified doctors. These women were very scared of these symptoms and felt the sense of losing womanhood and sexuality .When these ladies were counseled for incorporating yoga, meditation and exercise in their life, menopausal symptoms reduced. These ladies were also counseled to lead active sexual life which resulted in lessening in the menopausal symptoms. It can be concluded that cases of early menopause are also evident in some cases, women are not aware of menopausal symptoms and its management. Counseling improves management of menopausal symptoms, better sexual life even during and after menopause.

Keywords: Menopause symptoms; management of menopause

PS-1049

Filtered Diesel Exposure in a Whole-body Exposure Chamber Impairs Testicular Function in Male Wistar Rats

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The male reproductive outcome is a sensitive marker of the effects of environmental pollution and requires thorough investigation due to its possible vulnerability. An indigenously developed whole–body exposure facility was fabricated to study the causal link between filtered diesel exhaust and some parameters of male reproduction using male Wistar rats. Adult male rats were exposed to clean air (CAG)/ filtered fraction of diesel exhaust (FDG) in the indigenously developed whole body exposure chamber and compared with rats housed in conventional cages (n=8/group). Similarly, juvenile male rats were subjected to clean air/filtered diesel exhaust. The generated diesel exhaust was diluted with clean air (1:10), the concentrations were comparable to the levels observed at heavy traffic intersections, and the exposure protocol was 6 hours/day x 5 days/week x 6 weeks. The rats were sacrificed after 6 weeks, epididymides, and testes were collected for evaluation of sperm parameters, histology, and hormones, respectively. In the adult group, a significant difference was observed in sperm concentration (0.0042), % sperm motility (0.006), and testicular testosterone levels (0.0057). In the adult group, a significant difference was observed in sperm concentration (0.013), % sperm motility (0.007), % morphological abnormality (0.003), and testicular testosterone levels (0.017). Histology of testis revealed degenerative changes, loss of germ cells, and patency in filtered diesel exhaust groups while the rats in the control and clean air groups had their testicular histoarchitecture maintained. Our preliminary data highlight the damaging impact of filtered diesel exhaust on rats in a whole–body exposure chamber on their intratesticular functionality. The detrimental effect of gaseous components in diesel exhaust on intratesticular milieu and spermatogenesis underscores the need for further investigations to decipher the underlying mechanisms.

Keywords: Whole–body exposure; diesel engine; gaseous pollutants; male reproduction; rat

PS-1050

Impact of Sleep Quality and Circadian Rhythm on Sperm Telomere Integrity in Recurrent Pregnancy Loss

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Sleep quality plays a pivotal role in hormonal regulation, with its disruption adversely affecting sperm quality, and overall reproductive health. Modern lifestyle factors, such as increased screen time, stress, and reduced physical activity, significantly impair sleep quality. The circadian rhythm, a key regulator of processes including reproductive hormone release and fertility, has been found altered in infertile men, particularly those with Asthenozoospermia (AZS). Studies reveal that clock gene expression levels are linked to sperm motility, suggesting their potential as molecular markers of male infertility. Additionally, chronic insomnia and sleep deprivation have been associated with shorter telomere lengths, while aneuploidy abnormalities remain the primary cause of recurrent pregnancy loss (RPL). Despite this, most RPL research focuses predominantly on female factors, leaving paternal contributions largely unexplored. This study aimed to investigate the potential paternal factors associated with RPL by examining sleep quality and semen parameters in male partners of women with RPL and fertile men. Furthermore, the relationship between lifestyle changes affecting sleep quality and sperm telomere length (STL) integrity was explored across these groups. After obtaining ethical approval, three groups were recruited:Fertile males with proven fertility, Male partners of women with idiopathic RPL (iRPL) and Male partners of women with RPL associated with female factors. DNA and RNA were extracted from sperm of male partners of each group to assess relative sperm telomere length and clock genes (BMAL1/ CLOCK) respectively, while sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI). This self-rated questionnaire assesses subjective sleep quality across seven clinically derived components, each scored from 0 to 3, resulting in a global score ranging from 0 to 21. A PSQI score of 5 or above indicated poor sleep quality. Fertile males exhibited good sleep quality, with PSQI scores ranging from 0 to 5. Both iRPL and RPL groups demonstrated significantly disturbed sleep quality (PSQI scores >5), with major deviations observed in habitual sleep efficiency, sleep latency, and sleep disturbances.Sperm telomere length was significantly reduced in the RPL group compared to healthy controls, highlighting altered telomere integrity in cases.Expression analysis of clock genes could possibly reveal notable differences between cases and controls, underscoring their potential link to sperm motility and reproductive outcomes.This study underscores the impact of sleep quality and lifestyle factors on sperm telomere integrity and fertility. Disturbed sleep and reduced STL in male partners of RPL patients suggest the importance of addressing paternal contributions to unexplained pregnancy losses.

Keywords: Recurrent pregnancy loss (RPL); Asthenozoospermia (AZS); Pittsburgh Sleep Quality Index (PSQI); Sperm telomere length (STL); Idiopathic RPL (iRPL)

PS-1051

CRISP3 and PSP94 as Soluble Mediators Shaping P2RX7 Mediated Signalling Probably via CITED2 in Tumor Microenvironment

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The dynamic interplay between the tumor and the infiltrating immune cells within the tumor microenvironment critically shapes cancer progression, particularly through mechanisms of immune evasion and tumor cell survival. Cysteine Rich Secretory Protein 3 (CRISP3) is elevated in prostate cancer and linked to poor prognosis. Originally identified in neutrophilic granules and body secretions, CRISP3 levels are frequently dysregulated in inflammation. Whether overexpressed CRISP3 modulates tumor immune microenvironment remains largely unexplored. Our study unravelled a potential mechanism whereby CRISP3 controlled the expression of P2RX7 (Purinergic Receptor X7), a key player in the inflammasome pathway, in tumor cells and macrophages. Using antibody array, we identified CITED2 (cAMP–responsive element–binding protein (CBP)/p300–interacting transactivator with glutamic acid (E) and aspartic acid (D)–rich tail) levels to be upregulated in cells exposed to CRISP3. CITED2 is a transcriptional co–regulator and a potent molecular switch that promotes macrophage polarisation. In silico analysis the human P2RX7 promoter demonstrated presence of p300/CBP binding sites suggesting possible sequestration of p300/CBP in presence of CITED2, thus downregulating P2RX7. Publicly available single cell RNA–seq data also highlighted the involvement of CITED2 in regulating the expression of P2RX7. Ectopically added CRISP3 significantly altered ATP-induced cytotoxicity and IL-1β maturation due to downregulated P2RX7. Interestingly, when CRISP3 was complexed with its binding partner, PSP94 (Prostate Secretory Protein of 94 amino acids), its regulatory action on P2RX7 was inhibited. The presence of PSP94 also affected CRISP3 endocytosis which was via flotillin–2 dependent pathway. Together, our data provides evidence for an important role for CRISP3 and PSP94 in regulating P2RX7 levels. Upregulated CRISP3, in prostate tumorigenesis, suppresses P2RX7 expression, impacting IL-1β maturation and potentially driving macrophage polarization to M2-like by upregulating CITED2. This supports poor prognostic outcomes in prostate cancer patients showing upregulated CRISP3. Inhibition of CRISP3 can be an interesting therapeutic strategy in alleviating immunosuppressive tumor milieu.

Keywords: Cysteine rich secretory protein 3 (CRISP3); purinergic receptor X7(P2RX7); CITED2; prostate cancer

PS-1052

Lectin-Based Comparative Profiling of Differentially Abundant Glycans in Spermatozoa from Distinct Fertility Buffalo Bull

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Bull fertility plays an important role in the overall reproductive performance of dairy farms. Sperm membrane glycans are essential determinants of spermatozoa functions such as motility, sperm–egg recognition, and overall spermatozoa's fertilizing capacity. Lectin–based glycan profiling offers a powerful and non–invasive technique for investigating the glycosylation patterns of spermatozoa, which play a critical role in sperm function, thus, contributing to bull fertility. In this study, we employed a lectins–based approach to analyze the glycan profiles of high–fertile (HF) and low–fertile (LF) bull spermatozoa using microscopy to identify specific glycan patterns associated with bull fertility. A variety of lectins, each targeting distinct carbohydrate residues, were used to uncover key differences between the sperm of HF and LF bulls. The lectin MAL–II (*Maackia amurensis* lectin II), which binds specifically to α-2,3-linked sialic acid residues, demonstrated stronger binding to HF sperm, indicating a higher abundance of these sialic acid residues in the high-fertility sperm. α-2,3-linked sialic acids are crucial for sperm functionality, particularly in mediating sperm–egg interaction, sperm motility, and the fertilization process. In addition to sialic acid residues, the lectin ABL (Agaricus bisporus lectin), which recognizes mannose–containing glycoconjugates, revealed a greater presence of these structures in HF sperm. This finding suggests that mannose–containing glycans also play a significant role in sperm function and fertility. The comprehensive glycan map generated through lectin–based profiling highlighted a distinct glycosylation pattern in HF sperm, characterized by elevated levels of α-2,3-linked sialic acids and N-acetylgalactosamine, along with mannose-containing glycans. This study underscores the potential of lectin-based glycan profiling as a valuable tool for identifying fertility-associated glycosylation patterns, offering new insights into sperm biology, and providing opportunities for improving reproductive technologies in buffalo bulls.

Keywords: Glycan profiling; spermatozoa; fertility; lectin

PS-1053

Evaluating the Efficacy of Herbal Formulation of Nyctanthes Arbor-Tristis and Polyalthia Longifolia against PCOS Induced Wistar Rats

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The present experimental study aims to assess the potential of herbal formulation of *Nyctanthes arbor-tristis* and *Polyalthia longifolia* against PCOS (Polycystic Ovary Syndrome) through PCOS induced Wistar rat's evaluations. It is hypothesized that administration of this herbal formulation will lead to improved hormonal balance, ovarian function, and metabolic parameters in a PCOS-induced animal model. This investigation could contribute to novel therapeutic strategies for managing PCOS by harnessing the effects of natural botanical compounds and their regulatory actions. The objectives of the study were (1) To assess the effect of herbal extract on hormonal imbalance (LH, FSH, Testosterone, oestrogen, Thyroid profile), (2) To evaluate the effect of herbal extract on metabolic parameters (glucose tolerance, insulin level, lipid profile),(3) To evaluate antioxidant potential for measuring oxidative stress markers (like MDA, SOD, CAT, NGSH) and (4) To evaluate histopathological changes and statistical analysis. The study utilized analytical-grade chemicals and involved the collection and authentication of selected plants followed by methanol extraction. Acute oral toxicity testing was conducted per OECD guidelines. PCOS was induced in Wistar rats using DHEA, with animals divided into six groups for treatment with standard drugs, plant extracts with varying ratio combinations. Treatments lasted 15 days, after which blood and ovary samples were collected for hormonal, biochemical, histopathological, and statistical analysis. The herbal combination is intended to lower high androgen levels, enhance hormonal balance, and ease PCOS symptoms. It may have a good influence on ovarian function, metabolic parameters, and overall reproductive health, making it an effective and natural alternative for treating PCOS. The herbal formulation of *Nyctanthes arbor-tristis* and *Polyalthia longifolia* effectively reduced elevated androgen levels, demonstrating its potential as a therapeutic agent for PCOS. The study highlights the positive impact of this formulation on hormonal balance, biochemical parameters, and ovarian histopathology, supporting its use as a natural alternative for PCOS management.

Keywords: PCOS; acute oral toxicity; metabolic parameters; histopathology

PS-1054

To Investigate Genomic variants in Paediatric 46, XY Patients of Disorders of Sex Development (DSD)

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Disorders of sexual development (DSD) are a group of congenital conditions characterized by atypical development of chromosomal, gonadal, or anatomical sex. Among these, 46,XY DSD is a significant subset, involving individuals with a typically male karyotype (46,XY) but varying degrees of undervirilization or ambiguous genitalia. It can occur due to chromosomal abnormalities or genetic variants in the genes involved in the development or function of the male gonad as well as anomalies of downstream target tissues. Despite progress in the genetic diagnosis of DSD, most 46,XY DSD cases remain idiopathic. This study aims to investigate the genomic variants in paediatric patients with 46,XY DSD to better understand the genetic basis of this condition. The objectives will encompass the identification of genetic sex in cases of apparent DSD utilizing fluorescence in situ hybridization test (FISH), followed by an exploration of genomic variants in 46,XY DSD cases through whole exome sequencing. A cohort of paediatric patients presenting with clinical features of DSD was recruited for the study. Each patient underwent fluorescence in situ hybridization test (FISH) to confirm the 46,XY genotype on metaphase chromosomes. Seven cases, selected based on clinical presentation and genetic findings, were further analysed by whole-exome sequencing (WES) to identify potential pathogenic variants contributing to the DSD phenotype. Cytogenetic abnormalities were found in 61.1 % of individuals (11/18). Remaining 38.8% (7/18) of individuals were having 46,XY DSD, all of which were presented with ambiguous genitalia and reared as male. Ultrasound imaging revealed no indications of adrenal mass in any of the patients, thereby diminishing the likelihood of Congenital Adrenal Hyperplasia (CAH) variants. Additionally, mullerian remnants were identified in only one patient, potentially attributable to anti-Müllerian hormone (AMH) insensitivity. Other major possibilities were excluded through hormonal screens and external genitalia examinations. DNA samples were extracted for whole exome sequencing. Quality control was performed, and exonic and adjacent intronic sequences were enriched from genomic DNA, followed by paired-end sequencing. Reads were aligned using the Aligner. Single nucleotide variants (SNV) and copy number variations (CNVs) were generated, and we anticipate data availability within the next two weeks. This study is expected to contribute valuable insights into the genetic underpinnings of 46,XY DSD, which may enhance diagnostic accuracy at an early age, to ensure proper clinical management including counselling for the sex of rearing, facilitate personalized treatment approaches for affected individuals to improve their quality of life, and prospects of sexual function and fertility.

Keywords: 46,XY DSD; whole exome sequencing; XY FISH

PS-1055

Purification and Characterization of Human Chorionic Gonadotropin and its Applications

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Affinity chromatography by Carboxy methyl blue Sepharose was used to increase the purity and further the biological activity to more than 12000 IU/mg from 1.05mg of protein. The glycoprotein was then assessed for its conformational and functional ability in rats and could efficiently pronounce itself as a protein with increased purity.

Keywords: affinity chromatography; HCG; CMB Sepharose; purification

PS-2056

Proteomic Landscape of Extracellular Vesicles (EVs) in Seminal Plasma Reveals the Fertility Status of Sahiwal Cattle Bulls

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Seminal plasma contains heterogeneous extracellular vesicles (EVs) of varying size (50–200 nm), classified into exosomes, microvesicles, and apoptotic bodies based on their size and biogenesis. Prostasomes and epididymosomes, specific to seminal plasma, deliver fertility-related cargos such as DNA, RNA, proteins, and enzymes to spermatozoa leading to enhanced motility, capacitation, fertilization, and embryo implantation. In this study, seminal plasma EVs from high- and low-fertile bulls were isolated and purified through size exclusion chromatography (SEC), Sepharose, CL-2B. The pooled fractions (7–16) of purified EVs were characterized via diffraction light scattering (DLS), Nano-tracking analysis (NTA), transmission electron microscope (TEM), and Western blotting. We performed high-throughput LC-MS/MS analysis to map the protein abundance in seminal EVs of high and low fertile bulls. Label-free LC-MS/MS analysis identified 1,702 proteins, with 1,631 common to both groups. A total of 12 and 59 unique proteins were found in the high-fertility and low-fertility EVs. Differentially abundant proteins (DAPs) showed 103 enriched (log2 FC>1.5) and 120 depleted (log2 FC≤ 1) in high-fertility bulls. Further bioinformatics analysis (PCA, Heatmap, Volcano Plot) and DAVID Gene Ontology analysis linked DAPs to various energy-related pathways like glycolysis and glutathione transferase, critical for sperm capacitation, motility, and fertilization. In summary, this study highlights the differential abundance of fertility-associated proteins in seminal plasma EVs. Our findings successfully identify the promising protein candidates in high fertile bulls and the study provides an alternative approach to assess the bull fertility.

Keywords: Extracellular vesicles; Differentially abundant proteins; Fertility

PS-2057

Deciphering the Molecular Basis of Endometrial-Embryonic Crosstalk in Ruminants

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A receptive endometrium is crucial for successful embryo implantation and the establishment of pregnancy in mammals. The process of endometrial receptivity is complex, involving changes that allow the embryo to attach and interact with the maternal endometrium. These changes, particularly in the gene expression profile of endometrial epithelial cells during the implantation window, are influenced by rising progesterone levels and interactions between the epithelial cells and the trophoectodermal cells of the implanting embryo. In ruminants such as goats, sheep, buffalo, and cattle, in addition to progesterone (P4) and estradiol (E2), conceptus-derived interferon-tau (IFN-τ) plays a pivotal role in preparing the endometrium for implantation. IFN-τ is essential for signaling the endometrium to express proteins required for conceptus elongation, conceptus attachment, and factors that prevent luteolysis, thereby aiding the establishment of pregnancy. In our study, we investigated the effects of IFN-τ on bovine endometrial cells (BEND cells) to better understand its role in priming the endometrium for implantation. Our results demonstrated that IFN-τ significantly upregulated the expression of interferon-stimulated genes (ISGs), such as ISG15 and ISG12, compared to untreated and IFN-τ treated cells. These genes are involved in immune responses, antiviral defense, and tissue remodelling, underscoring the importance of IFN-τ in these processes. Additionally, we conducted a proteomic analysis of IFN-τ treated and untreated cells under conditions simulating luteal levels of estrogen and progesterone. From our LC–MS/MS analysis, we identified a total of 2,850 proteins across all treatment groups. A comparison of differentially expressed proteins revealed notable differences between untreated, estrogen and progesterone (EP)-treated, and estrogen, progesterone, and IFN-τ (EPT)-treated cells. One of the most significant findings was the upregulation of the protein Peptidyl-prolyl cis-trans isomerase NIMA-interacting 1 (PIN1) in the EPT group. PIN1 plays a key role in the cell cycle and its regulation, suggesting its involvement in the cellular dynamics necessary for successful embryo attachment and implantation. The elevated levels of PIN1 in the EPT group but not in the EP group indicates that IFN-τ may enhance its expression. Further investigations will focus on understanding how IFN-τ regulates PIN1 expression and the subsequent effects on endometrial receptivity.

Keywords: Endometrium; IFN-τ; Peptidyl-prolyl cis-trans isomerase NIMA–interacting 1 (PIN1)

PS-2058

Integrating Wastewater Treatment and Menstrual Hygiene: Advancing Sustainable Practices in Aandhi Village, Rajasthan

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Menstrual hygiene management (MHM) and wastewater treatment are interconnected challenges in rural communities, impacting public health and environmental sustainability. In Aandhi Village, Rajasthan, a study on MHM practices revealed that 81% of women used disposable pads, with 75% discarding them in open areas. This improper disposal contributes to pollution, creates breeding grounds for pathogens, and poses severe health risks. Furthermore, irregular garbage collection (87%) and the lack of proper infrastructure for waste segregation (66%) exacerbate the issue. Despite these challenges, 85% of respondents expressed a willingness to adopt waste segregation practices, signaling readiness for change. A holistic framework is required–where technological interventions and awareness initiatives work together to improve menstrual hygiene. To address these challenges, MHM education with sustainable wastewater treatment solutions are integrated. A Constructed Wetland has been installed to treat greywater, and a Vermifiltration system processes hospital wastewater, reducing organic pollutants and microbial contamination by over 85%. Together, these systems treat over 10,000 liters of wastewater daily, ensuring cleaner water resources and a hygienic environment. Studies indicate that poorly managed wastewater increases bacterial loads by up to 500 times, exacerbating hygiene–related infections. By integrating menstrual waste disposal with decentralized wastewater treatment, this initiative ensures safer disposal, minimizes pollution risks, and fosters sustainable sanitation practices. This integrated approach combines community education, sustainable technologies, and improved infrastructure, linking menstrual waste management with broader environmental goals. It presents a scalable model for enhancing community health and environmental sustainability while highlighting wastewater treatment as a key component of menstrual hygiene advancements.

Keywords: Menstrual hygiene management; Wastewater treatment; Menstrual waste disposal; Rural sanitation; Environmental sustainability

PS-2059

Stress-Induced Changes in Reproductive Hormones of Female Swiss Albino Mice

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Stress is a leading factor affecting hormonal balance and reproductive health in females, often leading to infertility. Present study uses a mouse model to evaluate psychological stress-induced changes in reproductive and stress associated hormones along with body weight. Twenty-one female Swiss albino mice were divided into three groups: Control (basic diet), Single Exposure (six minutes of daily tail suspension stress for ninety days), and Double Exposure (six minutes of stress twice daily with a fifteen minute break for ninety days). Hormonal analysis and body weight monitoring were conducted post-experimentation. Results revealed that stress disrupted key reproductive hormones, with estrogen levels significantly reduced in the Double Exposure group compared to the Single Exposure and Control groups. FSH levels increased in the Single Exposure group but decreased in the Double Exposure group, while LH levels were markedly lower in both stress groups compared to controls. Corticosterone levels were significantly elevated in stressed groups, with Single Exposure showing higher levels than Double Exposure. Body weight decreased notably in stressed groups, with Double Exposure mice displaying the most significant reduction. These findings reveal that chronic psychological stress alters the hypothalamic-pituitary-ovarian axis and disrupts weight regulation, potentially impairing reproductive health and fertility. The study highlights the importance of managing stress to support hormonal equilibrium and reproductive well-being, while emphasizing further research to elucidate the underlying mechanisms and long-term effects of stress on reproductive health.

Keywords: Psychological stress; female infertility; hormonal imbalance; mouse model

PS-2060

Significance of *KISS1* Polymorphism (rs5780218) with Polycystic Ovary Syndrome : A Case-control Study

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Polycystic ovary syndrome (PCOS) is the most prevailing endocrine–metabolic disorder in women at their childbearing age assisted by various symptoms and consequences. This syndrome is characterized by reproductive, metabolic, and endocrine abnormalities including hyperandrogenism, ovulatory dysfunction, infertility, obesity, insulin resistance, hepatic steatosis, and dyslipidemia. Although the pathogenesis of Polycystic Ovary Syndrome (PCOS) is still unclear, the disturbance of hypothalamic–pituitary–gonadal (HPG) axis is suspected to be the main culprit in the development of PCOS. Kisspeptin is a potent GnRH neuron regulator, generally involved in establishing the onset of puberty and fertility. It is a natural ligand of G–protein coupled receptor 54 (GPR54) and a peptide encoded by *KISS-1 gene*, which is associated in the regulation of HPG axis. The rs5780218 polymorphism occurs at –145 position of the 5'UTR of mRNA transcript and represents the deletion of Adenine (A) nucleotide. The present study is the first of its kind from the North population to analyze the association of *KISS1* in women with PCOS cases and controls. The study was conducted involving 60 female participants, comprising 30 cases of PCOS and 30 healthy controls. Following informed consent, 5 mL of blood was collected from each participant. The *KISS1* polymorphism (rs5780218) was genotyped using PCR–RFLP. Statistical analysis was performed using SPSS (version 21, IBM SPSS, NY, USA). The present study demonstrated no significant differences in genotypic ($p = 0.39$) and allelic ($p = 0.23$) frequencies of the *KISS1* polymorphism (rs5780218) in relation to polycystic ovary syndrome (PCOS). In our study, we observed no significant association between *KISS1* polymorphism and polycystic ovary syndrome (PCOS).

Keywords: PCOS; *KISS1*; rs5780218; PCR–RFLP

PS-2061

Infertility stigma and its impact on the Mental Health of Woman

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Infertility, although a medical condition, has implications beyond the inability to conceive and its physical symptoms. According to the American Society of Reproductive Medicine (ASRM, 2017), infertility is defined as the failure to achieve clinical pregnancy after engaging in regular unprotected intercourse for at least one year or after six months if the woman is older than 35. Infertility carries social consequences due to the emphasis on childbearing and the stigma associated with failure to conceive. This stigma adds to the psychological burden and may lead to psychiatric disorders. While research on the psychological impact of infertility is expanding, studies on the stigma faced by Indian women remain scarce. This study explores infertility stigma among Indian women using the validated Hindi version of the Infertility Stigma Scale. The study aims to assess perceived infertility stigma and measure levels of depression, anxiety, and stress among women undergoing IVF. This ongoing study includes participants from Jaipur and nearby rural areas. The Infertility Stigma Scale assessed perceived stigma, while the DASS-21 Hindi version measured depression, anxiety, and stress. Descriptive statistics were used for data analysis. Among patients analysed, 66.67% experienced clinical stress or mental health issues. Depression was reported in 18.52%, while 33.33% experienced anxiety. Additionally, 40.7% experienced self-devaluation, 74.1% engaged in social withdrawal, 81.5% felt socially stigmatized, and 37% were stigmatized by family. Overall, 85.19% suffered from one or more forms of stigma. The findings highlight the psychological and social burden of infertility. Further research will explore whether stigma or other factors contribute to mental health issues. These insights can help develop targeted interventions for women undergoing infertility treatment.

Keywords: infertility stigma; infertility; depression; anxiety; stress; mental health

PS-2062

Therapeutic Efficacy of Adult Stem Cells to Restore Ovarian Insufficiency in Rat Model

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Infertility is defined as failure to achieve pregnancy after one year of sexual intercourse. Premature Ovarian insufficiency (POI) is one of the main causes of female infertility. POI is characterized by menstrual disorder, ovarian atrophy, decreased sexual life and decreased fertility in women before 40 years. Some known causes of POI are autoimmune disorders, genetic causes such as Turner and Fragile X syndrome, family history of POI, medical treatments such as chemotherapy and radiation therapy. Chemotherapy can affect the ovarian follicle of young females and cause long–term infertility. According to recent reports, Mesenchymal Stem Cells (MSCs) have therapeutic efficacy to treat ovarian insufficiency due to their ability to self–renew, multilineage differentiation potential and produce different paracrine factors to regenerate the damaged cells. The present investigation examined the efficacy of Bone Marrow (BM) derived MSCs in restoring fertility in rat models. In the study, rats were divided randomly into three groups. Group 1, representing control rats, group 2 was induced infertile (chemo–ablation through cisplatin) and group 3 was treated with intra–ovarian injection of MSCs after induction. BM was collected from the tibia and femur bone of rats, enriched through Magnetic assisted cell sorting of CD45–& CD90+. The purity of MSCs was confirmed through FACS analysis of positive and negative cell surface markers, i.e., CD90+, CD54+, CD29+ and CD45–, CD31–. Purified MSCs were injected into ovaries of infertile rats, and results were assessed gradually after 2, 4, 6, 8, 10 and 12 weeks of MSCs transplantation. Overall, results revealed that ovarian histology and expression levels of oocyte maturation markers were resumed near to normal gradually after MSCs treatment. Completely restored ovaries were authenticated through the delivery of normal pups within 8 weeks of stem cell therapy. In conclusion, MSCs repair chemotherapy–induced ovaries and can effectively restore female fertility.

Keywords: chemo–ablation; dysfunctional ovaries; infertility; stem cells

PS-2063

Comparative Study of Stimulation Protocols on *In-vitro* Embryo Production of Sahiwal Cows

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This study aims to evaluate the effects of two FSH stimulation (200 mg) protocols on *in-vitro* embryo production (IVEP) in Sahiwal cows. They are, single FSH stimulation and multiple doses of FSH stimulation. In this study the stimulation effect on ovarian follicular growth, oocyte yield, *in-vitro* maturation (IVM) of oocytes, *in-vitro* fertilization (IVF) rates of oocytes, IVEP were evaluated. Irrespective of the phase of the estrous cycle, cows were divided into three equal groups. In group–1 (single FSH stimulation, n=6), CIDR was inserted intravaginally on Day 0, GnRH and FSH was given on day 5 and day 7 respectively. Ovum–pick–up was performed on the 9th day with 48hrs of coasting period. Animals in group–2 (multiple doses of FSH, n=6), CIDR was inserted intravaginally on Day 0 and FSH was given intra–muscularly from day 4 onwards with 12hrs interval in 8 divided tapering doses. OPU was preformed 10th day after 36hrs of coasting period. In group–3 (non–stimulated, n=6) OPU was performed on a random day of estrus cycle. Viable oocytes were *in-vitro* fertilized using sexed–sorted semen. FSH treatment ($P<0.05$) increased the number of follicles per animal (group–1, 20.00 vs. group–2, 22.16 vs. group–3, 5.66). FSH treatment increased the number of oocytes recovered per animal (group–1, 11.50 vs. group–2, 16.16 vs. group–3, 2.66), oocyte recovery rate was also good (group–1, 57.5% vs. group–2, 72.93% vs. group–3, 47.05%), and increased the mean number of *in-vitro* produced blastocyst per animal (group–1, 2.66 vs. group–2, 3.83 vs. group–3, 1.16) and blastocyst conversion rate (group–1, 44.44% vs. group–2, 53.48% vs. group–3, 40.75%). In conclusion, donor animal stimulated with tapering doses of FSH will give better results when compared to stimulation with GnRH and single–FSH injection.

Keywords: *in-vitro* maturation; *in-vitro* fertilization; *in-vitro* embryo production; OPU

PS-2064

A Cross Sectional Study of Socio Demographic and Stigma Factors among Infertile Females of Deoghar District of Jharkhand, India

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Infertility is growing as a menace globally. Couples who are unable to start a family face mental and social breakdown and also find it as a personal failure. As in our country, religion and socioeconomic traditions make it very essential to have a child. Many societies link womanhood to motherhood, this again promotes stigma in infertile couples especially females. Aim: The study was aimed to observe the socio-demographic factors and stigma scale among infertile females of Deoghar district of Jharkhand, India. The cross sectional study was conducted at few designated clinics at Deoghar from the month of February 2022 to January 2023. All the eligible couples seeking infertility treatment consenting to be a part of the study were included. A pre designed Performa was used to fill up the socio demographic profile of screened infertile couples. For observing infertility stigma scale (ISS) in females, FU et al., method was used. The present study used 22 supportive items ranked on a 5 point likert scale. The obtained result was statistically analyzed by Student's t test. Most of the infertile females were in the age group 20–25 years. The mean age of females was 23.92±4.22 years. Out of 75 infertile females recruited for the study, 27 gave consent for stigma study. Duration of infertility among the study group ranged between 2 to 7 years. The duration of infertility was 3.51±1.45 years. Most of the females were housewives (81.48%) and 62.96% of respondents belonged to a joint family. The overall stigma scale was 85.44±6.72. The average value was 2.61± 1.23. Out of four ISS factors, self devolution score was 2.92±1.1; public stigma score, family stigma and social withdrawal score was 2.51±1.26, 2.05±0.94 score 2.82±1.32 respectively. Social withdrawal is significantly higher in infertile females as compared to public stigma. The stigma score for infertile females having masters degree was significantly less as compared to uneducated or those with secondary or higher secondary education. In our study socio-demographic factors were observed to be significantly connected with fertility outcomes. Present study showed that infertile females experience a high level of social stigma and self devolution. However, government policies and suitable public health educational awareness programs can improve patient's cognition and help coping with pessimistic experiences and obtain improved quality of life.

Key words: Female Infertility; stigma; socio-demographic factor

PS-2065

Evaluation of Fertility Trait of Non-return Rate at 90 days in Murrah and Surti Buffalo in Rajasthan

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This study evaluated the fertility trait of Non–Return Rate at 90 days (NRR90) in Murrah and Surti buffaloes in Rajasthan, utilizing 5,93,745 fertility records obtained from the INAPH database maintained by Rajasthan Livestock Development Board for period 2020–2023. Categorization of records was done by the factors like season of artificial insemination, period and region of artificial insemination. Seasons were divided into Rainy (June–August), Autumn (September–November), Winter (December–February), and Summer (March–May). The study analysed artificial insemination data across three periods: 2020–2021, 2021–2022, and 2022–2023, covering ten agroclimatic zones of Rajasthan. Generalized Linear Models (SPSS version 25) with normal identity, binary probit link functions were used for evaluation of the trait. Effects for season, period and region of artificial insemination for Non–Return Rate at 90 days (NRR90) were significant ($P < 0.001$). Autumn season showed the highest NRR90 for both buffalo breeds. Least squares mean values of Non–Return Rate at 90 days (NRR90) for Murrah buffalo were 0.54 ± 0.0014 by identity function and 0.10 ± 0.0036 by probit function, while for Surti buffalo these were recorded as 0.54 ± 0.0041 by identity function and 0.09 ± 0.0102 by probit function. Among the periods, 2022–2023 had the highest NRR90 (0.53), and 2020–2021 the lowest (0.50). Regional analysis revealed the highest NRR90 for Murrah buffalo (0.62) in the Arid Western Plain (Jodhpur and Barmer) and the lowest (0.47) in the Humid Southeastern Plain (Kota, Jhalawar, Bundi, Baran, Sawai Madhopur, and Karauli). Surti buffalo showed the highest NRR90 (0.61) in the Humid Southeastern Plain and the lowest (0.31) in the Transitional Plain of Luni Basin (Jalore and Pali). The findings emphasize the importance of Autumn as the most favourable season for buffalo fertility due to reduced heat stress, better forage quality, and alignment with the natural breeding cycle. Proper nutrition and health care during this season can further enhance reproductive outcomes.

Keywords: Artificial insemination; fertility; Murrah; non–return rate at 90 days; Surti

PPS-2066

Heavy Metal Contamination in Wetlands and its Impact on Reproductive Health

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Wetlands are vital ecosystems that serve as transitional zones between land and water, offering essential services like groundwater recharge, flood mitigation, habitat for diverse fauna, and resources such as fish, fodder, and food for local communities. However, rapid urbanization, globalization, and industrialization have resulted in the discharge of untreated domestic and industrial wastewater into water bodies, causing eutrophication and heavy metal contamination. Toxic metals accumulate in sediments, water, and aquatic organisms, eventually entering the human food chain through contaminated food and water. Heavy metals like mercury (Hg), lead (Pb), cadmium (Cd), chromium (Cr), and arsenic (As) are non-essential and highly toxic, posing significant risks to human health, particularly reproductive health. Prolonged exposure to these metals can impair reproductive functions, such as reduced sperm count, motility, and viability in males, as well as hormonal imbalances and delayed oocyte maturation in females. Chronic exposure has been linked to conditions like infertility, breast cancer, endometriosis, menstrual disorders, spontaneous abortions, preterm deliveries, and stillbirths. Specific metals exert unique reproductive effects: nickel disrupts spermatogenesis through reactive oxygen species (ROS), cadmium causes erectile dysfunction and developmental harm to fetuses, and lead alters sex hormones, destabilizes chromatin, and affects fetal development, leading to miscarriages and low birth weight. Heavy metals interfere with DNA, RNA, and protein synthesis during spermatogenesis and impair ovarian function, delaying ovulation and reducing conception rates. Integrated efforts should focus on restoring wetlands to reduce heavy metal contamination while advancing research on its impacts on human reproductive health. Stricter pollution controls, eco-friendly remediation, and public health interventions are crucial to safeguard ecosystems and mitigate reproductive toxicity.

Keywords: wetland; heavy metals; reproductive health; sperm count; hormonal imbalance

PS-2067

Impact of Combined effects of Dimethyl Phthalate (DMP) and Bis (2-ethylhexyl) Phthalate (DEHP) on Fertility and Reproductive Outcomes in Sprague-Dawley (SD) Rats

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Phthalates, a class of endocrine-disrupting chemicals, are ubiquitous environmental pollutants that have been linked to reproductive toxicity. Dimethyl Phthalate (DMP) and Bis (2-ethylhexyl) Phthalate (DEHP) are two commonly used phthalates with potential adverse effects on fertility and reproductive outcomes. This study aimed to investigate the combined effects of DMP and DEHP on fertility and reproductive outcomes in Sprague-Dawley (SD) rats, exploring the potential mechanisms underlying these effects. The study involved 100 Sprague-Dawley rats of each sex, divided across five dosage groups: control (corn oil), DMP (1000 mg/kg), DEHP (1000 mg/kg), DMP+DEHP (300+300 mg/kg), and DMP+DEHP (1000+1000 mg/kg), through oral gavage. Exposure was two weeks prior to mating, and postmating in males, continued through gestation and lactation in females. Fertility and reproductive outcomes, including sperm quality, estrous cyclicity, and reproductive organ morphology, were assessed. Histopathological and biochemical analyses were performed to elucidate the underlying mechanisms. The combined exposure to DMP and DEHP resulted in significant alterations in fertility and reproductive outcomes, including decreased sperm motility, increased sperm abnormalities, and disrupted estrous cyclicity. Histopathological analysis revealed testicular atrophy, epididymal inflammation, and ovarian follicle degeneration. Biochemical analysis showed alterations in hormone levels (Testosterone, Estradiol, FSH, LH and TSH) at 1000 mg/kg. This study demonstrates that the combined exposure to DMP and DEHP has adverse effects on fertility and reproductive outcomes in SD rats, highlighting the potential risks to human reproductive health. The findings suggest that the synergistic effects of phthalates may exacerbate reproductive toxicity, emphasizing the need for further research and regulatory measures to mitigate exposure to these chemicals.

Keywords: Dimethyl phthalates (DMP); bis(2-ethylhexyl) phthalate (DEHP); fertility; reproductive toxicity.

PS-2068

Research Trends in Animal Reproduction at Post- Graduate Institute of Veterinary Education & Research, Jaipur

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In order to enhance the productivity of livestock and to ease the reproduction methods in companion animals, a number of research work was carried out in the last five years (2019–2024) at Post−Graduate Institute of Veterinary Education & Research, Jaipur. Assisted reproductive technology and conservation of biological fluid for the improvement, conservation and dissemination of germplasm was carried out efficiently in the Veterinary Gynaecology & Obstetrics department. Progress in the research area of animal reproduction will be detailed.

Keywords: Livestock; reproduction; five years; PGIVER; Post− Graduate Institute of Veterinary Education & Research

PS-2069

Generation of MSTN Gene-edited Embryos Using SCNT and Zygote Electroporation in Buffalo: A Comparative Study

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Genome-editing technology has transformed animal breeding by enabling precise modification of genes associated with desired traits. This method is quicker and more cost-effective than traditional hybridization breeding, which can be time-consuming. However, its advancements in buffaloes have been slower compared to other mammals due to long gestational periods, single pregnancies, and high rearing costs. In the present study, we aimed to generate MSTN-edited buffaloes, known for their distinctive double-muscling phenotype, as a proof of concept. Myostatin (MSTN) is a key gene affecting muscle development, and deletion of MSTN gene can significantly improve growth rate and muscle yield; therefore, gene editing of MSTN is an important research direction in beef buffalo breeding. To meet our goal, we used somatic cell nuclear transfer (SCNT) and zygotic electroporation (CRISPR-EP) technique. For this, we firstly determine the optimal conditions to introduce CRISPR components into *in vitro* produced buffalo zygotes by electroporation. Electroporation was performed using different combinations of voltage, pulse and time, and we observed that the electroporation in buffalo zygote at 20 V/mm, 5 pulses, 3 msec at 10 h post insemination (hpi) resulted in increased membrane permeability and higher knockout efficiency without altering embryonic developmental potential. We also identified the best transfection method for introduction of RNP complex into fibroblast which was further used for SCNT. To investigate this, we compared transfection, cleavage efficiency, and cell viability between nucleofection and lipofection in adult fibroblasts. Our results demonstrated that nucleofection significantly ($P \leq 0.05$) outperformed lipofection, leading to the use of nucleofection for generating MSTN-edited cell colonies, which were subsequently used for SCNT. Additionally, we compared the embryonic developmental rate of SCNT and zygotic electroporation and found that the blastocyst rate in the electroporated group was significantly ($P \leq 0.05$) higher than in the SCNT group. Thus, the present study shows that zygotic electroporation, which does not require complex micromanipulation techniques, simplifies genetic modification in large livestock and offers a practical alternative to SCNT.

Keywords: CRISPR-EP; lipofection; MSTN; nucleofection; SCNT

PS-2070

Differential Glycolipid Levels in Sperm Plasma Membrane are Linked to Subfertility in Sahiwal Cattle Bulls

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India is blessed with a huge livestock population but unfortunately, a significant obstacle in this field is still the low conception rate brought on by the subpar quality of semen. The low quality semen further negatively impacts sperm capacitation processes that prepare mammalian sperm for the challenging task of fertilizing an oocyte. It includes intricate changes in plasma membrane proteins and lipid rafts, triggering various signaling pathways that boost progressive motility prior to the acrosome reaction and zona penetration. Inadequate capacitation can reduce the likelihood of successful fertilization consequently lowering fertility rates. Lipids have been identified as one of the many molecular components that combines to make spermatozoa functional. Any changes in its composition affects functionality in terms of motility, ability to capacitate and perform acrosome reaction. This study used advanced LC-MS/MS techniques to analyze plasma membrane lipids in Sahiwal bulls. LF sperm showed lower viability, acrosome integrity and higher cryo-induced capacitation, lipid peroxidation, and reactive oxygen species (ROS) levels indicating significantly lower functioning ability in the LF group ($P<0.05$). Computer-assisted semen analysis suggested that the altered lipid profile in LF bulls may contribute to suboptimal sperm kinematics. Further, we selected a glycolipid, CerG2GNAc1 also known as glucosylceramide (GlcCer), from the LC-MS/MS data due to its significantly higher abundance in the LF group. This glycolipid plays a crucial role in regulating sperm signaling, influencing sperm function and fertilization potential; however, excessive GlcCer accumulation can impair sperm function, reducing male fertility. By inhibiting GlcCer, we observed a significant increment in the series of processes crucial to successful completion of sperm capacitation including changes in ROS levels, mitochondrial membrane potential (MMP), and acrosome reaction (AR). Our findings suggest that blocking Glccer glycolipid on LF spermatozoa improved sperm capacitation, motility, and cervical mucus penetration, highlighting its major role in regulation of sperm functionality.

Keywords: capacitation; glycolipid; high fertile; low fertile; spermatozoa

PS-2071

Gut Microbiome Composition is Associated with Fecal Short-Chain Fatty Acid Profiles of CMV PCR-Positive and Negative Pregnant Women with Bad Obstetric History

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Cytomegalovirus (CMV) infection during pregnancy is a risk factor for adverse outcomes linked to a bad obstetric history (BOH). Short-chain fatty acids (SCFAs), produced by gut microbiota, play a role in immune regulation and may contribute towards the modulation of immune responses associated with CMV-infection in pregnant women with BOH. Analyzing SCFA profiles in CMV-positive and negative pregnant women can provide insights into microbiome alterations and their impact on pregnancy. Pregnant women recruited for the study were categorised into four groups depending on clinical history and diagnosis of CMV infection by PCR–BOH CMV+ve, BOH CMV-ve, Healthy CMV+ve, Healthy CMV-ve. Stool samples were collected from a total of 50 women i.e. 10 pregnant women each from these four groups along with 10 non-pregnant women. and SCFAs were quantified using HPLC while microbiome analysis was performed using 16S rRNA sequencing. Preliminary analysis revealed distinct SCFA profiles. BOH CMV-ve individuals had higher levels of butyrate, acetate, and propionate, while valerate was increased in Healthy CMV+ve individuals. Microbiome analysis showed lower *Actinobacteria* in BOH CMV+ve women, while *Proteobacteria* increased and *Bacteroidetes* decreased in both CMV and BOH groups. *Actinobacteria* negatively correlated with acetate, butyrate, and *valerate*, while *Bacteroidetes* positively correlated with these SCFAs. The study highlights the correlation between CMV infection, SCFA profiles, and gut microbiome composition in pregnant women. Altered SCFA levels and microbiome composition in CMV-positive pregnant women with BOH may contribute to immune dysregulation and adverse pregnancy outcomes, suggesting potential microbiome-targeted interventions for CMV-infected BOH mothers.

Keywords: Cytomegalovirus; bad obstetric history; SCFA; HPLC

PS-2072

The Impact of Various Factors on Recurrent Pregnancy Loss in Jaipur Population

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Around 1–5% of women worldwide suffer from recurrent pregnancy loss (RPL), a serious reproductive health concern. Numerous factors, including autoimmune diseases, genetic predispositions, and uterine anomalies, contribute to this complex syndrome. Improving diagnostic, preventative, and treatment approaches for women experiencing recurrent pregnancy loss requires a better understanding of these aspects. The primary objective of this study was to investigate the role of autoimmune disorders, genetic mutations, and uterine abnormalities in the pathophysiology of recurrent pregnancy loss in women from Jaipur. Specific aims included identifying the prevalence of these factors and their correlation with RPL in this population. A structured questionnaire will collect demographic details, including age, marital status, education, socio-economic status, occupation, lifestyle factors (e.g., smoking, alcohol use, diet), and geographical location. Detailed medical histories of participants will be obtained, including previous pregnancy outcomes, family history of genetic disorders or RPL. Also, hormonal tests, genetic testing, immunological tests and ultrasound examination would be done to check all the basic parameters. It is anticipated that this study will offer important information on the different elements causing this illness. Chromosome abnormalities, thyroid dysfunction, autoimmune illnesses, and uterine abnormalities are just a few of the genetic, endocrine, immunological, and environmental variables that are likely to be identified as contributing to RPL. The study could also examine the efficacy of other interventions and treatments, like lifestyle changes, hormonal therapy, and surgery, and evaluate how well they address the root reasons of RPL. To sum up, this study will give an in-depth understanding of the condition's multifactorial character, emphasizing the intricate interactions between genetic, endocrine, immunological, environmental, and sociodemographic elements that affect the condition's prevalence in the area.

Keywords: Recurrent Pregnancy Loss (RPL); autoimmune disorders; genetic mutations; uterine abnormalities; antiphospholipid syndrome.

PS-20

Bacteriophage Characterization for Combatting Mastitis-causing MDR *Escherichia coli* and Methicillin Resistant *Staphylococcus aureus*

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Bovine mastitis is a significant economic concern in dairy farming. Multidrug-resistant (MDR) *Staphylococcus aureus* and *Escherichia coli* are among the primary pathogens causing clinical and subclinical mastitis. The increasing antimicrobial resistance (AMR) in these pathogens complicates treatment with conventional antibiotics. This study explores bacteriophages as a promising alternative against MDR *S. aureus* and *E. coli*. From 84 mastitis milk samples, 52 *S. aureus* and 20 *E. coli* isolates were obtained. Antibiotic susceptibility testing revealed resistance to six antibiotic classes in *S. aureus* and five in *E. coli*. Notably, 31 of the *S. aureus* isolates were methicillin-resistant (MRSA), with 11 harboring the *coa*, *mecA*, and *blaZ* genes. Additionally, 19 of the 20 *E. coli* isolates were ESBL-producing. Lytic bacteriophages were successfully isolated against one MRSA isolate (A1) and one ESBL-producing *E. coli* isolate (92CQ). The MRSA phage (Phage A1) exhibited lytic activity against 15 out of 31 MRSA isolates, while the ESBL-producing *E. coli* phage (Phage 92CQ) lysed 14 out of 19 *E. coli* isolates. Adsorption assays indicated that ~60% of phages adsorbed within 5 minutes (with $MgCl_2$) and ~90% within 20 minutes. Single-step growth assays revealed favorable latent periods, rise periods, and burst sizes for both phages. Both phages demonstrated stability across a broad range of temperatures and pH levels. Transmission electron microscopy identified the MRSA phage as belonging to the *Myoviridae* family and the ESBL-producing *E. coli* phage to the *Podoviridae* family. This study highlights the potential of these phages as therapeutic agents against AMR pathogens in bovine mastitis, paving the way for alternative treatment strategies.

Keywords: Bacteriophage; *Escherichia coli*; mastitis; methicillin-resistant; multidrug-resistant (MDR); *Staphylococcus aureus*

PS-2074

Effect of Bisphenol A (BPA) on Reproductive Health and it's Bioremediation Approaches

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Modern manufacturing processes produce the hazardous endocrine disruptor bisphenol A (BPA) into the environment. BPA can interfere with endogenous hormone synthesis, function, and activity, which can lead to abnormalities in pituitary–adrenal and hypothalamic–pituitary–gonadal gland function. Because of the extreme genotoxicity and cytotoxicity of BPA, it is urgently necessary to identify and eliminate its effects. It was shown that the BPA negatively impacts maturing oocytes are the initiation of meiosis in fetal ovaries, the dissolution of germ cell nests, and follicle development. The gonads (the female ovaries and the male testes), and the hypothalamic–pituitary–gonadal (HPG) axis a neuroendocrine system is ultimately responsible for reproductive health. The hypothalamus pituitary–gonadal axis, a critical neuroendocrine circuit that controls reproductive function, is abnormally organized in mice exposed to BPA, which can cause pubertal timing disruption and impair the ability to sustain a regular ovulatory cycle. Additionally, BPA has been shown to cause cell arrest and death in cultured ovarian granulosa cells, indicating that BPA may also affect the adult ovary. Due to its toxic effects on reproductive health the bioremediation technique developed and it shows a significant role to degrade the BPA. The microorganism, which produces laccase and lignin peroxidase enzymes may break down BPA. Therefore, we propose the use of different bacterial cultures which produce ligninolytic enzymes for degradation of BPA and its toxicity evaluation.

Keywords: BPA; enzymes; hypothalamic–pituitary–gonadal gland; toxicity

PS-2075

Serum Leptin and BMI Per Se do not Impact Ovarian Gametogenic and Steroidogenic Potential during *In Vitro* Fertilization and Embryo Transfer

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Overweight and obesity are associated with increased risks of morbidity with metabolic and reproductive health consequences and affects quality of life. Female reproductive functions are exquisitely sensitive to the alteration in the body's metabolic states. But the mechanistic link between body mass and reproductive functions is not clearly elucidated. Leptin, an adipocyte derived hormone, encoded by the '*Ob*' gene has emerged as a peripheral signal indicating the adequacy of nutritional status for reproductive functions. It plays an important but controversial role in ovarian folliculogenesis. Though leptin is widely present in reproductive tissues, its relationship to reproductive hormones is still poorly understood. An attempt has been made in the present investigation to study the inter-relationship between body mass index (BMI), leptin and ovarian functions. Women (23-36 years) enrolled for *in vitro* fertilization–embryo transfer (IVF-ET) were evaluated for BMI and categorized under two subgroups: non-obese (BMI≤ 25) and obese (BMI>25). Subsequently they underwent controlled ovarian hyperstimulation (COH) with standard long protocol GnRH-agonist down regulation followed by rFSH and hCG stimulation. Serum leptin levels were measured in different phases of IVF-ET. Depending on the hCG-day leptin levels, patients were further categorized under three (3) (<15, 15-30 and >30ng/ml of serum leptin) sub-groups. Numbers of oocytes retrieved were counted. Luteinized granulosa cells (LGC) were cultured *in vitro* and assayed for gonadal steroids. GraphPad Prism Statistical Software Package (GraphPad Software Inc.) was used for data analysis. *P* value <0.05 was considered significant. Serum leptin level positively correlated with BMI. However, the number of oocytes retrieved and LGC's response to gonadotropin did not differ statistically in the obese/non-obese as well as between the three sub-groups of patient population. Present Observations exhibit that BMI and serum leptin concentration *per se* do not impact the gametogenic and steroidogenic potential of ovary during COH followed by IVF-ET.

Keywords: Body mass index; controlled ovarian hyperstimulation; hypothalamic-pituitary-gonadal axis; *in vitro* fertilization-embryo transfer; leptin.

PS-2076

Clinical Outcomes of Assisted Reproductive Techniques in Obstructive Azoospermia: A Case Series of Four Patients

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Infertility affects millions of people and has an impact on their families and communities, approximately 1 in every 6 people of reproductive age worldwide experiencing infertility in their lifetime. In male reproductive systems, infertility is mainly caused by problems in the ejaculation or semen absence or low level of sperm or abnormal shape i.e. morphological motality of the sperm. Azoospermia, the absence of sperm in the ejaculation, is identified in 15% of infertility men and results from the pre–testicular, testicular, and post–testicular causes and may be classified as obstructive azoospermia and non–obstructive azoospermia. In most cases of obstructive azoospermia, normal or near–to–normal sperm production continues in the testes. Testicular biopsy is a surgery to remove a piece of tissues from the testicles. The tissue is examined under a microscope. The development of assisted reproductive technology, especially in intracytoplasmic sperm injection, i.e. ICSI, the testicular biopsy, has transformed from a simple diagnostic method to a means of both diagnosis and treatment. The aim of this study is to evaluate the impact of testicular biopsy with obstructive azoospermia in determining the ART outcome. It is a retrospective study which includes case histories for Azoospermic patients with primary infertility. TESA, TESE and PISA surgery was performed followed by ICSI. In a 3 case studies out 4 extracted few motile sperm whereas 1 obtained non motile sperm. Those sperm were used for ICSI which gave good quality embryos in all 4 cases which were transferred using either fresh cycle or frozen cycle on day 3 or day5 respectively. All the 4 cases showed the implantation rate, 3 cases showed pregnancy as well as take home baby rate whereas 1 case had miscarriage rate in 3rd month of pregnancy. To conclude there is good quality embryo development even with the TESA sample. The miscarriage in that 1 case may be due to the non motile sperm injected. Therefore more case studies are required to support these outcomes /results. Limitation of the study excludes female infertility factor, endometrium thickness during ET and sample size.

Keywords: Azoospermia TESA; Obstructive azospermia; TESE; PESA; Testicular Biopsy; ICSI

PS-2077

Mitochondrial Genetic Etiology Implicated in Premature Ovarian Insufficiency of Adolescence

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Premature Ovarian Insufficiency (POI) is the early loss of ovarian function before age 40, affecting ~1% of women. Its etiology remains largely idiopathic, with limited therapeutic options, necessitating novel research into underlying mechanisms. This study explored genetic abnormalities in adolescent POI patients using Whole Exome Sequencing (WES). WES was performed on three adolescent women with idiopathic POI, followed by in silico analyses to predict the functional impact of identified variants. Protein modeling was used to assess their potential effects on structure and function. Gene variants were found in pathways related to the mitochondrial fatty acid shuttle, endoplasmic reticulum (ER) stress, mitochondrial function, and apoptosis, shedding light on POI pathophysiology. Known pathogenic variants were identified in FIGLA, DNAH6, NOTCH2, and GHR. Additionally, several variants of uncertain significance (VOUS) were detected in EIF2AK3, CYP4A11, CPT2, and mitochondrial genes MT-ND2, MT-CO1, MT-CO2, MT-ATP6, MT-ND3, MT-ND4, MT-ND5, and MT-CYB, which are involved in oxidative phosphorylation. Notably, novel variants were discovered in POF1B, FMR1NB, SLC25A5, RNF167, AOX1, AP3S1, FAM8A1, PANO1, ZNF267, SGSM2, SCNN1D, ATAD3C, TAF1B, RBM5, HTT, ARHGEF28, ZNF658, FAM177A1, YY1, GOLGA8H, SON, and VCX. Among these, three novel mitochondrial variants—SLC25A5, AOX1, and ARHGEF28—showed high predicted local distance difference test (pLDDT) scores, indicating significant structural impacts. SLC25A5 (critical for ATP production) and AOX1 (involved in ROS production) had pLDDT scores >90, while ARHGEF28 (cell cycle regulator) scored between 70–90. These genes play key roles in ovarian biological processes, including meiosis, follicular development, cell differentiation, and ovulation. *In-silico* analyses and genotype–phenotype correlations suggest most variants contribute to mitochondrial fatty acid shuttle dysfunction, ER stress, lipid oxidation, and cell cycle dysregulation. Disruptions in ATP production may induce lipotoxicity, ER stress, and follicular atresia, impacting ovarian function and fertility. This study highlights the value of WES in identifying genetic contributors to POI and underscores the need for further research into mitochondrial and ER stress-related mechanisms in ovarian failure.

Keywords: Premature Ovarian Insufficiency (POI); mitochondrial fatty acid shuttle (MFAS); Whole Exome Sequencing (WES)

PS-2078

A Qualitative Study on Women's Experiences with Infertility and the Role of *In-vitro* Fertilization with Special Reference to Haryana

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According to Friedan (1963) fertility is central to a woman's identity. Bhardwaj (2016) also suggests that infertility disrupts the traditional social and natural triangle of mother, father, and child, leading to societal stigma, especially in patriarchal cultures like India. This study examines the experiences of women undergoing *in-vitro* fertilization (IVF) at private clinics in Gurugram, Haryana. The respondents were chosen through purposive sampling and in-depth interviews were conducted with 20 women, 10 husbands, and five infertility specialists through interview schedules with open-ended questions. Data was analysed qualitatively. Findings reveal that women experiencing primary infertility often confront significant social stigma and emotional isolation, compounded by a pervasive culture of silence surrounding treatment. Respondents reported lower social status linked to their infertility. Reliance on alternative therapies such as homeopathy and Ayurveda was also found. Emotional vulnerability was particularly pronounced in women undergoing second and third IVF cycles, highlighting the psychological toll of repeated treatments on their mind and body. Cases of Ovarian Hyperstimulation Syndrome (OHSS) were visible among respondents highlighting the reduction of women to mere bodies during IVF treatments. Furthermore, a strong preference for using their own eggs over donor options reflects deep-seated societal norms regarding the sacredness of motherhood. Furthermore, infertility specialists identified late marriages, Polycystic Ovary Syndrome (PCOS), endometriosis, and increased stress as critical factors contributing to infertility among women. Lastly, this study underscores the need for a more supportive discourse surrounding infertility that acknowledges its complex intersections with gender, identity, and societal expectations.

Keywords: India; infertility; IVF; motherhood

PS-2079

Fortification with Vitamin C, Vitamin E and their Combination of Cryopreserved Semen of Murrah Buffalo Bulls

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To evaluate the effect of vitamin E, vitamin C and their combination (vitamin C+E) on antioxidant enzymes i.e., CAT SOD, GSH–Px, GSH and DFI, LPO in cryopreserved semen of Murrah buffalo bulls. Semen samples collected from three healthy Murrah buffalo bulls. Semen sample was divided into four equal groups *viz.* T–1,T–2,T–3 and Control. The divided samples were diluted with a Tris Egg yolk Glycerol (TYG) extender supplemented with antioxidants vitamin C (3.5 mM) (T–1), vitamin E (5 mM) (T–2), vitamin C+E combination (3.5 mM+5 mM) (T–3) and extender containing no antioxidants (control). French mini straws and stored in LN_2 (−196°C). Frozen straws were thawed at 37°C in a water bath and evaluated upto 5th day of storage. The lipid peroxidation was significantly ($p<0.05$) more reduction in combination of vitamin C+E as compared to vitamin C, vitamin E and control group. In combination, vitamin C+E was exhibited significantly ($p<0.05$) higher catalase activity as compared to vitamin C, vitamin E and control group. Significantly ($p<0.05$) higher SOD activity in T–1 compared to control whereas, significantly ($p<0.05$) higher SOD activity showed in T–2 and T–3 group as compared to control. Glutathione peroxidase and glutathione reductase enzyme activity was significantly ($p<0.05$) higher in T–1,T–2 and T–3 as compared to control. DNA fragmentation index was significantly ($p<0.05$) lower DFI in T–1 and T–2 as compared to control group whereas in combination of vitamin C+E (T–3) exhibited significantly ($p<0.05$) lower DFI as compared to control, vitamin C and vitamin E on day 5 of preservation. The results concluded that the combination of vitamin C+E has the most protecting effects on sperm integrity against ROS production when compared to vitamin E and vitamin C groups.

Keywords: DNA fragmentation index (DFI); liquid nitrogen (LN_2); Murrah buffalo bulls; reactive oxygen species (ROS); Superoxide dismutase (SOD)

PS-2080

"BPA free" Plastic Products Contain "BPS": Equitably Precarious to Male Fertility

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Bisphenol A (BPA) is one of the anthropogenic chemicals, commonly used as a building block of many consumer products like epoxy resins, polycarbonate plastics, medical equipments, dental sealant, eyeglasses, toys, in lining of food and beverage containers, infant feeding bottles, thermal papers etc. Many studies have acknowledged BPA as endocrine disruptor and linked it with various health adversities such as; developmental disorders, metabolic disorder, obesity, endocrine disorder, infertility, DNA damage, breast cancer etc. Because BPA has such harmful impacts, it was replaced by other analogue compounds of bisphenols like Bisphenol S, Bisphenol F, bisphenol Z etc. Bisphenol S (BPS) is structurally similar to BPA having two phenolic groups on either side of the sulfonyl group. Hence, researchers claimed that BPS showed similar hormonally active as BPA and thus, has endocrine disrupting effects. To test the effects of BPS a study was planned as, Wistar albino rats were orally administered with 10, 50, and 100 µg/100g body weight/day of BPS for 45 days. Results of the study showed significant decline in body weight based on dose–dependent manner, significant decline in fertility of male rats among all test groups. Sexual hormonal assays confirmed dose–dependent decline in serum testosterone, FSH and LH. Histological architecture of testis indicated vacuolization in seminiferous tubules due to loss of interstitial spaces and Leydig cells were also common in all test groups and presence of pyknotic spermatogonia, Conclusively, the results indicated BPS induced reproductive toxicity in testicular cells leading to decline in male fertility.

Keywords: Bisphenols; endocrine disruptor; male infertility; reproductive toxicity.

PS-2081

A Multifactorial Approach to Male Infertility: Exploring The Epigenetic Landscapes of Sertoli Cell Only Syndrome

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Sertoli cell only syndrome (SCOS) is a histopathological subtype of primary testicular failure, characterized by total loss of germ cells leading to azoospermia. The current understanding of aetiology and associated molecular mechanisms explains only 20% of the cases. Infertility in men is linked to stigma, emotional distress, increased cancer risk, and poor overall health. Given that sustainable development goals target 3.7 seeks to attain reproductive health by 2030, this work could serve as a resource for national strategies and programs aimed at integrating reproductive health into these initiatives. It is an exploratory study to investigate epigenomic factors associated with idiopathic cases of SCOS. It is a hospital based observational study in which we prospectively recruited male patients with azoospermia due to spermatogenic failure. Comprehensive clinical history, blood samples, semen analysis parameters, and reproductive endocrine evaluation was performed on 50 SCOS patients. Experiment specific control samples were collected. The known genetic causes were investigated using XY fluorescent *in-situ* hybridization (XY-FISH) and Yq microdeletion for exclusion. DNA methylation microarray and small RNA sequencing was performed to investigate epigenomic factors. We found CCDC169-SOH2, and MOV10L1 were found to be hypomethylated while MCPH, ODF1, PICK1, CHD5, SBF1 were hypermethylated between control and idiopathic SCOS groups. From the literature it can be inferred that SBF1 and CCDC169-SOHLH2 may be NOA candidate genes. The differential miRNA expression analysis of 50 SCOS vs 10 NS showed a total of 78 up-regulated and 175 down-regulated miRs. To further investigate the gene functions regulated by the differentially expressed miRs in SCOS, target gene prediction was done using miRDB tool. Gene ontology (GO) and KEGG pathway analysis demonstrated the target genes of downregulated miRs with log2 fold change≥2 to be enriched in important biological processes like apoptosis and cell differentiation. Also, the target genes were involved in important pathways like PI3K-Akt and MAPK signaling with significant enrichment scores as per the KEGG analysis. This study shows the prevalence of epigenomic contributors in SCOS patients. The outcome in terms epigenomic factors (as they are trans-generationally heritable) could help in patient counselling before proceeding for assisted reproductive treatment.

Keywords: Male infertility; Sertoli cell only syndrome; Azoospermia

PS-2082

Impact of Pesticides on Human Health: Risks and Concerns

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Agriculture has been essential to the development of human civilization and is the bedrock of contemporary society. It is the primary food source, giving people all around the world the nourishment they need to survive. Agriculture plays a crucial role in the global economy by providing raw materials for sectors like textiles, medicines, and biofuels in addition to food. To ensure food security and reduce losses, farmers add pesticides to maintain crop quality and quantity. In order to determine food security and reduce losses, farmers use pesticides, such as herbicides, insecticides, and fungicides, to maintain crop health and production. Exposure to pesticides has been linked to various human diseases, including cancers (brain tumours, leukaemia, non–Hodgkin lymphoma, breast, prostate, and others), neurodegenerative disorders (Alzheimer's, Parkinson's, ALS), infertility, birth defects, ADHD, autism, respiratory issues, and organ diseases. Pesticides have harmful effects on both men and women, affecting fertility, the reproductive system becoming unbalanced by imitating natural hormones like estrogen. Thyroid hormones, which are essential for controlling metabolism and reproduction, can potentially be impacted by pesticides. Reduced sperm motility, general semen quality have all been related to certain pesticides, including carbamates and organophosphate, exposure to these chemicals may cause testosterone levels to drop, which could affect male fertility while female fertility is greatly affect by irregular menstrual periods, premature ovarian failure and ovulatory dysfunction. Pregnancy–related exposure to pesticide residues may raise the chance of low birth weight, which can cause the unborn child to have further developmental delays. Pesticides may affect the neurodevelopmental abnormalities, and a higher risk of autistic spectrum disorder (ASD) in pregnant women who are exposed to pesticides. To promote sustainable agriculture and reduce these risks, organic fertilizers and vermicompost offer eco–friendly alternatives for achieving high crop yields.

Keywords: pesticides; cancers; infertility; toxicants

PS-2083

Whole Exome Sequencing Approach to Explore Genetic Variants in PCOS

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Polycystic ovary syndrome (PCOS) is a complex polygenic endocrinopathy affecting 5–20% of reproductive-age women. Familial studies, candidate gene investigations carried out globally and genome-wide association studies in Chinese and European women have identified multiple PCOS-associated genetic loci. This study aims to identify the functional variants linked to PCOS by whole exome sequencing (WES) using Agilent SureSelect CREV2 Exome capture panel probes. We identified nonsynonymous variants among eighty-five well-characterized women with PCOS. The annotated variants were filtered based on minor allele frequency and in-silico pathogenicity prediction tools. We found a significant association of 234 rare pathogenic nonsynonymous variants in 201 genes significantly associated with PCOS in our study group. These genes are involved in steroid hormone biosynthesis, ovarian steroidogenesis, insulin resistance, and PI3K–Akt signaling pathway, all of which play critical roles in the pathophysiology of PCOS. A comprehensive evaluation of genes known to be associated with PCOS was performed to deepen the understanding of the polygenic profile of PCOS. Women carrying these variants presented with altered hormonal profiles, and clinical signs of hyperandrogenism and hyperinsulinemia, emphasizing their impact on PCOS pathophysiology. Several functional single nucleotide variants linked to PCOS pathophysiology have been revealed in our analysis which could shed light on the genetic susceptibility landscape of Indian women to PCOS. The study will contribute to a deeper understanding of how polymorphisms and rare variants influence the complex genetic nature of PCOS.

Keywords: Polycystic ovary syndrome; exome sequencing; single nucleotide variant; minor allele frequency

PS-2084

Viral FAST Proteins: a Guide in Search of Mammalian Gamete Fusogens

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Life begins with the fusion of sperm with oocyte but despite many studies on mammalian fertilization, the molecular players involved in this process have not been identified clearly. Discovering the sperm–oocyte membrane fusion molecule(s) remains the "Holy Grail" for reproductive scientists. Till date, IZUMO1, SPACA6, FIMP, TMEM95 and SOF1 are the only sperm proteins proven to be essential for fertilization using gene-knockout studies. However, current evidence shows their role is restricted to gamete adhesion only and not in gamete fusion. Since the sequence of events leading up to the merger of the two lipid bi-layers has been studied extensively in viral membrane fusion, we hypothesized that mammalian proteins with domains similar to viral fusogens may play a critical role in sperm-oocyte fusion in mammals. Viral fusion proteins can be classified into four different classes based on the differences in their tertiary structure and multimerization. Class IV fusion proteins–also called fusion–associated small transmembrane (FAST) proteins-are produced by non-enveloped reoviruses which merge multiple host cells into a syncytium. We hypothesized that fusogens responsible for membrane fusion events during mammalian fertilization will be structurally similar to these FAST proteins. To identify these, testis-enriched genes were sorted out from the available gene expression database Human Protein Atlas. Structural similarities between proteins of these testis-enriched genes and known viral fusogens were analysed using different bioinformatic tools. RT-PCR, Western blot and immunofluorescence were used to detect the expression and cellular localization of the selected proteins. Out of 950 testis-enriched proteins in the Protein Atlas database, two proteins viz., TEX29 and TMEM210, were found to have domain similarity with viral FAST proteins. Expression was detected only in the murine testis among all the tissues tested. Protein expression was observed in testicular germ cells as well as in epididymal sperm. Immunofluorescence data indicated that these proteins are localized to the head region of sperm. Further carrying out gene functional studies through Knock-out models can decipher the precise role of these proteins in fertilization.

Keywords: Sperm proteins; fusion proteins; fusogens; FAST proteins

PS-2085

Genetic Insights into PCOS: Unravelling the Role of *GnRH1* Polymorphism in the Punjabi Population

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Polycystic ovary syndrome (PCOS) is a prevalent hormonal disorder impacting about 9.2% of women. It often manifests with cardiovascular risk factors, reproductive and metabolic issues, and increased levels of androgen, resulting in symptoms such as irregular menstrual cycles, hirsutism, and insulin resistance. The condition remains widely underdiagnosed, affecting physical and emotional well-being. PCOS is often diagnosed using the Rotterdam criteria, which requires two out of three key features: irregular ovulation, hyperandrogenism, or polycystic ovarian morphology (PCOM). The gonadotropin-releasing hormone (GnRH) system, particularly the *GnRHI* gene located on chromosome 8, plays a central role in regulating hormonal responses. In PCOS, GnRH resistance to feedback from hormones like progesterone is evident and may be related to elevated androgen levels. This study is among the first to analyze the association of the *GnRHI* gene variant (rs6185) in PCOS within the Punjab region, aiming to understand genetic factors contributing to disease expression and severity. A study was conducted on 60 female participants including 30 PCOS cases and 30 healthy controls. Following informed consent, 5 mL of blood was collected from each participant, further, *GnRHI* polymorphism was genotyped using ARMS-PCR, and Statistical analysis was performed using SPSS (version 21, IBM SPSS, NY, USA). In our study, we did not find any significant difference in the genotypic (p=0.2) and allelic (p=0.4) frequency of polymorphism rs6185 between PCOS cases and healthy controls. The current investigation demonstrates a non-significant association between the GNRH1 polymorphism (rs6185) and PCOS.

Keywords: PCOS; GnRH1; rs6185; ARMS-PCR

PS-2086

Somatic Gonad Cells-Specific Collagens Modulate Reproductive Aging via FOXO/DAF-16-Dependent Insulin Signaling in *Caenorhabditis elegans*

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The insulin signaling pathway (IIS) plays a pivotal role in regulating oocyte and distal germline quality, directly influencing embryonic viability and reproductive longevity. Despite IIS's well-documented impact on germline aging, the contribution of somatic gonads to these effects remains elusive. Our investigation seeks to clarify the interplay among IIS-regulated targets at the systemic level, which are accountable for maintaining somatic gonad integrity. This interplay has the potential to impact the integrity of germline/oocyte, enhance morphology, and sustain germ cell proliferation as organisms age. To address this, we isolated gonads from wild-type and low insulin signaling condition worms across various time points, subjecting them to RNA-Seq analysis. Our results unveiled a significant upregulation of collagen genes, highlighting their potential significance in reproductive aging. To delineate their specific roles, we categorized collagens, based on sequence similarity and conducted knock-down experiments. Collagen gene knock-down affects reproductive aging without substantially impacting reproductive capacity. However, targeted knock-downs of collagen genes specific to gonads underscored their crucial role in maintaining somatic gonad cell morphology and integrity with advancing age in a FOXO/DAF-16 transcription factor dependent manner. These findings suggest that somatic gonadal collagens contribute to reproductive aging regulation by influencing gonadal structural integrity. Furthermore, our analysis revealed a notable overlap in gene expression profiles between gonads and whole worms, with distinct stage-specific patterns persisting in an insulin signaling–dependent manner over time. This observation underscores the intricate temporal coordination of gene expression dynamics, particularly influenced by insulin signaling, in both gonadal and whole organism contexts. In summary, our study offers novel insights into the mechanisms governing reproductive aging, highlighting the intricate interplay between insulin signaling, somatic gonads, and germline integrity. Understanding these interactions could pave the way for potential therapeutic strategies to counteract age-related reproductive decline and enhance overall reproductive health.

Keywords: Reproductive aging; insulin signaling; collagen genes; FOXO/DAF-16; *Caenorhabditis elegans*

PS-2087

Enhancing Efficacy of Cisplatin with Sesamolin as an Adjuvant in Ovarian Cancer

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Ovarian cancer (OC) is one of the fatal malignant tumors because the disease is often diagnosed late due to the lack of effective screening strategies at the early stage. Cisplatin, a platinum-based cytotoxicity drug, is effective initially, but has severe side-effects. Therefore, it is necessary to find a suitable adjuvant for use in combination therapy to reduce the dosage of Cisplatin. Sesamolin, a lignan compound isolated from the seeds of *Sesamum indicum*, has been reported as an effective anticancer agent. The current study aimed to examine the effects of Sesamolin alone and in combination with Cisplatin in OC cells.The current study aimed to examine the effects of Sesamolin alone and in combination with Cisplatin on cellular behaviour, as well as to analyse the expression patterns of EMT markers and selected proteins to elucidate the role of Sesamolin in pathway modulation in human OC cells. Cytotoxicity of Sesamolin and Cisplatin drug combination was assessed using MTT assay on SKOV3 cells. Transwell migration and invasion assay was performed to check the migratory and invasive ability through the extracellular matrix of OC cells. Western Blotting was performed to explore the expression pattern of EMT markers. The differential proteomics analysis of treated and untreated OC cells groups was done by LC-MS/MS. The current study has shown for the first time that Sesamolin inhibited the viability of OC cells *in-vitro*. It also suppressed the migratory and invasive ability of OC cells by affecting the expression of EMT markers. Also, treatment of OC cells with a combination of Sesamolin and Cisplatin led to an increase in cytotoxicity. This potentiates the use of Sesamolin as an adjuvant with Cisplatin *in-vitro*. Sesamolin has shown anti-proliferative effect on OC cells and is working synergistically with Cisplatin *in-vitro*.

Keywords: cisplatin; *Sesamum indicum*; ovarian cancer

PS-2088

Deciphering the Impact of KISS1 Polymorphisms with Polycystic Ovary Syndrome: A Case-Control Study

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KISS1 polymorphisms might lead to PCOS by dysregulating GnRH which causes disturbance in the LH/FSH ratio. The present study aimed to analyze the genetic association of *KISS1* polymorphism rs4889 in females with PCOS in Punjab. This study comprised 212 PCOS women and 238 healthy controls. Blood samples were collected and DNA was extracted, further genotyping of *KISS1* polymorphism was analyzed by PCR–RFLP technique. Anthropometric measurements and biochemical analysis including lipid profile and hormonal profile were calculated to evaluate the association of these parameters with PCOS. Statistical analysis was done by using SPSS (version 21, IBM SPSS, NY, USA). In our study, BMI, WHR, cholesterol, triglycerides, VLDL, LH, and testosterone levels were found to be significantly higher while HDL level was significantly lower, in PCOS women than in controls ($p<0.05$). The polymorphism rs4889 showed a strong association with PCOS. The mutant genotype (CC) and mutant allele (C) conferred 3.79 folds ($p<0.0001$) and 2.3 folds ($p<0.0001$) higher risk towards the progression of PCOS. It is the first Indian study that performed the association analysis of *KISS1* polymorphisms with PCOS and our study deciphered the cardinal role of *KISS1* polymorphism rs4889 in the progression of PCOS.

Keywords: PCOS; KISS1; kisspeptin; rs4889

PS-2089

Effect of Lipid Emulsion on Trophoblast Cell Functions

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The maternal immune system undergoes significant changes throughout pregnancy to defend against infections while avoiding rejection of a semi-allogeneic fetus. An imbalance in this immunological interface can result in Recurrent Pregnancy Loss (RPL), which is linked to various factors such as genetic abnormalities, hormonal imbalance, and immune dysfunction. The underlying reasons for up to 50% of RPL cases remain unknown, with immune system irregularities playing a central role. Lipid emulsion therapy (LET) has emerged as a promising treatment for RPL. Although its precise mechanism remains unclear, LET appears to normalize NK cell activity, which is often dysregulated in these conditions. Through this immunomodulatory effect on NK cells, LET may facilitate successful embryo implantation and maintain pregnancy progression. Trophoblast cells of the placenta are also crucial for successful pregnancy maintenance. However, the effects of LET on trophoblast functions have not been studied comprehensively. Hence, this study aimed to investigate the effects of a commercially available lipid emulsion, Intralipid, on key aspects of trophoblast functions. The trophoblast cell line, JEG-3 was cultured in Dulbecco's Modified Eagle's Medium (DMEM). Cells were treated with different doses of Intralipid for various time points. After treatment, cell viability and proliferation were assessed using MTT assay. Migration and invasion abilities were evaluated through wound healing and Matrigel transwell assays, respectively. To assess the effect of Intralipid on endocrine function of trophoblasts, levels of hCG, progesterone, and estradiol were measured in the spent media using immunoassay. The expression of immune- and angiogenesis-related molecules was analyzed by qPCR and western blotting. Results of this study will help determine the possible cellular and molecular mechanisms underlying the modulatory effect of LET on trophoblast cells, which may support successful pregnancy.

Keywords: Recurrent pregnancy loss; lipid emulsion therapy; trophoblast cells; invasion; endocrine function.

PS-2090

Advancements in Assisted Reproductive Technology: Innovations Shaping the Future of Infertility Treatment

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Assisted Reproduction Technology (ART) is an area of active research and hope for millions of individuals across the globe. With new advancing technologies each day, ART has completely transformed the treatment of infertility. The recent advancements in reproductive medicine are shaped to ensure safety, accessibility and improved outcomes. Embryo culture techniques like time-lapse imaging and dynamic culture media are enhanced to enable more accurate embryo selection and culture. Genetic screening during IVF treatment has improved accuracy and invasiveness with the development of preimplantation genetic testing (PGT) with two-parent testing to niPGT (non-invasive PGT). Through advancements in cryopreservation methods like ovarian tissue freezing (OTF) and vitrification (rapid cooling) of oocytes the potential for preserving fertility has been significantly increased. Machine Learning and Artificial Intelligence are disrupting ART by improving embryo assessment and personalising treatment. Technologies including magnetic-activated cell sorting (MACS) and microfluidics improved fertilisation and implantation rates through better sperm and embryo selection. Therapies like mitochondrial replacement therapy and uterine transplantation are approaching. Non-invasive endometrial receptivity tests offer accurate windows of implantation, resulting in increased implantation and further resulting pregnancies. In the era of personalised medicine, hormonal stimulation protocols are optimised such that all aspects of treatment can be tailored to the individual patient, leading to a more efficient process. Another potential future, perhaps more controversial, is that of gene editing technologies like CRISPR, which can edit genetic abnormalities in embryos. In ART, new technologies, such as robotics, facilitate greater procedural precision, and improved fertility preservation techniques hold promise for those who may face infertility as a result of age or medical conditions or treatments. These advancements are aimed at being both patient-centred and efficacious whilst also ensuring safety in addressing the challenges of infertility. As ART progresses, realizing its full potential will demand multidisciplinary collaboration and ethical scrutiny.

Keywords: Assisted Reproductive Technology (ART); Preimplantation Genetic Testing (PGT); Cryopreservation; Machine Learning and Artificial Intelligence; Personalised Medicine

PS-2091

Effects of Escitalopram, a Selective Serotonin Reuptake Inhibitors (SSRIs) on Sertoli Cell (TM4) Functions

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Depression is a common mental disorder worldwide and lowers the quality of life. Selective serotonin reuptake inhibitors (SSRIs) are used as the first line of treatment for major depression in males of reproductive age. However, SSRIs are known to affect both male and female fertility. In vivo studies have reported that maternal treatment with fluoxetine reduced the volume of seminiferous tubules, number of spermatozoa, Sertoli and Leydig cells in male offsprings of the treated rats or mice. In humans, SSRIs can result in reduced libido, erectile dysfunction, and inhibited ejaculation. One of the commonly used SSRI, escitalopram, has been shown to decrease sperm concentration, motility, and morphology in humans. However, the effect of escitalopram on Sertoli cell functions is yet to be studied. Hence, this study aimed to check the effect of escitalopram on Sertoli cell functions in vitro. Sertoli cell line, TM4 was grown in DMEM/F-12 medium supplemented with 5% Horse serum and 2.5% Fetal Bovine Serum. Cells were seeded in 6-well, 24-well or 96-well plates to measure the RNA level, hormone secretion or cell viability respectively. TM4 cells were treated with different doses (0, 25, 50, 100, 200 and 400µM) of escitalopram for 24 hours and spent culture media or cells were collected. Expression of AMH, Inhibin B and ABP were measured at mRNA and protein level by doing q-PCR and ELISA. Cell viability of TM4 cells was assessed by performing an MTT assay. No significant changes were observed in AMH gene expression at RNA or protein levels. Inhibin B RNA levels significantly decreased with higher concentrations of escitalopram but its protein expression increased with some doses. ABP significantly increased in a dose-dependent manner. Interestingly, decrease in the cell viability was obtained with 100-400µM of escitalopram. This is the first study documenting the effect of escitalopram on Sertoli cell functions.

Keywords: Selective serotonin reuptake inhibitors; escitalopram; sertoli cells; anti-mullerian hormone; androgen binding protein

PS-2092

N-Acetyl Cysteine Mediated Amelioration of Cadmium Induced Oxidative Stress and Granulosa Cell Apoptosis

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Cadmium (Cd) is a non-essential trace element that is widely distributed in the environment. Both geogenic and anthropogenic sources can elevate Cd concentrations in soils and groundwater, which are important for maintaining healthy supplies of food and safe drinking water. Cd has long biological half-life and low excretion rate, thus accumulates to a high level in several organs including kidney, liver and ovaries. It has been reported that Cd may be associated with adverse reproductive health outcomes in women. Therefore, the present study was designed to evaluate dose and time dependent effects of Cd exposure within granulosa cells of goats (*Capra hircus*) along with an antioxidant NAC. *In-vitro* cultured antral follicles were treated with different doses of CdCl2 and NAC for 24 and 48 hrs duration and various biochemical, histological, and oxidative parameters were employed. MTT assay and differential staining results revealed that Cd caused a time-and dose-dependent decline in percentage viability of granulosa cells and increase in incidence of apoptosis. Transmission electron microscopy revealed diminished cell-cell contact and cellular integrity, chromatin condensation, and pyknosis with nuclear membrane folding, accumulation of lipid droplets in Cd treated granulosa cells. However, NAC co-supplementation increased the granulosa cell viability, reduced the frequency of apoptotic attributes, and ultrastructural alterations. NAC further reduced the production of MDA in the caprine ovary exposed to Cd by significantly reversing the reduction in the enzymatic activity of antioxidant enzymes (GST, SOD, and CAT) and ferric reducing antioxidant power. In conclusion, this study shows cadmium has a negative impact on the female reproductive system and NAC treatment significantly attenuated the Cd evoked ovarian damage, suggesting its beneficial potential in preventing or at least in managing the gonadotoxicity in females induced by steadily increasing Cd contamination in the environment.

Keywords: Cadmium; N-acetyl cysteine; apoptosis; reproductive system

PS-2093

PFOA Induced Alterations in Ultrastructure of Cauda Epididymal Sperm and Fertility Consequences in Wistar Albino Rats

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Perfluorooctanoic acid (PFOA) belongs to a group of chemicals that comes under perfluorinated alkylated substances (PFAS). It is widely used in non–stick cookware and stain resistant products, fire–fighting foam, food packaging materials and various industrial processes. Drinking water is thought to be a major source of exposure to PFOA including food ingestion in contaminated areas, sea food, popcorn bags, PTFE cookware etc. Perfluorooctanoic acid (PFOA) adversely affects male reproductive system. This study attempted to ascertain effects of PFOA on gonadal hormone and resulting changes in cauda epididymal sperm. Wistar albino male rats were exposed to 2, 5 and 10 mg PFOA/ kg body weight for 45 days along with parallel control. Sperm characteristics, fertility rate, hormonal levels, ultrastructure of sperm and TUNEL assay were performed to evaluate impact of PFOA. Results showed significant reduction in sperm count (>50%), motility (>60%), viability (>20%) in rats exposed to 10 mg/kg b.w./day of PFOA. Abnormality in cauda epididymal sperms also increased 2–folds compared to control. A 20% decline in fertility rate was noted in rats treated with 10 mg/kg b.w./day of PFOA. Direct impact of exposure was evident in both testosterone and luteinizing hormones. Ultrastructure of cauda epididymal sperm revealed typical oxidative stress related damages in the tail and apical head region. Affirmative increase in the number of apoptotic germ cells was observed. Conclusively, it was evident that daily administration of PFOA could adversely affect spermatogenesis, sperm characteristics by regulating testosterone and gonadotropins.

Keywords: Perfluorooctanoic acid; spermatogenesis; male fertility; gonadotropins

PS-2094

First Successful Live Births in Sheep through Laparoscope Assisted Multiple Ovulation and Embryo Transfer Procedure in India

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Multiple ovulation and embryo transfer (MOET) technologies form an integral part of breeding schemes in sheep husbandry, enabling a rapid increase in the numbers of high genetic merit animals. The most challenging aspects of this technology is the inconsistent ovarian responses of donor sheep to various hormonal treatments, difficulty in embryo recovery, and the reproductive status of the recipient when transferring viable embryos. This study was undertaken to assess the success of multiple ovulation and embryo transfer (MOET) protocol using Porcine Follicle Stimulating Hormone (pFSH) and Pregnant Mare Serum Gonadotropin (PMSG) and therefore determining the conception success. Study was conducted at University Sheep Farm, SKUAST-K, Shuhama using a laparoscope-assisted procedure for both embryo recovery and transfer. Porcine FSH and GnRH were used in donors and PMSG in recipients using the 18 day protocol, all the ewes responded to the treatment (n=14). The mean super ovulatory response (SOV) in terms of the number of corpora lutea was 9.43 per animal. The mean SOV response from right ovaries and left ovaries was 53.64±6.91 and 46.35±6.91 respectively. The average embryo recovery rate by laparoscope-assisted flushing was 70.71%. The embryos obtained were mostly un-cleaved with sperms attached or of two cell stages. The embryos collected via flushing were cultured *in-vitro* and transferred into donor ewe, either on the next day of flushing or at blastocyst stage, through fimbriae or mid horn respectively. On day 40, via trans abdominal USG pregnancy was confirmed in six (40%) of animals with each animal showing a single viable fetus. Out of these 6 pregnant ewes, one intrauterine death occurred on 100th day of gestation, while one of the ewes died preterm, and revealed a single fetus on post mortem. 3 healthy lambs were born normally and one gestation is still on. Overall, the results of this study suggest the first successful laparoscope-assisted MOET procedure with live birth in sheep in the country using pFSH and PMSG protocol with 40% conception rate.

Keywords: Laparoscope**;** embryo; sheep; hormone; pregnant

PS-2095

The Role of Bio-enzymes in Sustainability, Pollution Reduction and their Impact on Reproductive Health

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In the pursuit of sustainable solutions to environmental challenges, bio-enzymes have emerged as a promising tool for reducing pollution and promoting eco-friendly practices. Derived from natural resources such as fruit and vegetable peels, bio-enzymes and environmental enzymes offer a non-toxic, biodegradable alternative to harmful chemicals. This study explores the direct role of bio-enzymes in sustainability and pollution reduction, and their indirect but crucial impact on human health, including reproductive health. Bio-enzymes play a significant role in degrading organic pollutants, reducing the chemical burden on ecosystems, and minimizing hazardous substances in household and agricultural products. By replacing conventional chemical cleaners and pesticides with enzyme-based solutions, we reduce the exposure to endocrine-disrupting chemicals, heavy metals, and other pollutants that negatively affect human health, particularly reproductive health. Although the primary benefits of bio-enzymes lie in their environmental applications, their indirect effects on reproductive health are noteworthy. By promoting cleaner, healthier living environments and reducing the presence of harmful pollutants in the ecosystem, bio-enzymes contribute to better overall health, including fertility and reproductive well-being. This study outlines the potential for bio-enzymes to mitigate environmental stressors that are linked to reproductive health issues, providing a pathway to safer, more sustainable living. Through a combination of experimental studies, product development, and environmental assessments, we demonstrate how bioenzymes contribute to both environmental sustainability and human health. Our findings highlight the need for further exploration of bio-enzymes in addressing broader health issues, including reproductive health, as part of a holistic approach to sustainability.

Keywords: Bio-enzymes; sustainable solutions; reproductive health; eco-friendly practices

PS-2096

Establishing a Three-Dimensional Endometrial Cell Culture Model to Modulate Endometrial Cells Functions in Buffalo

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The uterine endometrium plays a crucial role in fertility and the onset of uterine infection compromises the fertility and productivity of dairy cows and buffaloes. Development of endometrial culture systems that mimic *in vivo* conditions would be valuable for studying pathogen–endometrial cell interaction and testing drug efficacy for modulating endometrial cells functions. Therefore, the present study was carried out to develop a three–dimensional endometrial cell culture (3D–ECC) model as a prototype to modulate endometrial cells functions in buffalo. Endometrial epithelial (EECs) and stromal (ESCs) cells were isolated from buffalo genitalia using two step digestion protocols. Different extracellular matrices (ECMs) such as purecol (PL), Geltrex (GX), Maxgel (MX), Gelatin (GL) and Hydromatrix (HX) alone or in combination were used for culture of endometrial cells. In brief, ESCs were seeded ($2x10^5$ cells/ ml) on culture plate coated with ECM and on reaching confluence (60%), a thin layer of ECM was laid over the ESCs followed by seeding of EECs ($2x10^5$ cells/ml) and the developed model was observed for 1 week for its structural and functional details. Based on structural, growth and functional characteristics, Geltrex–Purecol–Gelatin and Geltrex–purecol combination were considered as most suitable ECM for 3D-ECC. Further, treatment of cells in 3D-EEC with IFN-τ @1µg/ml for 24 hrs significantly ($P<0.01$) reduced both basal and steroid induced $PGF_{2\alpha}$ production & PGFS expression and increased both basal and steroid induced PGE_2 production & PGES expression. Similarly, treatment of cells in 3D–EEC system with OT @100 ng/ml for 24 hrs significantly ($P<0.01$) increased both basal and steroid induced $PGF_{2\alpha}$ production & PGFS expression and reduced both basal and steroid induced PGE_2 production & PGES expression simulating *in vivo* condition. Altogether, from this study a structurally and functionally competent bubaline 3D–endometrial cell culture system was developed which can be used as a model for drug testing and to understand pathogen–endometrium interactions.

Keywords: Buffalo; endometrium; epithelial cells; stromal cells; prostaglandin production.

PS-2097

Electrospun Nanofiber Encapsulation: A Novel Approach for Progesterone Delivery System for Controlled Breeding in Dairy Cattle

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Progesterone (P4) is a commonly used steroidal hormone in humans and livestock that possesses huge therapeutic potential in regulation of pregnancy and augmentation of fertility in females. Nano based P4 delivery platforms are the new generation P4 devices developed with biocompatibility, biodegradability, and better drug economy. Liposomes are lipid nanocarriers. P4 encapsulated liposome cream is commonly used in hormone replacement therapies in postmenopausal women. Currently, P4 loaded liposomal cream has been developed for estrous synchronization through transdermal route in cattle. Pressurized gyration method also used for progesterone incorporated polyethylene oxide (PEO) nanofibers for vaginal delivery. Recently, electrospinning has effectively been used to encapsulate P4 in various biopolymers for controlled drug delivery especially for hydrophobic drugs. With the aim of developing an economic, biocompatible, and biodegradable P4 release intravaginal device for dairy cattle, we have made an attempt to incorporate P4 in various biopolymers using electrospinning methods. The present study was aimed to encapsulate the hydrophobic drug P4 in cellulose acetate (CA) for controlled delivery by electrospinning. Because, CA is a cellulose derivative, it is plentiful, natural, biodegradable, biocompatible, non-toxic polymer that can form nanofibres with high chemical, mechanical stability with high porosity and serve as an effective drug carrier for controlled P4 release. The P4 was successfully incorporated in CA nanofibers and mean fiber diameter ranged from 162.38±25.72 to 281.08±39.75 nm. Fourier transform infrared spectroscopy revealed the interaction of P4 with CA. The zeta potential of P4 loaded CA nanofibers were positively charged and ranged from 13.87±0.04 to 3.58±0.28 mV, indicating biopolymer CA could be more amenable for transmucosal delivery through negatively charged mucin surfaces. Hydrodynamic diameter of P4 loaded CA nanofibers ranged from 606.0±32.0 to 727.0±34.7 nm, indicating the more stabilized/protective shell layer around CA. The cumulative P4 release profile from the CA nanofibers indicated an efficient and prolonged release of P4 from CA. The kinetic modelling of the P4 release revealed Fickian diffusion of P4 from CA nanofibers. Cell viability assay revealed optimal survivability of Baby Hamster Kidney cells (67.52±7.12 to 74.33±5.61%) on exposure to P4 loaded CA nanofibers that ensured biocompatibility. In conclusion, the present study revealed successful nano-encapsulation of P4 in CA biopolymer and suggests the potential of P4 loaded CA nanofibers for the development of intravaginal P4 delivery system for controlled breeding/estrus induction in dairy cattle.

Keywords: Nanofiber; electrospinning; cellulose acetate; biopolymer; cattle; breeding

PS-2098

From Fabrics to Fallout: Addressing the Dual Crises of Pollution and Reproductive Health in the Textile Industry

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The textile industry, while a critical driver of industrial growth, is a significant contributor to environmental contamination through the release of untreated, dye-laden wastewater. This effluent contains toxic chemicals, heavy metals such as lead, cadmium, and mercury, and persistent dyes, posing severe risks to the environment and human health. Pollutants like azo dyes and aromatic amines are not only carcinogenic but also disrupt aquatic ecosystems and reduce photosynthetic activity. Traditional wastewater treatment methods, including physical, chemical, and biological approaches, often fall short of achieving complete pollutant removal and generate secondary waste such as sludge.The harmful impacts of textile wastewater extend to reproductive health, particularly due to hazardous materials like synthetic dyes and endocrine-disrupting compounds such as phthalates and nonylphenols. Men exposed to heavy metals in textile effluents frequently experience testicular damage, hormonal imbalances, and reduced sperm quality. Women face irregular menstrual cycles, infertility, and pregnancy complications, including embryonic abnormalities and miscarriages. Prenatal exposure to these toxicants further leads to developmental delays, congenital abnormalities, and neurotoxicity in children.Studies from major textile hubs like China and India reveal alarming statistics: 30% of male workers report reduced sperm quality, while infertility rates among women exposed to textile effluents are 25% higher. Recognizing this, organizations like the United Nations Environment Program (UNEP) and the World Health Organization (WHO) have officially identified untreated textile wastewater as a significant contributor to reproductive toxicity and water pollution.To address these challenges, the implementation of advanced, sustainable wastewater treatment solutions is essential. Strict regulation of hazardous chemical use, coupled with efforts to raise public awareness, is crucial to mitigate the environmental and health risks posed by the textile industry. This study highlights the urgent need for comprehensive measures to reduce these hazards, ensuring a healthier and safer future for affected communities.

Keywords: Textile industry; Environmental contamination; Sperm quality; Pregnancy problems; UNEP (United Nations Environment Program); WHO (World Health Organization)

PS-2099

Ecotoxicological Effects of Chronic Exposure of Dibutyl Phthalate on Zebrafish: Gonadal Tissue Examination and Developmental Perspective

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Dibutyl phthalate (DBP) is a widely used plasticizer and a persistent environmental pollutant found in soil, water, and air. Its role as an endocrine disruptor raises concerns due to its negative impacts on reproductive health, including damage to gonadal tissues and interference with gametogenesis. While zebrafish (*Danio rerio*) are a reliable model for studying reproductive toxicity, the chronic effects of DBP on aquatic organisms remain underexplored. This study aimed to investigate the long-term effects of DBP exposure on gonadal health in adult zebrafish (F0 generation) and assess potential intergenerational impacts on their F1 offspring. Adult male and female zebrafish were acclimated to laboratory conditions, with breeding trials confirming their initial reproductive health. Fish were then exposed to DBP for 21 days. Gonadal histology analysed and reproductive outcomes, including fertilization success were evaluated. F1, offspring were assessed for developmental, reproductive, and survival outcomes. The findings highlighted that DBP exposure caused a dose-dependent deterioration in gonadal health, with significant histopathological damage to both testicular and ovarian tissues. Impaired germ cell development and reduced fertilization success were observed in the F0 generation. Intergenerational effects in F1 offspring included delayed development, and increased mortality was observed correlating to DBP exposure levels. DBP exhibits pronounced reproductive toxicity in zebrafish, affecting both the exposed generation and their offspring. Hence, concluding DBP's potential ecological and health risks, demonstrating the utility of zebrafish as a model for studying the long-term effects of environmental pollutants on reproductive health.

Keywords: Dibutyl phthalate (DBP); zebrafish model; reproductive toxicity; environmental pollution; intergenerational effects

PS-2100

Overview of the Antioxidant Effects of Coenzyme Q10 on Induced Testicular Toxicity on Albino Rat: A Review

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Male reproductive health is significantly threatened by oxidative stress and environmental contaminants, both contributing to testicular toxicity. Lifestyle and environmental factors can induce oxidative stress, negatively impacting fertility. Consequently, interest in antioxidant supplementation therapy is growing. Coenzyme Q10 (CoQ10), vital for energy synthesis and possessing substantial antioxidant properties, is widely used to enhance spermatogenesis in cases of idiopathic male infertility. Recognized as a highly effective antioxidant, CoQ10's role in alleviating induced testicular toxicity in albino rats is comprehensively examined in this review. While studies suggest CoQ10 supplementation improves sperm parameters, randomized controlled trials are limited. Nevertheless, CoQ10 has emerged as one of the most effective treatments for male infertility, emphasizing the need for further research.

Keywords: Coenzyme Q10; oxidative stress; antioxidant; male infertility; testicular toxicity

PS-2101

Arsenic Exposure and Molecular Insight of Arsenic-Induced Reproductive Toxicity

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Heavy metals contamination becomes a major topic of concern to global health of humans and animals. Among the various heavy metals, Arsenic (As), is a toxic metalloid element with no biological function in the body. Its use in pesticides, herbicides, and industries led to the contamination of groundwater and agricultural land. The main source of exposure to the general population is through drinking water. According to UNICEF report (2021) approximately 1.4 million wells were contaminated with arsenic and potentially affected 22 million people in Bangladesh. Arsenic exposure and bioaccumulation causes damage to various body organs such as lungs, skin, kidney, liver and reproductive system. Arsenic is also categorised as carcinogen, a potent reproductive toxin which causes malformations in male reproductive system. Arsenic induced-oxidative stress plays a pivotal role in increasing infertility among male. Some *in vitro* studies conducted on rabbits and Japanese eel revealed the toxic effects of arsenic on sperm characteristics and steroidogenesis. Furthermore, few studies also indicate that arsenic affects male fertility by altering the levels of luteinizing hormones (LH), follicle-stimulating hormone (FSH), testosterone and distort the process of spermatogenesis. In addition, some studies documented that arsenic exposure to male shows erectile dysfunction, prostate cancer, and testicular disorders. Thus the objective of this review is to address the effects and mechanism of arsenic-induced toxicity in male reproductive system.

Keywords: Heavy metals contamination; arsenic; reproductive toxicity.

PS-2102

Retrospective Evaluation of Trophectoderm (TE) Biopsy on IVF Outcome

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Preimplantation Genetic Testing (PGT) detects IVF embryos for chromosomal abnormalities and identifies euploid embryos to be implanted while excluding aneuploid ones, thereby maximizing implantation success and minimizing genetic risks. PGT involves removal of one or two cells, called blastomeres, from the embryo at the 6–10 cell stage (day 3 of development) or removal of several (5–10) Trophectoderm cells at the blastocyst stage, termed as Embryo Biopsy. This procedure aids the selection of viable embryos thus leading to better success rate in pregnancies. The cause of implantation failure could therefore be contributed by transfer of aneuploid embryos, especially amongst women who are Advanced Maternal Age (AMA) and also people who experience repeated implantation failures. The developmental potential of embryos is usually poor, and in most cases, miscarriages are usually recorded. This study aimed to assess the quality of biopsied embryos before embryo transfer (ET) and the impact of embryo biopsy on pregnancy and miscarriage rates in women with a history of repeated implantation failure. It was a retrospective study, conducted at Apollo Fertility on 40 patients who underwent ART cycles. The participants were split between two groups: embryo biopsy patients and others who were not embryo biopsy before ET. Data analyses in this study are based on these three parameters: embryo grading, transfer of embryos, and pregnancy outcome. The results reveal a great and considerable number of positive outcomes resulting from pregnancies. While the reason behind this could be the transfer of genetically tested normal embryos, further study is required to establish direct correspondence between embryo biopsy and successful pregnancy. The present study therefore illuminates the role that embryo biopsy may have in enhancing the implantation outcomes and decreasing miscarriage during the IVF cycle.

Keywords: Preimplantation genetic testing; embryo biopsy; aneuploidy; pregnancy outcome

PS-2103

Fluorescence Spectroscopic Investigations on DSP-3, a Major Fn-II Protein of Donkey Seminal Plasma: Chemical Unfolding and Phospholipid Binding

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Fibronectin type-II (Fn-II) proteins from mammalian seminal plasma, such as PDC-109, HSP-1/2, DSP-1, and DSP-3, bind specifically to choline phospholipids on the sperm surface and induce cholesterol efflux, which is a prerequisite for sperm capacitation. We investigated the microenvironment of tryptophan residues in DSP-3, in its native state and upon ligand binding, using steady-state and time-resolved fluorescence. Quenching of the protein intrinsic fluorescence by neutral and ionic quenchers revealed that binding of choline-containing lipids, Lyso-PC, and DMPC provided greater shielding of the Trp residues than phosphorylcholine, which could be attributed to partial penetration of the protein into the hydrophobic interior of the lipid membrane. Studies on chaotropic-induced unfolding revealed that disulfide bonds prevent the complete unfolding of DSP-3. Biexponential decay profiles were obtained in time-resolved fluorescence studies, consistent with the above observations. In future work, we propose to investigate the oligomeric state of the above Fn-II proteins under native and ligand-bound states employing biophysical methods such as fluorescence correlation spectroscopy (FCS) and dynamic light scattering (DLS).

Keywords: Seminal plasma proteins; fluorescence spectroscopy; quenching Studies; chemical denaturation; DMPC

PS-2104

Significance of LHCGR Polymorphisms in Polycystic Ovary Syndrome: An Association Study

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Polycystic ovary syndrome (PCOS) is an endocrine–metabolic disorder that affects women during their reproductive years. The precise etiology of PCOS remains uncertain; however, it has been suggested that the development of PCOS involves the interplay between multiple genes and environmental factors. This study was conducted to analyze the association of *LHCGR* rs4953616 and rs7371084 polymorphisms with the risk of polycystic ovary syndrome in Punjab. A total of 823 women (443 PCOS cases and 380 healthy controls) were enrolled in the present study. The polymerase chain reaction–restriction fragment length polymorphism technique (PCR–RFLP) was used for genotyping. Anthropometric parameters like BMI and WHR, as well as lipid and hormonal profiles, were compared between the two groups. All the statistical analyses were done using SPSS. The mutant genotype (TT), mutant allele (T), and recessive model of rs4953616 polymorphism conferred 1.77, 1.3, and 1.5 times more risk to PCOS development, respectively. In contrast, no significant association was observed for rs7371084 polymorphism. Dyslipidemia was found to be associated with PCOS women. The values of BMI and WHR were significantly higher in PCOS cases. The levels of testosterone and luteinizing hormone were elevated in women with PCOS. Upon haplotype analysis, the TT haplotype was found to be significantly associated with the increased risk of PCOS. Our results demonstrated a significant role of *LHCGR* rs4953616 polymorphism in the development of PCOS, therefore, this polymorphism can be used as a risk factor for early diagnosis of PCOS in females of Punjab.

Keywords: PCOS; LHCGR; polymorphism; PCR–RFLP

PS-2105

Comparative Evaluation of Biochemical and Genotoxic Effects of Intratesticular Administration of Zinc Gluconate, Calcium Chloride and Cadmium Chloride in Male Albino Rats

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Intratesticular injection of chemical Agents offers a minimally invasive method to induce aspermatogenesis and permanent infertility, providing a potential solution for controlling stray dog populations. In this study, 60 adult male rats were divided into four groups: group A: vehicle injected control (0.1 mL physiological saline); group B: zinc gluconate (13.3 mg/mL; chelated with L–Arginine) into each testis; group C: calcium chloride (20% in neutralized physiological saline) into each testis and group D: cadmium chloride (0.5 mg/kg b.wt.) chelated with EDTA into left testis. Five animals from each group were euthanized at 30, 90, and 180 days post–injection for analysis. Groups B, C and D showed disorganization of seminiferous tubules, arrested spermatogenesis, exfoliation of immature germ cells, thickened lamina propria, and reduced Leydig cells after 180 days. Plasma levels of testosterone, LH, and FSH were significantly altered ($P<0.01$; $P<0.001$), and oxidative stress with low androgenic enzyme activity was noted. Biochemical markers in testis and epididymis fluctuated significantly but group D returned to normal after 180 days. Micronuclei incidence decreased in groups B and C, while no changes were seen in group D. Chromosomal studies showed no abnormalities. Vital organs weight, blood serum and hematological parameters remained unchanged in all groups. In conclusion, zinc gluconate and calcium chloride negatively affected the reproductive system while cadmium chloride showed greater sterilizing potential.

Keywords: Genotoxicity; intratesticular injections; sterilization

PS-2106

Comparison of Exosomes Isolated from Normal Pregnant Women & Women with Recurrent Pregnancy Loss

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Recurrent Pregnancy Loss (RPL) is defined as the loss of two or more pregnancies before 20 weeks of gestation. Some etiologies of RPL are genetic, anatomic, autoimmune, endocrine etc., however the cause cannot be ascertained in about 50% cases. It is known that proper embryo–maternal interactions are required for successful implantation and subsequent pregnancy. Any dysregulation of these interactions may lead to pregnancy complications including RPL. Exosomes are one of the newly identified mediators of this embryo–maternal cross–talk and may have a role in the pathophysiology of RPL. Exosomes carry many biomolecules, like proteins, nucleic acids etc, as cargo between different cells. We hypothesized that exosomes (or their cargo) may differ between RPL women and normal pregnant women. Hence, in this study, exosomes were isolated from serum of normal pregnant women (CP) or pregnant women with history of RPL using an exosome precipitation kit. Serum samples of non–pregnant, normal menstruating women (CNP) were taken as additional control. Western blotting and Transmission Electron Microscopy (TEM) were performed for qualitative analysis of exosomes and Nanoparticle Tracking Analysis (NTA) was used for quantitative analysis of exosomes. Further, miRNAs with a possible role in decidualization were selected based on literature search and exosomal miRNAs were analyzed. Total RNA was isolated from exosomes and qRT–PCR was performed to check the levels of 10 selected miRNAs using specific primers. The results exhibited that exosomes isolated from all groups of women were comparable in their shape, size and quantity. The relative levels of hsa–miR–146a–5p and hsa–miR–181b–5p in the exosomes were significantly lower in CP and RPL group as compared to CNP group. Future studies are needed to decipher the precise role of these differential miRNAs in pregnant women.

Keywords: Recurrent Pregnancy Loss; circulating exosomes; miRNAs

PS-2107

Impact of Paper and Pulp Industry Waste on Human Reproductive Health and its Remediation by Biogas Production

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The paper industry produces a byproduct called paper and pulp, producing a significant quantity of effluent and bio sludge as a result of the use of chemicals; it contains sulfur compounds (hydrogen sulfide, methyl mercaptan), chlorine-based chemicals (like dioxins), heavy metals, paper dust, and volatile organic compounds (VOCs). When inhaled or coming into contact with the skin, these compounds can cause respiratory problems, skin irritation, cancer, impaired lung function and reproductive health problems through exposure to endocrine-disrupting chemicals, especially for workers exposed to such environments. This waste also poses environmental risks when released untreated. Making biogas from waste from paper mills is one possible way to address this problem. Anaerobic digestion, which essentially breaks down waste without oxygen, can be used to reduce hazardous pollutants and improve the quality of the air and water. It can lower the risk to human reproductive health by reducing the number of harmful pollutants released into the environment from paper mill wastewater containing toxic chemicals. Anaerobic digestion of this lignocellulosic material can produce biogas, which will ultimately help reduce waste and generate sustainable energy. This can be achieved by maximizing methane yield through optimization of digestion parameters and exploring the potential benefits of co-digestion with other substrates to improve the C: N ratio and overall biogas production efficiency. Therefore, in this study, we are addressing the reproductive health risks caused by the paper and pulp industry and exploring the potential of biogas production by utilizing paper waste through anaerobic digestion and promoting sustainable waste management.

Keywords: respiratory problems; skin irritation; headaches; anaerobic digestion

PS-2108

Impact of Non-Caloric Sweeteners (Acesulfame Potassium, Aspartame, Stevia) and Natural Sweeteners (White Sugar and Brown Sugar) on Fertility, Reproductive, Pregnancy Outcomes in Obese vs. Non-Obese Mice

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Obesity in women negatively impacts fertility, increases pregnancy complications, and affects offspring health. It's crucial to develop strategies to mitigate these issues. Since excessive white sugar consumption may lead to obesity, and non-caloric sweeteners could have negative health effects, understanding their impact on maternal obesity's effects on fertility and pregnancy is essential. This study examines how acesulfame potassium, a common non-caloric sweetener, influences fertility and pregnancy risks during and after weaning, as well as its potential to cause sex-specific metabolic changes in offspring after gestational exposure. The primary goal of this study was to clarify the impact of NCS in conjunction with the natural sweeteners on fertility, reproductive health, and pregnancy outcomes. A total of 144 mice (Males: 36 non-obese and 36 obese; Females: 36 non-obese and 36 obese) were distributed to 12 groups of six mice each. Intraperitoneal injection of Gold thioglucose was given at 0.8 mg/gm to induce obesity in mice. NCS and NS were administered by oral gavage at a dose of 40 mg/kg/day prior to mating, during mating and post-mating periods (for males), during pregnancy and up to Lactation Day (LD) 21 (for females). The weekly body weight and food consumption were monitored. Fasting insulin and/or glucose and plasma creatinine were measured. Fertility parameters, including male and female mating partners, fecundity, and live offspring per female, as well as pre-weaning litter size and sex were determined. obesity-related gene and protein expression in the hypothalamus was measured. NCS affects the sperm density, motility in obese mice compared to non-obese mice. Total cholesterol was significantly elevated in both sexes of obese mice. Microscopic examination showed pathological changes in testis. Obesity also reduced the number of pups born alive and pup survival percentage compared with those of non-obese dams. The steroidogenic gene expression was downregulated in obese mice treated with NCS. More studies are required to identify the molecular mechanism and the pathways involved.

Keywords: Obesity; non-caloric sweeteners; natural sweeteners; nutritional impact

PS-2109

Does Bisphenol A Induce PCOS Through Epigenetic Alterations?

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Polycystic ovary syndrome (PCOS) is a common endocrinopathy that affects 8 to 13% of women in their reproductive age worldwide. The underlying etiology of PCOS in humans remains unexplored. The cause of PCOS in humans has an association with environmental, epigenetic and genetic factors. This study aimed to explore BPA-induced epigenetic changes in patients with PCOS phenotype A. We performed a hospital-based observational study in which 88 PCOS phenotype A patients were recruited prospectively. Forty-five age-matched fertile females were recruited as controls. Whole blood samples were collected for serum and genomic DNA isolation to perform Bisphenol A ELISA and DNA methylation microarray (n=30). *In silico* analysis was performed to identify the highly enriched associated with differentially methylated genes in PCOS phenotype A. The levels of BPA were found to be comparatively higher in PCOS phenotype A cases, and the difference was statistically significant. Based on the cut-off value obtained from ROC analysis (> 36.9 ng/mL), the PCOS cases were divided into three groups (High BPA with control, Normal BPA with control, High BPA with Normal BPA). In the High BPA (n=9) case with control (n=5), a total of 169 differentially methylated CpG sites were found, among which 6 DMRs are hypomethylated, and 10 DMRs are hypermethylated which are involved in the highly enriched pathway of Th17 cell differentiation (HLA-DPB1, HLA-DMB and RUNX1) and Type I diabetes mellitus (HLA-DPB1, HLA-DMB) respectively. In the case of Normal BPA (n=21) with control (n=5), 205 differentially methylated CpG sites were found in which 13 DMRs are hypomethylated, and 7 DMRs are hypermethylated. They were found to be associated with the steroid biosynthesis pathway, including the LIPA gene. In the case of High BPA (n=9) with Normal BPA (n=21), we identified 233 differentially methylated CpG sites in which 20 DMRs are hypomethylated, and 5 DMRs are hypermethylated and were found to be associated with cell adhesion molecules (LRRC4C, HLA-DPB1). Our study concludes that environmental pollutants like BPA affect DNA methylation in the PCOS Phenotype A. The identified DMRs in the study were found to be enriched in the immune response (high BPA group) and steroid biosynthesis pathways (normal BPA group). This indicates that HLA-DPB1, HLA-DMB, RUNX1, and LIPA genes were involved in the etiology of PCOS in association with BPA.

Keywords: PCOS; BPA; DNA methylation; DMRs

PS-2110

To Assess the Risk of OHSS by Evaluating LH, FSH and TSH Levels in Follicular Fluid of Non-PCOS, PCOS and POR Patients on the Day of Oocyte Retrieval

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Infertility affects millions of people and has an impact on their families and communities. Estimates suggest that approximately one in every six people of reproductive age worldwide experience infertility in their lifetime. PCOS (polycystic ovarian syndrome) and POR (Poor Ovarian Reserve) lie at the top of the list of female factors that account for 30% of infertile couples. Ovarian Hyperstimulation Syndrome (OHSS) is a complication of fertility treatment, which uses pharmacological ovarian stimulation to increase the number of oocytes and therefore, embryos available during Assisted Reproductive Technology (ART). Thus, in this current study, we examined the levels of LH (Luteinizing Hormone), FSH (Follicle-stimulating Hormone) and TSH (Thyroid-stimulating Hormone) in follicular fluid of PCOS, non-PCOS and POR patients. Alongside, we also examined the oxidative stress levels of all the samples. The follicular fluid samples were collected from Oasis Fertility IVF Centre, Vadodara. Metabolic, Hormonal and ROS (Reactive oxygen species) assays were performed with the aid of different kinds from all the collected samples. Glutathione (GSH), catalase and SOD (superoxide dismutase) were found to be least in the PCOS samples and highest in the control samples, followed by non-PCOS samples. However, LPO (lipid peroxidation) activity was seen highest in PCOS samples, followed by POR, non-PCOS and control samples. Hence, PCOS and POR patients showed higher occurrence of oxidative stress compared to non-PCOS and control samples. Additionally, TSH levels were found to be higher in follicular fluid than serum samples. The serum AMH (Anti-Mullerian Hormone) levels, LH/FSH ratio and number of oocytes retrieved were found to be highest in PCOS patients, followed by non-PCOS and POR patients. Thus, this study implies that PCOS patients could be at a lower risk of OHSS if the stimulation protocols are followed conventionally rather than focusing on success rates. This study can further be extrapolated by exploiting the role of melatonin in IVF outcomes.

Keywords: AMH; antioxidants; hormones; IVF; OHSS

PS-2111

Effects of Isobutyl Paraben on Male Fertility and Sexual Behaviour: An Endocrine Disruption Study in Rat

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This study investigates the endocrine-disrupting potential of isobutyl paraben (IBP), a widely used preservative. This study investigates the effects of IBP on male fertility and sexual behavior in Wistar rats. Twenty- four male sexually mature rats were administered IBP at doses of 10, 20, and 50 mg/kg/day via oral gavage for 30 days, with a corn oil vehicle control group for comparison. Results demonstrated dose-dependent reductions in body weight and food intake, along with significant alterations in hematological parameters, including decreased white blood cell counts and hemoglobin levels. Biochemical analyses revealed disruptions in cholesterol metabolism and renal function markers. Testosterone levels declined dose-dependently, with significant reductions at 20 and 50 mg/kg/day. Sperm quality, including motility, count, and morphology, was adversely affected in IBP-treated groups. Mating behavior assessments showed increased latency to mount and intromission, as well as reduced intromission frequency, indicating compromised sexual performance. Organ weight analysis and histopathological evaluations revealed hepatotoxic and adrenal effects, along with testicular and hepatic tissue damage. Collectively, these findings suggest that IBP exposure disrupts hormonal balance, impairs spermatogenesis, and alters sexual behavior, highlighting its potential risks to male reproductive health. Further investigation into IBP's effects on human reproductive health is necessary.

Keywords: Isobutyl paraben (IBP); Endocrine-disrupting chemical (EDC); Male reproductive health; spermatogenesis, mating behavior

About ISSRF

The comprehensive approach to reproductive health demands increased awareness on methods of family planning, maternal health, neonatal morbidity and a growing burden of reproductive ill health resulting from reproductive tract cancers, concerns of reproductive organs, sexually transmitted infections, including HIV/AIDS, infertility and the adverse effect on gender-based violence. In order to provide a common Scientific Platform for all these specialties and for the common cause of promoting reproductive health research, the Indian Society for the Study of Reproduction and Fertility (ISSRF) was formed and registered in **1988**. Over the years, the mandate of the Society has broadened and includes various multidisciplinary components of reproductive health.

Objectives of the Society are:

- To provide a forum for the discussion of **Scientific, Clinical, Social and Veterinary** knowledge on all aspects of Human and Animal Reproduction.
- To facilitate exchange of knowledge and ideas in the area of reproduction through Seminars, Workshops, Conferences and Meetings held from time to time.
- To promote the growth of the discipline of Reproductive Biology and Reproductive Medical Care.

ISSRF Newsletter (ISSN: 2395-2806): One of the most regular activities of the Society has been the publication of its biannual Newsletter, to disseminate information on reproductive health and also facilitate interpersonal communication between the members. The Society has published **32 issues** of the Newsletter on various priority areas of reproductive health.

The Journal of Reproductive Healthcare and Medicine (JRHM) (ISSN (Print):2768-1106; (Online): 2768-1114): JRHM is an official publication of ISSRF, published by the **Scientific Scholar LLC, USA**. JRHM is an open access journal and can be accessed online (https://jrhm.org/).

Annual and Mid-Term Activities: The society provides a platform for international/national level interaction/deliberations in the form of annual and mid-term conferences/seminars etc. The ISSRF has organized **34 International** and more than **25 national events** with publication of proceedings. The **Mid-term activity** of the Society and various **webinars/seminars** are organized that provides a platform for the researchers and scientists working in the field of reproductive biology to interact and disseminate the recent findings with younger generations (Adolescents) and to make people aware about the burning issues of the domain. Society has instituted **seven Orations and twelve Young Scientist Awards** to recognize the extraordinary contributions of researchers in the field of reproductive biology.

Strength of the Society: As on today the Society has **1792 founder and life members**, biomedical

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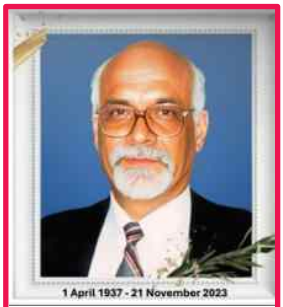
Journal of Reproductive Healthcare and Medicine

The **Journal of Reproductive Healthcare and Medicine (JRHM)** (ISSN (Print):2768-1106; (Online): 2768-1114) (https://jrhm.org/) is an open-access peer-reviewed official journal of Indian Society for the Study of Reproduction and Fertility (ISSRF). JRHM publishes articles on all aspects of basic and clinical research in the fields of reproductive health medicine and related subjects. The journal is published by the Scientific Scholar (https://scientificscholar.com).

JRHM publishes original scientific articles, brief reports, reviews, editorials, opinions/commentaries/meeting reports, and practice guidelines to promote clinical and basic reproductive healthcare sciences that have broad impact to a diverse audience.

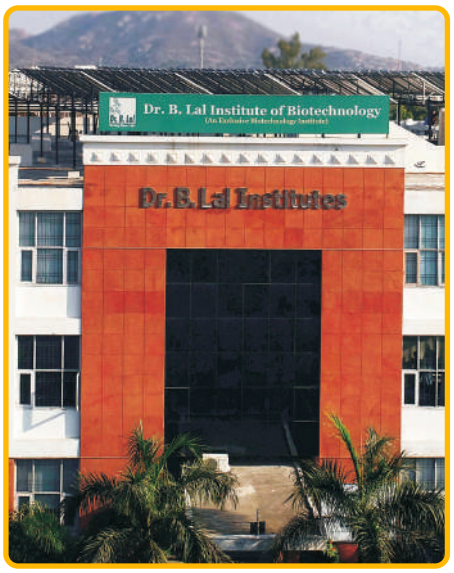
JRHM has a highly rigorous double-blinded peer-review process that makes sure that manuscripts are scientifically accurate, relevant, novel and important. Authors disclose all conflicts of interest, affiliations and financial disclosures such that the published content is not biased.



Late Dr. Ved Prakash Kamboj
MSc, PhD, DSc, FNASc, FNA

A special commemorative edition of the JRHM entitled **"Reproductive Biomedicine: Translating Research into Clinical Practice and Policy Implementation"**, dedicated to honouring the late **Dr. V. P. Kamboj's** remarkable contributions to reproductive endocrinology and translational medicine is in process of compilation. This unique issue will encompass an extensive range of reproductive health research topics, comprising Reviews, Mini Reviews, Commentary, and Original Research Articles. **Dr. Pradyumna Kumar Mishra**, Head of the Division of Environmental Biotechnology, Genetics, and Molecular Biology at the ICMR-National Institute for Research in Environmental Health (NIREH), Bhopal (pkm_8bh@yahoo.co.uk), is leading the editorial team for this special issue. The volume will serve as a lasting tribute to Dr. Kamboj's innovative work and an invaluable resource for fundamental and clinical scientists, scholars and colleagues who want to carry on **Dr. Kamboj's** legacy.

About the Institute



Dr. B. Lal Institute of Biotechnology, an **exclusive Biotechnology Institute**, affiliated with University of Rajasthan, was established in **2008** under the aegis of **Shri Krishna Education Society** and is dedicated to providing advanced biotechnology education and developing skilled technocrats committed to societal applications. The vision of the institute is to create a local niche for teaching and research. The institute offers **B. Sc. (Biotechnology), M. Sc. (Biotechnology & Microbiology) and PhD (Microbiology)** courses. The institute has established several thematic research clusters focused on multiple domains of technology such as environment biotechnology, plant and agriculture biotechnology and medical biotechnology, leading to high impact research. Known for its excellent academic and placement records, the institute also fosters entrepreneurship through comprehensive training and workshops. Actively contributing to the **Sustainable Development Goals (SDGs)**, the institute integrates sustainability, environmental conservation, and societal development into its curriculum and research initiatives.

About the City of Jaipur

Jaipur, known as the "**Pink City**", is a vibrant destination steeped in history and culture. Visitors can explore the magnificent **Amber Fort**, an architectural marvel of Rajputana grandeur, and marvel at the intricate craftsmanship of the City Palace. The **Hawa Mahal**, or Palace of Winds, is an iconic landmark with its ornate facade and honeycomb structure. The **Jantar Mantar** observatory offers insight into ancient astronomical instruments, while the bustling markets of Jaipur beckon with colorful textiles, handicrafts, and local delicacies. Additionally, the serene surroundings of **Jal Mahal** and the tranquil gardens of **Sisodia Rani Ka Bagh** provide opportunities for relaxation and rejuvenation amidst natural beauty. Jaipur's rich heritage, vibrant culture, and warm hospitality make it a captivating destination for conference attendees to explore and enjoy.

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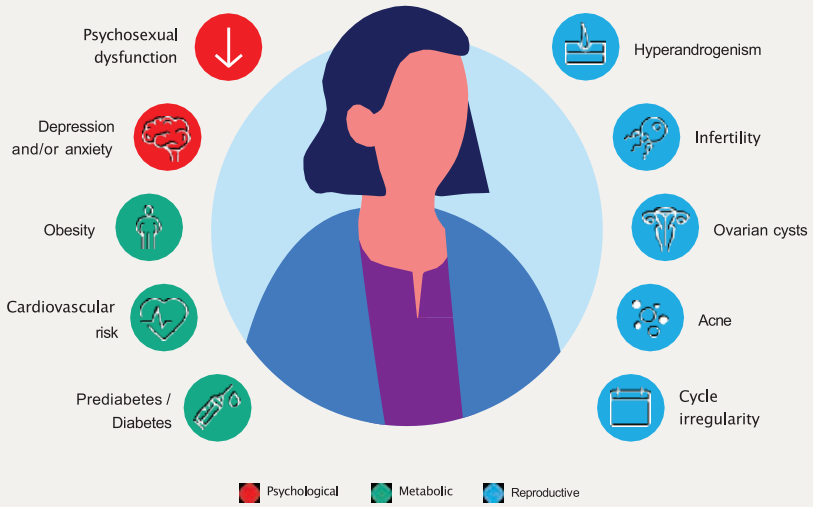
For the identification of PCOM as part of PCOS diagnosis

Polycystic ovary syndrome (PCOS) is the most common endocrine condition affecting women of all ages with reproductive, metabolic and psychological consequences.[1] PCOS is typically diagnosed based on the Rotterdam criteria which includes polycystic ovarian morphology (PCOM), hyperandrogenism and oligo/anovulation.[1]

PCOS[1-4]



8-13% of women of reproductive age worldwide is affected by PCOS [4]

~50% of women with PCOS suffer from infertility [5]

~50% of women with PCOS will develop type 2 diabetes or pre-diabetes by the age of 40 [6]

>66% of women affected by PCOS remain undiagnosed [7]

Diagnosis is challenging due to the heterogeneity of PCOS symptoms and its similarity to other clinical conditions.[8,9]

A transvaginal ultrasound (TVUS) is currently the preferred option for PCOM identification, despite not being suitable for all women.[1]

The lengthy referral processes in addition to finding the right facilities may result in late or missed diagnosis of PCOS. [9]

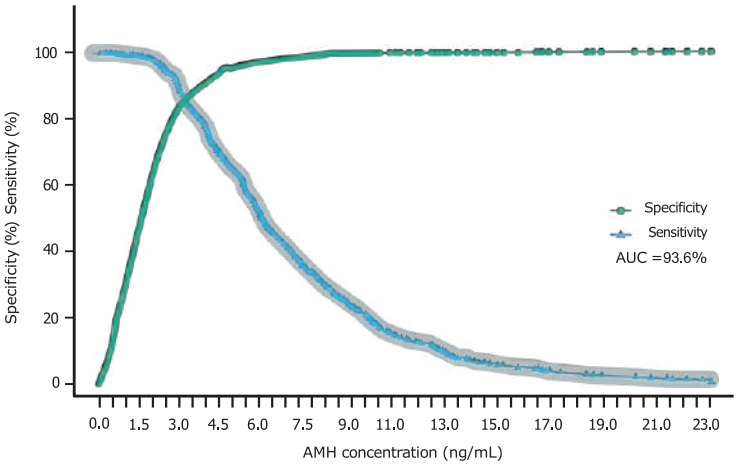
The associated cost to the standard of care, plus the management of resulting comorbidities, is an important economic burden for the healthcare system.[10,11]

Elecsys ® AMH Plus immunoassay can aid in the identification of PCOM as part of PCOS diagnosis[12]

Accurate PCOS diagnosis → Timely initiation of lifestyle and/or pharmacological treatment [13] → Better patient outcomes and reduced healthcare burden [14]

For the use only of a registered medical practitioners or a hospital or a laboratory

Elecsys® AMH Plus provides an accurate method for identifying PCOM [12]



Cumulative distribution analysis plot for derivation of an AMH cut off for PCOM in the development cohort (APHRODITE study) [12]

85% specificity and 89% sensitivity [12]

Serum AMH cut-off of 3.2 ng/mL (23 pmol/L) for PCOM identification [12]

Serum anti-Müllerian hormone (AMH) could be used for defining PCOM in adults.[1]

Elecsys® AMH Plus:

- Offers an easily accessible, accurate and reliable method for identifying PCOM as part of PCOS diagnosis [12, 15]
- Can identify PCOM and enable an accurate and early diagnosis of PCOS, potentially leading to lower risk of developing serious comorbidities such as type-2 diabetes and infertility, which may help reduce long-term costs [13, 14]

Learn more:

Visit for more information on the Elecsys® AMH Plus immunoassay [16]

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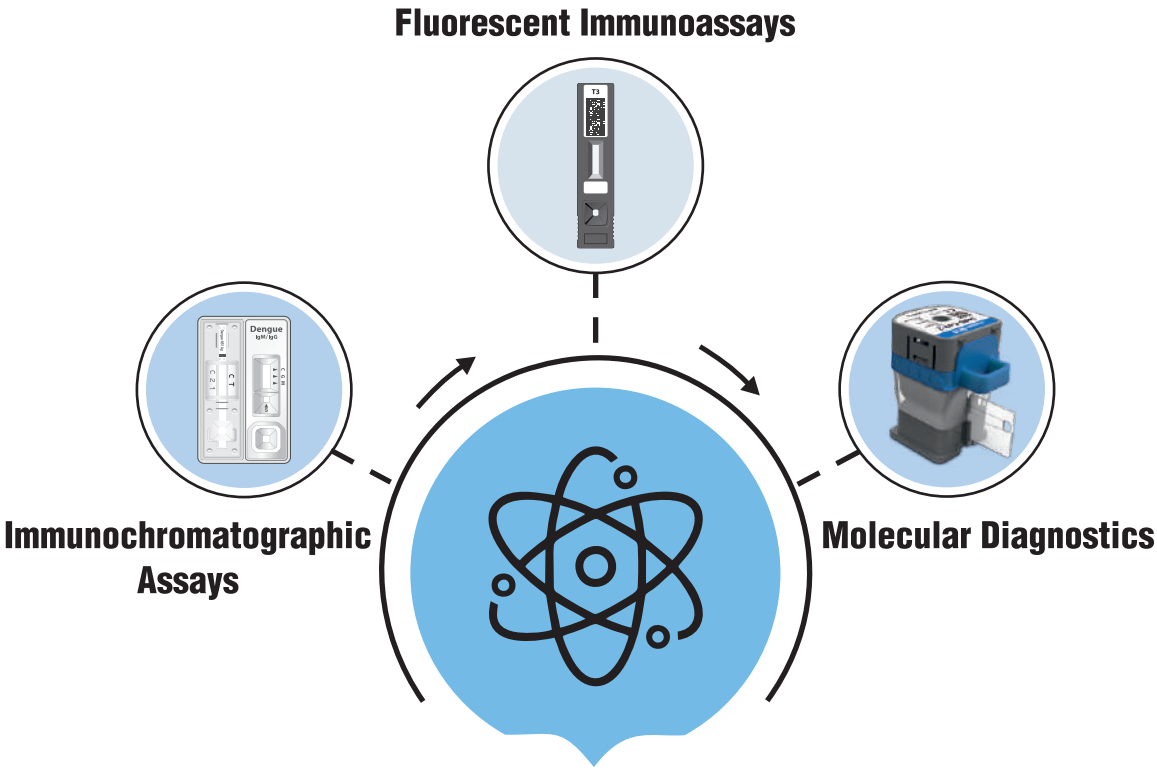

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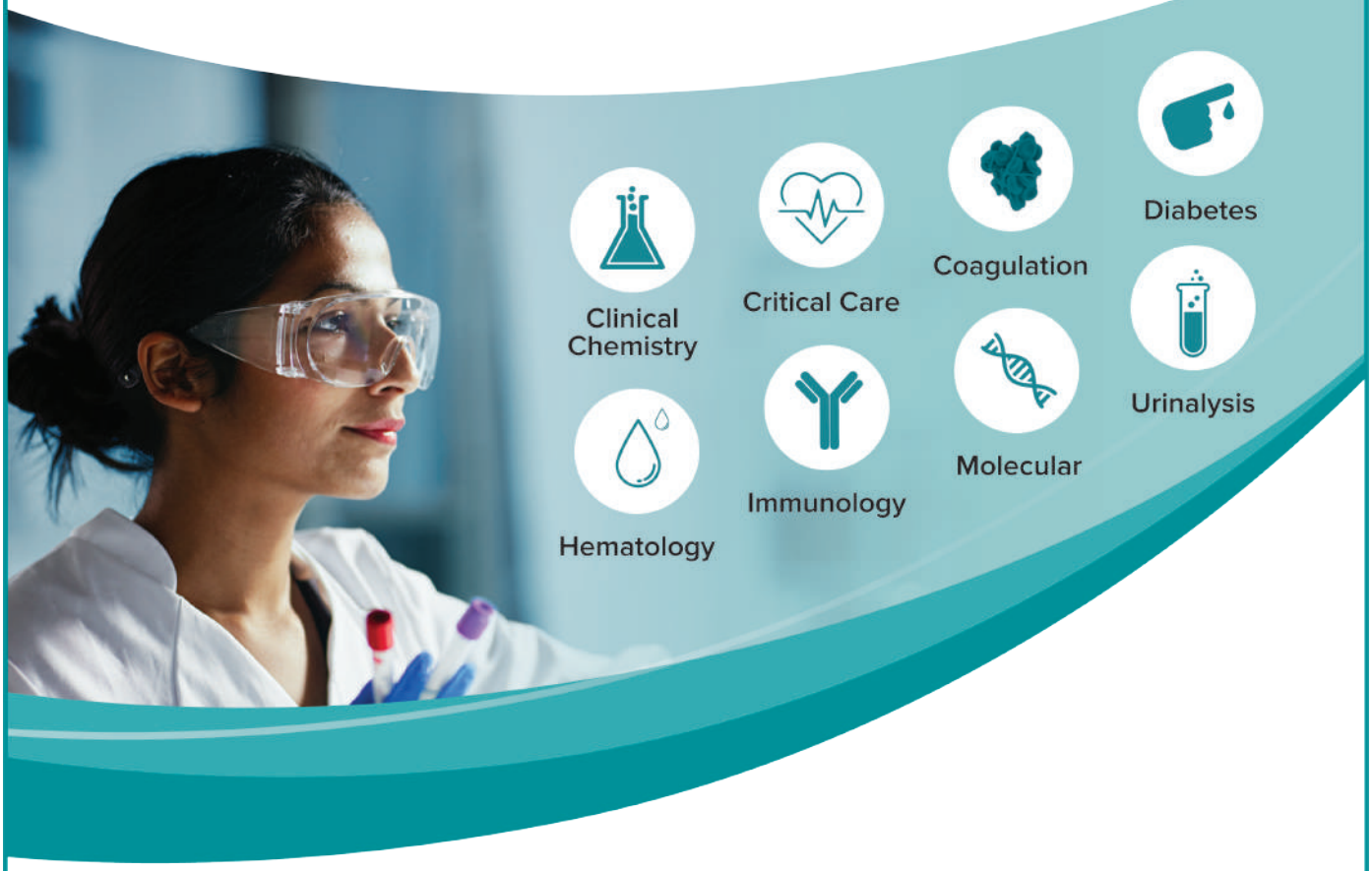

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