BRIC - NATIONAL INSTITUTE OF ANIMAL BIOTECHNOLOGY (BRIC-NIAB)

FiAB - HYDERABAD

FiAB 2026

FRONTIERS IN ANIMAL BIOTECHNOLOGY CONFERENCE

Theme: Mastitis – Diagnosis, Therapy and Beyond



FiAB INAUGURAL CONFERENCE COMPENDIUM

November 5-6, 2026

Venue: BRIC-NIAB Campus, Hyderabad, India



बीआरआईसी
बायोटेक्नोलॉजी विभाग का संगठन
BRIC
a DBT Organization

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NIAB
मानव कल्याण के लिए पशु स्वास्थ्य
National Institute of Animal Biotechnology

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FRONTIERS IN ANIMAL BIOTECHNOLOGY (FiAB)

Exploring Innovations. Advancing Animal Health. Transforming Tomorrow.

FiAB @ NIAB….

FiAB is envisioned as BRIC-NIAB's premier annual flagship conference, to be organized every year. The conference is aimed to provide an international platform for scientists, researchers, clinicians, industry experts, and innovators to discuss recent advances, emerging challenges, and future opportunities in animal biotechnology. The scientific programme will cover livestock health, genomics, transgenics, reproductive biotechnology, precision livestock farming, and One Health.

About FiAB 2026!

It is our distinct privilege to welcome delegates, researchers, clinicians, industry pioneers, and policymakers to the inaugural edition of **Frontiers in Animal Biotechnology (FiAB 2026)**, hosted at the **BRIC–National Institute of Animal Biotechnology (BRIC-NIAB)** campus in Hyderabad, Telangana, India.

The inaugural edition, FiAB 2026, is dedicated to the theme "Mastitis – Diagnosis, Therapy and Beyond" and will be held from 3–6 November 2026 at the BRIC-NIAB campus, Hyderabad, India.

The meeting will focus on one of the most important diseases affecting dairy animals worldwide. It will cover the complete spectrum of mastitis research—from early diagnosis and advanced therapeutics to novel preventive and alternative intervention strategies—while promoting translational research to improve animal health and dairy productivity.

Inaugural Edition Theme: *"Mastitis – Diagnosis, Therapy and Beyond"*

Bovine mastitis remains one of the most critical health challenges impacting dairy production, animal welfare, milk quality, and food safety globally. The inaugural edition, **FiAB 2026 (3–6 November 2026)**, is dedicated to uniting the scientific community against this global challenge.

FiAB 2026 bridges the gap between laboratory benchwork and real-world field applications. The meeting covers the **complete spectrum of mastitis research**—from early point-of-care (POC) diagnosis and data-driven computational models to novel therapeutic strategies, host-pathogen interactions, vaccines, and sustainable interventions aimed at mitigating antimicrobial resistance (AMR).

Program Structure Highlights

1. Pre-Conference Hands-on Workshop (November 3–4, 2026)

Focusing on **Molecular Diagnostics & Command-Line Bioinformatics**, this practical, application-oriented workshop offers 2 days of hands-on training.

2. Main Scientific Conference (November 5–6, 2026)

The main event features:

- **Inaugural & Keynote Lecture**
- **Oral & Poster Presentations** showcasing cutting-edge work by young scientists and researchers
- **Exclusive Industrial Sessions & Demonstrations** for product and tech exposure
- **Multi-Stakeholder Brainstorming Sessions** to shape future strategic directions in dairy management and One Health policies

Key Pillars & Objectives:

Pillar	Focus
Integrating Science & Technology	Fostering interdisciplinary approaches leveraging AI, omics, and molecular tools.
Sustainable Solutions	Developing preventive strategies, alternative therapies, and next-gen vaccines to combat AMR.
Real-World Impact	Promoting translational research to directly improve animal health and dairy productivity.
Unified Platform	Connecting academia, government organizations, veterinary universities, startups, and international bodies.

Venue: BRIC-NIAB Campus, Gachibowli, Hyderabad, Telangana, India

fiab.niab.org.in

Messages



Message from the Director, BRIC-NIAB

Advancing animal biotechnology through scientific innovation, collaboration, and a shared commitment to sustainable animal health

It gives me immense pleasure to welcome all distinguished speakers, eminent scientists, researchers, veterinarians, industry representatives, young scholars, and participants to the first edition of Frontiers in Animal Biotechnology (FiAB 2026), being organized by the BRIC-National Institute of Animal Biotechnology (NIAB), Hyderabad, from 3rd to 6th November 2026.

FiAB 2026 marks the beginning of a new scientific initiative at BRIC-NIAB, envisioned as an annual flagship forum to promote scientific excellence, interdisciplinary collaboration, and the translation of innovative research into practical solutions for animal health and productivity. Through this platform, we aim to bring together leading experts from academia, research institutions, industry, and the veterinary sector to address emerging challenges and opportunities in animal biotechnology.

The theme of this inaugural meeting, "Mastitis: Diagnosis, Therapy and Beyond," focuses on one of the most persistent challenges affecting dairy animal health, productivity, and farmers' livelihoods. The increasing threat of antimicrobial resistance further emphasizes the need for innovative diagnostics, effective therapeutics, preventive strategies, and sustainable disease management approaches within the broader framework of *One Health*.

I am pleased that this first FiAB meeting features a comprehensive four-day programme, comprising a two-day pre-conference workshop on 3rd-4th November, followed by the scientific conference on 5th-6th November 2026. The programme will bring together national and international experts to deliberate on advanced diagnostics, host–pathogen interactions, immunology, genomics, vaccine development, novel therapeutics, antimicrobial resistance, and emerging applications of artificial intelligence in animal healthcare. A key objective of FiAB is to bridge the gap between laboratory discoveries and field-level applications. At BRIC-NIAB, we believe that scientific advancements must ultimately contribute to animal welfare, farmers' prosperity, and sustainable livestock production.

As the first meeting in the FiAB series, FiAB 2026 represents an important step towards establishing a vibrant and enduring platform for scientific exchange, innovation, and collaborative research in animal biotechnology.

I extend my sincere appreciation to all distinguished speakers, scientific experts, collaborating institutions, industry partners, and participants for their valuable support. I also commend the organizing committee, scientists, students, and staff of BRIC-NIAB for their dedicated efforts in organizing this event.

I am confident that FiAB 2026 will lay a strong foundation for future editions of this scientific forum and inspire new ideas, lasting collaborations, and innovative solutions to advance animal health and sustainable livestock production.

I warmly welcome you all to BRIC-NIAB, Hyderabad, and wish the first FiAB meeting a resounding success.

Dr. Ravi Kumar Gandham

Director

BRIC–National Institute of Animal Biotechnology (BRIC-NIAB)



Message from Chief Guest, Dr. Gopi IAS

It is an honour to be part of the inaugural edition of FiAB 2026 at BRIC-National Institute of Animal Biotechnology. The launch of a conference of this stature marks an exciting step forward in advancing veterinary research, sustainable animal health, and livestock productivity. I extend my warmest greetings to the organizing committee for bringing together an exceptional assembly of minds dedicated to pushing the boundaries of scientific inquiry and driving meaningful innovation in the agricultural sector.

The focus of this year's forum on Mastitis addresses an issue of paramount importance to global food security, economic resilience for dairy farmers, and animal welfare. As we commence this event, focusing on mastitis provides a timely opportunity to explore ground -breaking diagnostics, preventive strategies, and therapeutic protocols designed to combat one of dairy farming's most complex challenges. This inaugural compendium stands as an inspiring collection of cutting- edge ideas, preliminary findings, and forward-thinking methodologies that set the benchmark for our discussions over the coming days.

As we embark on this collaborative journey, I encourage every participant to actively engage, exchange ideas, and build interdisciplinary partnerships that extend far beyond the conference hall. May the deliberations held throughout FiAB 2026 serve as a catalyst for practical innovations that transform everyday livestock management and elevate public health. I wish the inaugural event immense success in inspiring solutions for years to come.

Dr. B. Gopi, IAS,
Director of Veterinary & Animal Husbandry (FAC),
Government of Telangana



Message from Chief Guest, Dr. Raghavendra Bhatta

It gives me immense pleasure to extend my heartiest congratulations and warmest greetings to the organizers, faculty, participants, and distinguished guests of FiAB 2026. I commend BRIC-NIAB for establishing such a dynamic platform designed to convene visionary minds, deliberate on transformative ideas, and shape the discourse in animal biotechnology through a dedicated annual theme.

This year's focal theme—Mastitis—addresses one of the most critical challenges in dairy production, animal welfare, and global public health. By centering FiAB 2026 on this imperative issue, the conference casts a crucial spotlight on the balance between sustainable livestock management, food security, and modern veterinary practices. I am confident that this inaugural edition will serve as a beacon of innovation, fostering impactful dialogue and inspiring fresh perspectives among students, scholars, and industry professionals.

This compendium stands as a proud testament to our collective wisdom—a valuable repository of cutting-edge research, insights, and forward-thinking solutions that will guide policy, research, and field applications in the years ahead. As we look to the future, I encourage all participants to leverage the insights, networks, and inspiration gained here to drive tangible societal impact. May the spirit of curiosity and collaboration nurtured during this event propel you toward even greater personal and professional milestones.

I extend my best wishes to the editorial and organizing teams for the publication of this compendium, and I wish every participant continued success in their future endeavors.

Dr. Raghavendra Bhatta
Deputy Director General (Animal Sciences)
Indian Council of Agricultural Research



Message from Guest of Honor, Prof. Pallu Reddanna

It is a privilege to extend my warm greetings to the distinguished scientists, delegates, and guests assembled at BRIC-National Institute of Animal Biotechnology for the inaugural edition of Frontiers in Animal Biotechnology (FiAB 2026). The launch of this conference establishes a vital platform for visionary minds to convene, exchange breakthrough ideas, and shape the future of veterinary science.

By centering this year's deliberations on Bovine Mastitis, FiAB 2026 tackles one of the most pressing challenges facing modern livestock management. Mastitis is far more than a complex veterinary issue; it directly impacts dairy farm economics, animal welfare, milk quality, and broader public health. BRIC-NIAB's dedication to pioneering solutions for this threat plays a crucial role in safeguarding both national dairy sustainability and global food security.

This inaugural compendium serves as a valuable repository of cutting-edge research, diagnostic innovations, preventive measures, and therapeutic protocols. Beyond documenting scientific progress, these pages provide a practical blueprint for transforming lab-based discoveries into tangible, field-level practices that benefit dairy farmers worldwide.

I encourage all participants to leverage the networks and insights gained here to build lasting interdisciplinary partnerships. May the deliberations at FiAB 2026 spark innovative collaborations that elevate livestock productivity and community well-being for years to come.

I extend my sincere congratulations to the organizing committee and editorial team for bringing this publication to fruition, and I wish every participant continued success in their scientific endeavors.

Prof. Pallu Reddanna

Executive President Federation of Asian Biotech Associations (FABA)



Message from Guest of Honor, Dr. Pradeep K. Gupta

It is a profound privilege to join FiAB 2026 as the Guest of Honour at the inaugural conference. Bovine mastitis remains one of the most critical challenges confronting veterinary medicine and dairy economies worldwide. By threatening animal welfare, farm productivity, and milk quality, it directly impacts the livelihoods of millions of dairy farmers. The relentless dedication of BRIC-NIAB in pioneering solutions for bovine mastitis is central to protecting both Indian dairy sustainability and public health.

This compendium represents more than a collection of scientific papers; it is a repository of hope and a testament to collective ingenuity. To the brilliant scientists, scholars, and industry leaders contributing to this volume: your cutting-edge research is the blueprint for the future of animal biotechnology. The diagnostics, therapeutics, and management strategies detailed within these pages provide the vital tools we need to fight against mastitis and build resilient livestock systems.

I commend the organizing committee for creating this vital platform to bridge laboratory innovation with field-level impact. May the insights shared within this compendium inspire breakthrough collaborations and drive transformative change across the dairy sector. I wish the readers and participants immense success.

Thank you.
With regards,

Dr. Pradeep K. Gupta
Vice President, R&D
Indian Immunologicals Limited
Rakshapuram, Gachibowli Post, Hyderabad – 500032, Telangana.



Message from Guest of Honor, Prof. Ullas Kolthur-Seetharam

It gives me immense pleasure and honor to extend my warmest greetings to the distinguished scientists, researchers, industry leaders, delegates, and guests assembled for the inaugural edition of FiAB 2026. I commend BRIC-NIAB for creating such a dynamic platform—one designed to bring together visionary minds each year to deliberate on transformative ideas and advance the frontiers of animal biotechnology.

This inaugural edition casts a much-needed spotlight on Mastitis, addressing one of the most critical challenges facing dairy production, economic resilience for livestock farmers, animal welfare, and global public health. By bringing diagnostic breakthroughs, preventive strategies, and therapeutic protocols to the center of discourse, FiAB 2026 bridges the vital intersection of modern veterinary science, sustainable livestock management, and global food security.

This compendium stands as a proud testament to our collective wisdom—a rich repository of cutting-edge research, forward-thinking methodologies, and actionable solutions. It establishes a benchmark that will undoubtedly inform research, policy, and field practice for years to come.

As we embark on this collaborative journey, I encourage all participants to translate the insights, networks, and inspiration gained here into tangible contributions for society. May the interdisciplinary partnerships and spirit of inquiry nurtured at FiAB 2026 serve as a catalyst for practical innovations that transform livestock productivity and elevate community health.

I extend my heartiest congratulations to the organizing committee for the successful publication of this compendium, and I wish all participants continued success in their scientific and professional endeavors.

Prof. Ullas Kolthur-Seetharam

Director, Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad

Frontiers in Animal Biotechnology (FiAB) 2026

Theme: Mastitis – Diagnosis, Therapy and Beyond

Day 1: 5 November 2026

TIME	PROGRAMME
8:00 - 9:00	*Conference Registration*
Inaugural Session	
9:00 - 9:30	**Welcome address:** Dr. Ravi Kumar Gandham, Director, BRIC-NIAB **Chief Guest:** Dr. B. Gopi, IAS (Director, FAC, Directorate of Veterinary & Animal Husbandry, Telangana) **Guests of Honor:** Dr. Pradeep K. Gupta (Vice President, R&D, Indian Immunologicals Ltd.), Prof. Ullas Kolthur-Seetharam (Director, CDFD) & Prof. P. Reddanna (Executive Director, FABA)
9:30 - 10:10	**Inaugural Lecture:** **Dr. Suresh Kuchipudi** (University of Pittsburgh School of Public Health, USA) – online presentation Emerging Viral Mastitis: Molecular Mechanisms of H5N1 Mammary Tropism and Novel Therapeutic Approaches
Session 1: Setting the scene **Chair:** Dr. T.K. Mohanty (ICAR-NDRI) **Co-chair:** Dr. Sanjay Singh (BRIC-NIAB)	
10:10 – 10:30	**Dr. G. Dhinakar Raj** (Retd., TANUVAS) Mastitis interventions - the translational conundrum
10:30 - 10:50	**Prof. Punniamoorthy** (Trans-Disciplinary University) Ethnoveterinary Approaches to Mastitis Control: A One Health Perspective
10:50 - 11:10	**Mr. Anirudha Rajurkar, CEO, ZenexAH** A brief on industry requirements and expectations from research
11:10 – 11:30	**Dr. Rahul Modak** (KIIT) Beyond the Genome: Epigenetic Regulation of Immune Responses During Mastitis
11:30 – 11:50	*Tea Break*

TIME	PROGRAMME
Session 2: Mastitis diagnosis **Chair:** Dr. G. Dhinakar Raj (Retd. TANUVAS) **Co-chair:** Dr. Bappaditya Dey (BRIC-NIAB)	
11:50 - 12:10	**Dr. Dhiraj Kumar Gupta** (GADVASU) Present and Future Scenario in Bovine Mastitis Diagnosis and Therapy
12:10 - 12:30	**Dr. Srinivas Kiran Ambatipudi** (IIT Roorkee) Milk Speaks: Decoding the Hidden Peptide Signatures of Mastitis through Mass Spectrometry for Early Diagnosis
12:30 - 12:50	**Dr. T.K. Mohanty** (ICAR-NDRI) Non-invasive tools for early subclinical mastitis diagnosis using artificial intelligence in Dairy cattle and buffaloes
12:50 - 14:00	*Lunch &* *Poster presentations (Coordinated by Dr. Souvik Sen Sharma, BRIC-NIAB)*
Session 3: Mastitis treatment and prophylaxis **Chair:** Prof. N. Punniamoorthy (TDU) **Co-chair:** Dr. K. Lakshmi (PVNRTVU)	
14:00 - 14:20	**Dr. Deepak B. Rawool** (ICAR-NMRI) Green Nano-antibacterial to Address Subclinical and Clinical Bovine Mastitis Cases
14:20 - 14:40	**Dr. S. Manoharan** (TANUVAS) Challenges in Bovine Mastitis Vaccine Development and Its Control Measures
14:40 - 15:00	**Dr. Neelesh Sharma** (SKUAST) – online presentation Ethnoveterinary Medicine and Phytotherapeutics: Validating Herbal Alternatives for Udder Health in Dairy Cattle
15:00 - 15:20	**Dr. Ujjwal Kumar De** (ICAR-IVRI) Development and therapeutic evaluation of promising essential oil-based intramammary formulation for treatment of mastitis in dairy cows
15:20 - 15:40	**Prof. P. Anand Kumar** (SVVU) Exploration of antibacterial and immunomodulatory properties of natural compounds and phytochemicals for adjunct therapy in mastitis of dairy animals
15:40 - 16:00	**Dr. Joshi V.G.** (LUVAS) Antimicrobial Peptides for Mastitis: Innovations, Challenges, and Future Perspectives
16:00 - 16:20	*Tea Break-1*
16:20 - 17:50	**Session 4: Spotlight: The NIAB Mastitis Matrix** **Chair:** Prof. Sachinandan De (ICAR-NDRI) **Co-chair:** Dr. Utham K. Valekunja (BRIC-NIAB) **Dr. Anand Srivastava** Identification and characterization of antibiofilm molecule from plant source

TIME	PROGRAMME
	Dr. Pankaj Suman From Detection to Decision: Field-Deployable Technologies for Precision Mastitis Management **Dr. Paresh Sharma** Proteogenomic Insights into Cell Wall Dysregulation and Oxacillin Susceptibility in Oxacillin-Susceptible mecA-Positive Staphylococcus aureus **Dr. Sanjay Singh** Development of GOx–CeO_2 Hybrid Nanozyme for MRSA-induced Mastitis Treatment **Dr. Nagendra R Hegde** Good viruses vs bad bacteria **Dr. Sandeep Kumar Kushwaha** Decoding the Molecular Genetics of Bovine Mastitis Using Computational Biology Approaches
17:50 - 18:00	*Sponsor Showcase*
18:00 - 18:15	*Tea Break*
18:15 - 19:45	**Session 5: Oral presentations** **Session coordinator:** Dr. Yash Pal (BRIC-NIAB) 1. Outer Membrane Vesicles: Multifaceted Roles and Their Impact on Bacterial Multidrug Resistance – by Dr. M. V. Jagannadham, FABA 2. Bioactive Compounds as Alternative Therapeutics for Staphylococcus aureus-Associated Bovine Mastitis: An Integrated Ethno-veterinary study- by Dr. Sriram Vamshi Krishna, PVNRTVU 3. Genomic and Phenotypic Characterization of Lytic Bacteriophages Active Against Multidrug-Resistant Acinetobacter baumannii Clinical Strains – by Dr. Komal Ghonse, Symbiosis International University 4. PhaGenome: An Integrated Web Server for Bacteriophage Genome Characterization Targeting Bovine Mastitis Pathogens – by Dr. Sophia Inbaraj 5. Clinical and therapeutic efficacy of certified intraday infusion in dry cow therapy – by Dr. J. Jyothi, PVNRTVU 6. Caprine Mastitis-Two case reports – by Dr. Nandani Kumari, BAU 7. Clinical insights to the diagnosis and management of prepartum mastitis in goats – by Dr. K. Lakshmi, PVNRTVU 8. Bacteriological and Molecular Detection of Mastitis-Associated Bacterial Pathogens and Their Antimicrobial Resistance Profiles in Domestic Animals - by Dr. Sonali Menamvar, PVNRTVU 9. Effect of antibiofilm agents on mastitis causing staphylococcus species- by Dr. Shiva Jyothi, PVNRTVU
19:45 - 19:55	*Sponsor Showcase*
20:00 onwards	**Gala Dinner**

Day 2: 6 November 2026

TIME	PROGRAMME
Session 6: Beyond the lab to Beside the Barn -Speakers from Industry **Chairs:** Dr. Srinivas Kiran Ambatipudi (IIT Roorkee) & Dr. Nagendra R. Hegde (BRIC-NIAB)	
09:00 - 9:20	**Dr. Ponnanna N.M.** (NDDB) Bovine Mastitis in Indian Milksheds: Challenges, Opportunities and the Way Forward
9:20 - 9:40	**Dr. Chandr Shakhar** (Suvant Solutions Private Limited) Nutritional interventions for mastitis management
9:40 - 10:00	**Dr. Kartikeya Krothapalli** (Vitulomics) A Field Proven, Antibiotic Free, Phytotherapeutic Treatment for Bovine Clinical Mastitis
10:00 - 10:20	**Dr. Ragul Paramasivam** (Chimertech Private Limited) Beyond Subclinical Mastitis Diagnosis: An IoT- and AI-Driven Framework for Predictive Udder Health Management
10:20 - 10:40	**Mr. Rajat Pandya** (FaunaTech) Mastitis and Beyond: From Early Detection to Better Outcomes with Point-of-Care Diagnostics for Animal Health and Food Safety
10:40 - 11:00	*Tea break*
11:00 – 11.20	**Dr. Roshan Ratnakar Naik** (Diagopreutic Private Limited) Rapid Mastitis Detection and Antimicrobial Stewardship for Targeted Antibiotic Treatment
11:20 - 11:40	**Dr. D.J. Kalita** (ZenexAH) Proteolytic Enzymes & Bioflavonoids in the management of tissue damage in Bovine mastitis
11:40 - 12:40	**Session 7: Brainstorming session: From Udder Chaos to Udderly Innovative Solutions** **Panel members:** Dr. Dhinakar Raj, Dr. Nagendra R. Hegde and Dr. Pradeep K. Gupta **Moderator:** Dr. Anand Srivastava
12:40 - 12:55	*Sponsor Showcase*
12:55 - 14:00	*Lunch and Poster sessions*
Session 8: Mastitis & AMR **Chair:** Dr. Raghavendra Bhatta (DDG -AS, ICAR) **Co-chair:** Dr. Ravi Gandham (Director, BRIC-NIAB)	
14:00 – 14:20	**Dr. Shivasharanappa N** (ICAR-NIVEDI) Antimicrobial resistance in bovine mastitis pathogens: an update on surveillance of AMR in India

TIME	PROGRAMME
14:20 - 14:40	**Dr. Nidhi Rawat** (DSVCKV) Antimicrobial Resistance in Bovine Mastitis: Chhattisgarh Scenario and Alternative Therapeutic Strategies
14:40 – 15:00	**Dr. A. Manimaran** (ICAR-NDRI) Advancing antimicrobial stewardship in bovine mastitis: from clinical assessment to treatment decision
15:20 – 15: 40	**Dr. Sameer Shrivastava** (ICAR-IVRI) - online presentation Mastitis Management Beyond Antibiotics: Discovering Novel Antimicrobial Peptides from Natural Sources and Artificial Intelligence-Driven Approaches to Combat AMR
15:40 - 16:00	**Prof. Sachinandan De** (ICAR-NDRI) Extra-intestinal uropathogenic E. coli: an important pathogen of mastitis in dairy animals
16:00 onwards	**Valedictory Function & Award Ceremony- Chief guest: Dr. Raghavendra Bhatta (Deputy Director General (DDG) Animal Sciences, Indian Council of Agricultural Research)**
17:00 onwards	*Hi-Tea*

Invited Speakers

Inaugural speaker:



Prof. Suresh Kuchipudi

Department of Infectious Diseases and Microbiology,
The Center for Vaccine Research, Professor (secondary), Microbiology and Molecular Genetics, School of Medicine, Scientific Director, Pennsylvania One Health Consortium, University of Pittsburgh School of Public Health

Dr. Suresh V. Kuchipudi is Professor and Chair of the Department of Infectious Diseases and Microbiology at the University of Pittsburgh School of Public Health and the Endowed Chair in One Health. He also holds appointments in the Department of Microbiology and Molecular Genetics and the Center for Vaccine Research in the School of Medicine. A veterinary clinician and virologist, he earned his PhD at the University of Glasgow in the UK, is a Diplomate of the American College of Veterinary Microbiologists, and is a Fellow of the UK Higher Education Academy and holds an MBA from Penn State's Smeal College of Business. His research examines how viruses move between animals and people, adapt to new hosts, and become threats. His laboratory has made several pioneering discoveries, including the first evidence of widespread SARS-CoV-2 infection in a free-living wildlife population, and he is an inventor on multiple patents and patent applications spanning vaccines, antivirals, and diagnostics. His recognitions include Penn State's Research Innovator of the Year award, an Outstanding Collaborative Research Team award, and, most recently, a ranking in the top 1% of virology researchers worldwide by 2025 citation impact in the Stanford–Elsevier database. He has authored more than 110 scholarly publications in high-impact journals in the field. Dr. Kuchipudi also serves as the Scientific Director of the Pennsylvania One Health Consortium and previously held the Huck Endowed Chair in Emerging Infectious Diseases at Penn State, where he led the creation of the university's COVID-19 Testing and Surveillance Center.

Inaugural Lecture:

From Receptor to Response: Virus and Host Determinants of H5N1 Mastitis Pathogenesis in Cattle

Presented by Prof. Suresh V. Kuchipudi

Abstract

Highly pathogenic avian influenza H5N1 clade 2.3.4.4b emerged in United States dairy cattle in 2024, causing acute necrotizing mastitis rather than the respiratory disease typical of avian influenza in other hosts. Virus replicates to high titers in mammary epithelial cells and is shed

at high concentrations in milk, while respiratory involvement remains minimal. The basis for this unusual tissue tropism has been a central question for understanding how the virus established itself in a new mammalian host.

Using glycomics, linkage-specific lectin histochemistry, virus binding assays, confocal and electron microscopy, we characterized sialic acid receptor diversity and anatomical distribution, and virus binding, in bovine tissues. The mammary gland showed an abundance of N- and O-linked sialylated glycans and strong binding of clade 2.3.4.4b hemagglutinin, whereas the trachea contained only O-linked sialic acids and showed no detectable virus binding. These findings identify the receptor landscape of the mammary gland as the structural basis for H5N1 tropism in cattle and provide a methodological framework for assessing influenza A virus susceptibility in other unusual hosts.

We are extending this work to define the host response underlying disease severity. In primary bovine mammary epithelial cells, we are comparing transcriptional responses to infection with contemporary clade 2.3.4.4b viruses and ancestral H5N1 clades to identify innate immune and inflammatory signatures associated with necrotizing mastitis. In parallel, minigenome assays are being used to determine how specific polymerase substitutions enriched in mammalian adapted viruses affect replication activity, linking discrete genetic changes in the virus to its capacity for mammalian replication.

Together, these virus and host level analyses define the molecular determinants underlying a newly recognized manifestation of H5N1 disease. As clade 2.3.4.4b continues to expand its host and geographic range, illustrated by its first confirmed detection in Australia in 2026, this work provides a basis for anticipating tissue tropism and pathogenic outcomes in future mammalian hosts.



Dr. G. Dhinakar Raj

Former Professor of Head, Department of Animal Biotechnology,
Madras Veterinary College. TANUVAS

Dr. G. Dhinakar Raj obtained his B.V.Sc. degree from Madras Veterinary College and his M.V.Sc. degree in Biotechnology (first batch) from the Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh. He joined TANUVAS in 1990 and retired as Professor of Head, Department of Animal Biotechnology, Madras Veterinary College, after a total service of about 33 years and 9 months. He has played a significant role in establishing the Veterinary Incubation Foundation (VIF) @TANUVAS, a Section 8 company of TANUVAS which is involved in fostering 'start-up' culture in veterinary sciences domain through an overall funding from both State and Central Governments of Rs. 650.90 lakhs. He is Fellow of the National Academy of Veterinary Sciences and National Academy of Sciences, India.

He has been a member of the many DBT Task Forces / TEC at different stages in fields related to Animal Vaccines and Diagnostics, Animal Production, Biotechnology Support programme for North Eastern Region, Biotechnology Career Advancement and Re-orientation (BioCARe), Bioresource Inventorization and Prospecting, Review Committee on Genetic Manipulation.

Mastitis Interventions—The Translational Conundrum

Presented by Dr. G. Dhinakar Raj

Abstract

The significance of mastitis in the dairy industry cannot be overstated. Interventions in mastitis revolve around prevention, diagnosis or therapy. Additionally, management factors including milk hygiene, host factors and farmers awareness are also considered critical. The translational challenges of these interventions are highlighted here. Diagnosis of subclinical mastitis (SCM) is based on multiple principles that have been known for decades. Some of the methods include estimation of pH, somatic cell counts (SCC); electric conductivity; enzymes, DNA, proteins, ions or acute phase proteins; infrared thermography and isolation of organisms and their detection using nucleic acid / protein-based methods. Based on the above assays, the read outs of these results also vary, which includes visual read outs, colour cards, electrophoresis, automated gadgets, biosensors, app-based read-outs and so on. Further instruments such as DeLaval™ cell counter, Fossomatic™ cell counter, Lactoscan™ milk analysers etc. are also available in the market. The technology landscape for bovine mastitis diagnosis is varied and all-encompassing. Every institution working in this area comes out with an assay method and read-out that is claimed to be better than its competitors in terms of ease of usage, objectivity, automation, sensitivity etc., through use of contemporary technologies. These tests are ideally meant to be sensitive and specific, affordable, easy to read and interpret results and above all offer

solutions. In this context, there is presumably a lack of clarity on the translational outcomes of these innovations, on the following counts:

- What is the affordable price per test for diagnosis of bovine SCM?
- Who is to perform the tests - the farmer, para vet or veterinarian?
- What is the implication of SCC determination – whether to treat or not?
- What are the interventions recommended based on the diagnosis?
- Should these tests be applied on individual or bulk tank milk samples?

The fitting answers to these queries would lead to a better translational outcome keeping in mind the reality of the field situation. Some of the answers to these queries that would lead to better commercialization prospects are highlighted below:

The price per test should be as minimum as possible (Rs. 1-2) at the user end which in turn implies 4-5x lower production cost. The California Mastitis Test (CMT) reagent is sold in the market @ Rs.500 for 500 ml and assuming 2 ml reagent usage per test sample it costs only Rs. 2.00 per sample testing (*The price for tender-based purchases would be still lower as volumes could be high*). Researchers developing other mastitis diagnostic assays would justify increased sensitivity and machine-based read-outs for increased costs. What purpose would the increased sensitivity and objectivity concurrent with cost escalation serve in this case (*unlike for disease diagnosis*) needs explicit understanding. Already it is known that all SCM cows do not end up with clinical mastitis which is largely dependent on host immunity which is, in turn, dependent on management and nutrition. Hence interventions in all cases would be superfluous and can be recommended only if it does not involve antibiotics. The solution would then be, use of better management and nutritional supplementation (tri sodium citrate) along with use of phytochemicals (ethnoveterinary medicine) or food grade chemicals such as lanolin, collagen etc. These tests if it is integrated in to the milk analyzers that measure fat, SNF etc., this can be done at the collection centres and appropriate traceability can be ensured for interventions. Further, any product developed should have an USP (Unique Selling Proposition). For certain instrument-based products, there is a capital expenditure but recurring costs are not involved. This may be its USP but the deterrent would be the initial costs. In such cases, a business model such as instrument renting or a service model where the technician can visit farms at periodic intervals and assess the SCC scores of cows and give recommendations.

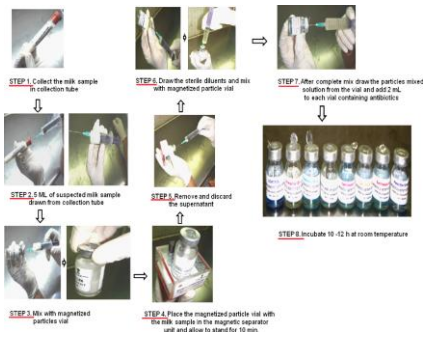
The other variable is the number of permissible SCC that is regulatorily approved or has been shown to indicate a 'cause of concern' in mastitis interventions in India. The threshold of 200,000 cells / ml is generally accepted although this varies with stress, nutrition, lactation phase, parturition, and the quality of the sampled milk fraction. If higher counts are used as cut-off, the specificity would improve and with lower counts used as threshold, the sensitivity would improve. The purpose of application of these estimated counts is critical.

TANUVAS-TRPVB has seen much success in this regard, with the use of ABT-SCC kit for estimation of SCC using esterase enzyme levels with a colour card and interventions with Teat Protect™, a collagen-lanolin based spray that reduces SCC and also increase milk yields. The cost of the kit is Rs. 125/- for 50 samples (Rs. 2.50 per sample) and the Teat Protect spray is Rs. 250/- for 500 ml (Rs. 5.00 per day for 2 sprays @ 5 ml per spray). If ABT-SCC is used 4 times a month (Rs. 40/-) the total cost implication would be Rs. 190/- per month. Unless the milk

production at least increases by 10% by the use of these interventions this would not be cost-beneficial. This is the real translational challenge for such interventions and one of the main reasons for the technologies being developed at various institutions not being extensively applied in the field to replace the ubiquitous CMT.









The other major intervention needed in the treatment of clinical mastitis cases is the choice and use of the right antibiotic for treatment. In some clinical cases choice of a resistant antibiotic could lead to no clinical recovery and ultimately even fibrosis of the udder. The ABTChoice kit is a single-use kit which enables identification of the sensitive antibiotic to be used for treatment of mastitis in a time period of 9 – 11 hrs. Using synthesised glycine functionalized magnetic particles that are used to entrap bacteria from clinical mastitic milk samples, a portable antibiotic selection kit was developed in which, antibiotic resistant bacteria turned the dye in to white colour while the bacteria that were killed (sensitive) retained the blue colour of the dye. Thus, the right choice of the antibiotic to treat cows with mastitis could be determined based on the naked eye. This technology was transferred to M/s Genomix, Hyderabad along with an order for 5088 kits (Rs. 150/- per kit) from State Animal Husbandry Department, Tamil Nadu for supply to most State Veterinary dispensaries. A similar kit is also available with HiMedia, MastiTest™ ABST Test Kit (Rs. 2400/-).

The observed challenges in the application of this technology by clinical veterinarians were as follows:

- Lack of understanding and motivation by the Vets in using new technology
- Not exactly a user-friendly farm-gate technology, like for example a strip test
- The antibiotics used in the kit need to be customized and correlating with the drugs available and used in that particular region
- Time constraint before initiating treatment for a clinical mastitis case without need for waiting for 24-48hours for a test result. When a clinical mastitis case is presented, the immediate need is for treatment based on a broad-spectrum antibiotic that the clinician would apply based on his local knowledge and experience.
- The concentration of the antibiotics in milk and udder tissue should exceed the minimum inhibitory concentrations (MIC) of the pathogen or the minimum biofilm eradication concentrations for successful treatment.
- These kits do not involve isolation of the organisms before evaluating its antibiotic sensitivity unlike in humans where isolation precedes antibiotic sensitivity determinations.

Intramammary drugs often fail to reach adequate concentrations because milk components interfere with the drug and biofilms of the organisms prevent adequate drug bioavailability. It has been shown that for biofilms of the same organisms, 100 to 1,000 times the concentration of a certain antibiotic were often required for the antibiotic to be effective. The cost of treatment is determined mainly by the cost of milk discarded rather than the cost of the drug. Third generation cephalosporins give broad-spectrum coverage and render antibiotic combinations unnecessary.

Overall, this write up is not meant to discourage any new technology developer in this domain but only to highlight the challenges to be surmounted before embarking on technology development and permeation. A clear understanding of the technology landscape available in mastitis diagnosis and interventions should lead to better interventions, always keeping in mind that affordability is the key issue along with cost benefits because unlike humans, most bovines are used for providing economic benefit for the farmers!



Prof. N. Punniamurthy

Professor Emeritus, TDU, Bengaluru

Former Head, EVM Herbal Research Centre,

TANUVAS · Thanjavur - 613 006, India

Dr. Punniamurthy is a pioneer in Ethno-Veterinary Medicine (EVM) with over 40 years of experience integrating traditional Siddha herbal practices with modern veterinary science. Honored with the Padma Shri (2026), the Tamil Nadu Scientist Award (2013), and a Lifetime Achievement Award in Siddha Medicine (2015), he has made landmark contributions to sustainable agriculture and the "One Health" framework. Throughout his distinguished institutional career—serving as the Founding Head of TANUVAS's EVM Herbal Training & Research Centre and currently as Professor Emeritus at TDU, Bengaluru—he was instrumental in securing major state funding for EVM infrastructure while developing scientifically validated protocols that resolve 80–82% of livestock diseases without antibiotics, dramatically curbing antimicrobial resistance (AMR) risks and securing residue-free milk production. His national outreach spans training over 1,500 veterinarians, 30,000 farmers, and 560 village resource persons, prompting the National Dairy Development Board (NDDB) to translate and deploy his EVM protocols nationwide across 12 Indian languages.

Ethnoveterinary Approaches to Mastitis Control: A One-Health Perspective

Presented by Prof. Punniamurthy Natesan

Abstract

Bovine mastitis is the largest single indication for antimicrobial use in dairying, placing it at the centre of the One Health challenge. Our quarter-century programme has subjected one traditional-Siddha knowledge- based formulation — a topical preparation of Aloevera, Curcuma longa and calcium hydroxide — to an unusually complete chain of validation. The evidence climbs a full ladder: field documentation of reduced antimicrobial use; molecular docking to inflammatory targets; in-vitro broad-spectrum antibacterial activity; and cytokine down-regulation. Mechanism was resolved in mammary epithelial cells (TLR2/NF-κB suppression with an enhanced antioxidant response), then confirmed in vivo in a Staphylococcus aureus model resolving the complete TLR-2/NOX-2 axis, with efficacy comparable to dexamethasone but residue-free. Independently, Information Flow Analysis reconstructed the same network and re-selected turmeric and Aloe vera from 12,600 plants — before wet-lab confirmation. At scale, NDDB deployment recorded outcomes across 340,000+ cases, including an 87.8% reduction in milk antibiotic residue within one year of training. Validated from receptor to herd, the formulation resolves the commonest disease of dairy cattle while cleaning milk, easing resistance pressure, and sustaining the farm ecosystem — a rigorous template for translating the ethnoveterinary pharmacopoeia into One Health practice.



Mr. Aniruddha Rajurkar

Chief Executive Officer, Zenex Animal Health

A brief on industry requirements and expectations from research

Mr. Aniruddha is an accomplished business leader with over 25 years of experience, building and scaling diverse businesses in pharma and healthcare space with marquee brands like Dr Reddys, Zydus and Ranbaxy. As CEO of Zenex Animal Health, he drives innovation, growth, and long-term impact in the animal health industry.

Beyond animal health, Aniruddha has held prominent leadership roles shaping the human healthcare industry as well. He has earned industry recognitions including Emerging Leader in Women's Health (2022) and the CII DX Award for Digital Leadership (2021) for Shield, and Indian Pharma Company of the Year (2016) for Dr. Reddy's.

A sought after speaker at forums such as CII and BioAsia, Aniruddha was an active industry contributor through the FICCI Pharma Committee, IPA Working Committee and the ET India Leadership Council. He holds an M.Pharm from BITS Pilani and has also completed an MBA.

Mastitis Management in India

Presented by Mr. Aniruddha Rajurkar

Abstract

Mastitis remains a major challenge to dairy animal health and sustainable milk production in India. Growing antimicrobial resistance, variable treatment outcomes and inconsistent preventive practices highlight the limitations of conventional antibiotic therapy. While the animal healthcare industry is advancing comprehensive prevention and control solutions, gaps in veterinary access and farm management practices persist. Addressing these challenges requires stronger collaboration between industry, academia, and veterinary research institutions, focusing on indigenous vaccines, alternative therapeutics and affordable early-diagnostic solutions to improve udder health, maintain milk quality and reduce economic losses.



Dr. Rahul Modak

Associate Professor and Associate Dean (Research).

School of Biotechnology, Kalinga Institute of Industrial Technology, Bhubaneswar.

Dr. Rahul Modak obtained his MSc. in Biotechnology from IIT Bombay in 2002 and earned his PhD in Molecular Biology and Genetics from Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore in 2009. He completed his postdoctoral training at JNCASR and subsequently pursued another postdoctoral training at Institute of Molecular Biology at Mainz, Germany. In 2013 Dr. Modak joined School of Biotechnology, Kalinga Institute of Industrial Technology, Bhubaneswar, where he currently serves as Associate Professor and Associate Dean (Research).

Dr. Modak's research group is studying epigenetic regulation of mammalian host response during bacterial infection. They have established robust cell line and mouse infection models for major gastrointestinal bacterial pathogens, including Salmonella, Vibrio cholerae and Vibrio parahaemolyticus. His group has identified multiple bacterial deacetylases and acetyltransferases and is studying their role in bacterial physiology and virulence. The group's research has demonstrated that different bacterial pathogens interact uniquely with host cells, leading to distinct epigenetic modifications and immune responses. By elucidating these molecular mechanisms, Dr. Modak's laboratory aims to identify and develop small-molecule modulators of host-pathogen interactions that could serve as novel therapeutic strategies against infectious diseases.

During 2009-2012, Dr. Modak played a key role in establishing a mouse mastitis model using field isolates of Escherichia coli and Staphylococcus aureus. His research demonstrated that these pathogens interact distinctly with mouse mammary epithelial cells, leading to pathogen-specific epigenetic alterations in the host and differential regulation of inflammatory responses.

Beyond the Genome: Epigenetic Regulation of Immune Responses During Mastitis

Presented by Dr. Rahul Modak

Abstract

Host–microbe interactions play a critical role in bacterial colonization, persistence, and virulence. Microbes employ diverse mechanisms to interact with host cells and modulate cellular responses. Epithelial tissues, including the skin, gastrointestinal tract, and mammary gland, represent major sites of host–pathogen interaction. While most studies have focused on pathogen identification and the characterization of differentially regulated host-cell signaling pathways, relatively few have investigated host–pathogen interactions from the perspective of epigenetic regulation.

Bacterial infection of the mammary gland parenchyma induces local and, subsequently, systemic inflammation, resulting in the complex disease known as mastitis. We developed a mouse model of mastitis to investigate how mammary epithelial cells and the innate immune system differentially respond to common mastitis-causing pathogens, *Escherichia coli* and *Staphylococcus aureus*, and how these responses contribute to distinct physiological outcomes. *E. coli* and *S. aureus* were isolated from milk collected from healthy cows and subsequently used to establish infection in mice. Immunohistochemical and immunoblotting analyses revealed strain-specific hyperacetylation and hypermethylation of specific histone lysine residues in infected mammary tissue. Global gene expression analysis further identified a selective set of upregulated genes whose expression significantly correlated with promoter-associated histone H3K14 acetylation, suggesting an important role for epigenetic regulation in pathogen-specific host responses. In addition, small RNA sequencing of mammary tissue from *S. aureus*-infected mice identified several differentially expressed known miRNAs as well as three novel miRNAs.

Comparative analysis of gene expression data showed that *E. coli* and one *S. aureus* isolate strongly activated NF-κB signalling, resulting in a pronounced inflammatory response and enhanced immune surveillance that may facilitate rapid pathogen clearance. In contrast, another *S. aureus* strain suppressed most inflammatory responses, potentially enabling its persistence within host tissue. Collectively, these findings demonstrate that bacterial pathogens can interact with host mammary epithelial cells in distinct ways, leading to pathogen- and strain-specific epigenetic modifications and differential activation of innate immune responses. More broadly, this study provides insights into how epigenetic mechanisms may contribute to the divergent outcomes of bacterial infection—ranging from rapid immune-mediated clearance to sustained pathogen persistence—and may help identify novel molecular targets for therapeutic intervention in mastitis.



Dr. Dhiraj Kumar Gupta

Professor, Dept. of Veterinary Medicine,
GADVASU, Ludhiana

Dr. Dhiraj Kumar Gupta is serving as a Principal Scientist since January 2022, specializing in udder health, milk quality, antimicrobial resistance (AMR), alternative therapies for bovine mastitis, and the application of diagnostic imaging techniques like infrared thermography and ultrasonography. His academic excellence has been recognized with honors such as the Young Scientist Award (UCOST, 2009) and the First Best Paper Award at the 47th Dairy Industry Conference (2019). Internationally, he broadened his research expertise as a Visiting Scientist at the School of Medicine, Wayne State University, USA (2023).

Beyond his core research, Dr. Gupta has made substantial contributions to academic leadership, capacity building, and peer review. He has coordinated prestigious national training initiatives, including a Ministry of Agriculture Model Training Course (2015) and an ICAR Summer School on emerging livestock diseases (2013), while also serving as an examiner for undergraduate and postgraduate programs across major Indian veterinary universities. An active figure in scholarly publishing, he serves as Associate Editor for the *Indian Journal of Veterinary Medicine*, an Editorial Board member for the *International Journal of Livestock Research*, and a reviewer for numerous national and international journals.

Present and future Scenario in Bovine Mastitis Diagnosis and Treatment

Presented by Dr. Dhiraj Kumar Gupta

Abstract

Bovine mastitis is one of the most important production-limiting diseases of dairy cattle, causing substantial economic losses through reduced milk yield and quality, treatment costs, premature culling, and antimicrobial use. Historically, diagnosis of mastitis relied mainly on clinical examination, observation of abnormal milk, udder changes, and microbiological culture. Treatment was predominantly based on conventional intramammary and systemic antimicrobial therapy, often initiated without identification of the causative pathogen. The present approach has shifted towards early and precise diagnosis of both clinical and subclinical mastitis using somatic cell count, California Mastitis Test, electrical conductivity, microbiological culture, antimicrobial susceptibility testing, and increasingly, molecular and automated diagnostic techniques. Treatment strategies are also moving towards pathogen-directed and selective antimicrobial therapy, supported by improved udder-health management, hygiene, vaccination approaches, supportive therapy, and responsible antimicrobial stewardship.

Advancement in diagnosis is expected to become increasingly rapid, sensitive, automated, and farm-based, incorporating biosensors, artificial intelligence, machine learning, ultrasonography of teat and udder, infrared and thermal imaging, real-time milk monitoring, genomic tools, and rapid molecular or proteomic techniques. Future treatment will aim at precision therapy, reduced antimicrobial dependence, immunomodulation, novel non-antibiotic approaches, bacteriophage therapy, antimicrobial peptides, probiotics, photodynamic and physical therapies, and other emerging technologies. Integration of real-time monitoring with precision dairy management may enable prediction and treatment of mastitis before clinical signs become apparent. Thus, the overall transition is from clinical and empirical diagnosis and treatment towards early diagnosis, pathogen-specific, precision-based, preventive and sustainable mastitis management.



Dr. Kiran Ambatipudi

Professor, Dept. of Biosciences and Bioengineering, IIT Roorkee

Dr Kiran Ambatipudi is a Professor in the Department of Biosciences and Bioengineering at IIT Roorkee, India. He received his Veterinary degree in India, completed his Master's training in the United Kingdom, earned his PhD in Australia, and subsequently worked as a Research Fellow at the National Institutes of Health (NIH) in the USA. Later, he joined the Biotechnology industry in the United States as a senior scientist. Since joining IIT Roorkee in 2014, his research has focused on developing mass spectrometry-based diagnostic approaches for the early detection and management of mastitis, including subclinical mastitis, by identifying milk-derived markers. He also works on milk-derived bioactives, modulation of the gut microbiome, probiotics, functional dairy foods, and the application of proteomics and metabolomics to human and animal health. His work explores the role of milk fat globules as natural delivery vehicles for probiotics and their influence on gut and immune health. He was recently elected a Fellow of the National Academy of Sciences, India (NASI), for 2026. He is also a Fellow of the National Academy of Dairy Science, India, and a Suzuki Next Bharat Fellow.

Milk Speaks: Decoding the Hidden Peptide Signatures of Mastitis through Mass Spectrometry for Early Diagnosis

Presented by Prof. Kiran Ambatipudi

Abstract

Bovine mastitis is one of the most economically important diseases in dairy production, leading to reduced milk yield, compromised milk quality, increased treatment costs, and premature culling. Subclinical mastitis (SCM) poses a particular challenge due to the absence of visible symptoms, often delaying diagnosis and intervention. Our research uses mass spectrometry-based discovery and targeted proteomics to identify milk-derived biomarkers associated with the onset and progression of mastitis. Comprehensive whey proteome profiling of healthy, subclinical, and clinical mastitic Holstein Friesian cows and Murrah buffaloes infected with Staphylococcus aureus identified 1,479 proteins. Among these, 128 proteins in cows and 163 proteins in buffaloes exhibited disease-stage-specific abundance patterns. Several proteins, including haptoglobin, fibronectin, osteopontin, angiogenin, cofilin-1, and fibrinogen-related proteins, were associated with inflammatory responses, tissue remodelling, and progression from subclinical to clinical disease. To translate these findings into practical diagnostic applications, discovery proteomics was complemented with targeted multiple reaction monitoring mass spectrometry (MRM-MS). Peptides derived from lactophorin, serum amyloid A, leukotriene-A4 hydrolase, and kininogen demonstrated strong diagnostic potential. A multi-peptide biomarker panel achieved greater than 90% sensitivity and specificity in distinguishing healthy from SCM milk, outperforming individual biomarkers. Together, these findings demonstrate the potential of milk proteome and peptide signatures as non-invasive indicators of mastitis. The integration of discovery and targeted proteomics offers a promising framework for early diagnosis, precision herd health management, reduced antimicrobial use, and improved sustainability in dairy production.



Prof. T.K. Mohanty

IVSAH, SOA

Retired Principal Scientist, National Dairy Research Institute

Dr T.K. Mohanty is Retd. Principal Scientist (Animal Reproduction, Gynaecology and Obstetrics) at LPM Division, ICAR-NDRI, Karnal, Haryana. Now joined as a professor in VGO. IVSAH, SOA Deemed University, Bhubaneswar. He graduated from OUAT, Bhubaneshwar, Odisha, in 1988. He completed his MVSc and PhD degrees in Veterinary Gynaecology and Obstetrics in 1990 and 1997, respectively, at ICAR-IVRI. Bareilly, UP. Joined ICAR and started his career as a trainee scientist at ICAR-NAARM, Hyderabad, Andhra Pradesh, and joined ICAR-NRC Yak as a scientist in 1994; in 2000, he moved to ICAR-NDRI, Karnal. Since then, he has worked in different capacities in ICAR-NDRI, Karnal. He has guided over 22 PhD and 18 MVSc scholars as major guides. He has handled about 22 externally and 22 institutionally funded research projects as PI and Co-PI.

He has worked as a member of different national and international delegations and expert committees of various government and semi-government organisations. An Indian delegation on Precision Farming visited the United Kingdom, Member of the Expert Group on Animal Health, Technical Expert Committee to discuss the India-US dairy issues and Health certificate for import of Milk and Milk Products and the Expert Group for veterinary drugs and vaccines by DADF, Govt. of India. Member of BIS for Veterinary Hospital Planning & Surgical Instruments Sectional Committee, MHD13, by Bureau of Indian Standards, Govt. of India.

He has been honoured as a fellow of various societies and organisations of national and international repute, viz. Fellow of the National Academy of Dairy Science, India (FNADSI), Fellow of Japan International Cooperation Agency (JICA), “Most Outstanding Researchers” in the field of Veterinary by Carrier360 in Faculty Research Awards 2018. He also received various prestigious awards and recognitions from different societies, viz. ICAR Hari Om Ashram Trust Award 2016-17. His group has been keen to conduct advanced research on production and reproductive management in dairy cattle and buffaloes. He is proficient in advanced data analysis, Cryopreservation of Germplasm, fertility improvement in farm animals through integrated management practices, Data Mining, Soft Computing, Decision Support Systems for animal management, and Applications of wireless sensor networks for animal management and precision dairy farming.

Non-invasive tools for early subclinical mastitis diagnosis using artificial intelligence in Dairy cattle and buffaloes

Presented by Prof. T.K. Mohanty

Abstract

Mastitis, both subclinical (SCM) and clinical (CM), significantly reduces dairy productivity by affecting milk quality and yield. SCM, often undetected because it lacks visible symptoms, reduces milk production and alters composition, lowering profitability. CM, characterised by visible signs like swelling and abnormal milk, causes more pronounced production losses and requires costly treatments. Globally, mastitis leads to economic losses of $20–30 billion annually, with significant impacts in India, where SCM and CM prevalence rates are 45% and 18%, respectively, among dairy animals. Additionally, mastitis increases culling rates, compromises reproductive performance, and escalates veterinary expenses, collectively impacting farm profitability and sustainability. Conventional diagnostic tools such as somatic cell count (SCC) and the California Mastitis Test (CMT) are effective but often labour-intensive, invasive, or impractical for continuous, automated herd health monitoring. To overcome these challenges, recent research by the ICAR-NDRI team and collaborators has advanced non-invasive diagnostic frameworks by integrating digital infrared thermography (IRT) with artificial intelligence (AI) across indigenous dairy cattle (Bos indicus, including Sahiwal and Tharparkar breeds) and Murrah buffaloes (Bubalus bubalis). Infrared thermographic evaluations demonstrate significant elevations ($p < 0.01$) in udder skin surface temperature (USST), teat skin surface temperature (TSST), and short milking tube (SMT) thermal signatures during subclinical infection stages compared to healthy quarters, showing strong correlation with somatic cell dynamics and California Mastitis Test scores across seasons. Using deep learning architectures such as Convolutional Neural Networks (CNNs), ResNet-50, and VGG-16 to analyse quarter-level udder and milking-unit thermograms, these AI models accurately discriminate between healthy and SCM quarters, achieving classification accuracies of 85% to 90% with high precision and sensitivity. These findings validate automated IRT-AI integration as a robust, non-invasive, stress-free precision screening paradigm that can detect subclinical intramammary alterations days before clinical manifestation, enabling timely therapeutic interventions and data-driven herd management.



Dr. Deepak B. Rawool

Principal Scientist,

ICAR-National Meat Research Institute

Dr. Deepak B. Rawool is a Veterinary Public Health scientist with nearly two decades of research experience specializing in zoonotic diseases, food safety, One Health, and translational diagnostics. Since 2011, as a Senior Scientist at ICAR–IVRI, Izatnagar, he has led key national and international research programs targeting foodborne pathogens, antimicrobial resistance (AMR), and disease surveillance. His professional background includes prestigious international fellowships in the USA (Albany Medical College), Germany (Justus Liebig University Giessen), and Australia (University of Adelaide), along with teaching experience as a Visiting Professor at St. George's University, Grenada.

Over his career, Dr. Rawool has secured 2 patents and published more than 110 research papers, translating his work into commercialized innovations such as green nano-antibacterial formulations and rapid diagnostic assays (LATs, LFAs, CRISPR-Cas) for pathogens like Listeria monocytogenes and Bacillus anthracis. Alongside supervising 11 M.V.Sc. and 8 Ph.D. students, he has provided strategic policy and technical leadership, including helping secure ISO/IEC 17025:2017 NABL accreditation for ICAR–NMRI's food laboratory and serving on expert advisory committees for the ICMR and Bureau of Indian Standards.

Green Nano-antibacterial to Address Subclinical and Clinical Bovine Mastitis Cases

Presented by Dr. Deepak B. Rawool

Abstract

Bovine mastitis, an inflammatory condition of the mammary gland and udder tissue, remains one of the most prevalent and economically significant clinical manifestations affecting dairy cattle worldwide. Moreover, the widespread and often indiscriminate use of antibiotics for mastitis treatment has contributed to the emergence and dissemination of multidrug-resistant (MDR) bacterial pathogens, further complicating its management. In this context, the present study was undertaken to investigate the potential of green-synthesized silver nanoparticles (AgNPs) as a sustainable therapeutic alternative for the management of clinical and subclinical bovine mastitis. The study encompasses the green synthesis and physicochemical characterization of AgNPs, followed by comprehensive *in vitro* evaluation of their safety, stability, and antimicrobial efficacy. Furthermore, the therapeutic potential of the synthesized nanoparticles was assessed under field conditions in animals affected with clinical and subclinical mastitis. Overall, the study generates robust scientific evidence supporting the development of environmentally compatible, safe, and effective nanoparticle-based therapeutic interventions for combating drug-resistant pathogens associated with bovine mastitis.



Prof. S. Manoharan

Director, Centre for Animal Health Studies, Tamil Nadu Veterinary and Animal Sciences University, Chennai

Dr. S. Manoharan is a highly accomplished Professor of Animal Biotechnology at the Vaccine Research Centre (Bacterial Vaccine), Centre for Animal Health Studies, under the Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Chennai. With over three decades of expertise spanning Veterinary Microbiology, Molecular Virology, and Animal Biotechnology—including postdoctoral training at Virginia Tech, USA—Dr. Manoharan is a leading figure in avian and livestock vaccine development.Throughout his distinguished career, he has successfully steered 17 research projects and is currently heading 5 ongoing initiatives funded by premier national agencies like DBT and DST-SERB. His pioneering research has resulted in two filed patents (including a granted patent for a rapid field test kit for chicken anaemia virus) and the commercial development of critical veterinary technologies, such as the Ranikhet disease inactivated vaccine for layers. An esteemed academic and researcher with over 65 national and international publications, Dr. Manoharan was honored with the prestigious Best Teacher Award by the Governor of Tamil Nadu, alongside multiple accolades for his breakthrough contributions to veterinary vaccinology.

Challenges in Bovine Mastitis Vaccine Development in India

Presented by Prof. S. Manoharan

Abstract

Bovine mastitis is one of the most significant production-limiting diseases affecting the dairy industry, causing substantial economic losses through reduced milk yield, deterioration of milk quality, increased treatment costs, and compromised animal welfare. In India, the challenge is particularly complex due to the diversity of dairy production systems, cattle and buffalo breeds, climatic conditions, management practices, and mastitis-causing pathogens. The increasing prevalence of antimicrobial resistance (AMR) among mastitis-associated bacteria further emphasizes the need for effective preventive strategies. Although vaccination offers considerable potential for reducing disease incidence and antimicrobial use, the development of a safe, affordable, and consistently effective bovine mastitis vaccine remains a major scientific and translational challenge.

A fundamental obstacle in mastitis vaccine development is the multifactorial nature of the disease, which is caused by diverse contagious and environmental pathogens, including *Staphylococcus aureus*, *Streptococcus agalactiae*, *Streptococcus uberis*, *Escherichia coli*, and *Klebsiella spp.* The geographical and epidemiological variation in pathogen prevalence, coupled with genetic diversity and antigenic variation among isolates, limits the effectiveness of vaccines targeting individual pathogens or antigens. Indigenous pathogen surveillance and genomic characterization are therefore essential for identifying conserved protective antigens and developing vaccines suited to Indian dairy populations.

The unique immunological environment of the mammary gland presents another major challenge. Effective vaccination must induce a rapid, localized and functional immune response capable of preventing infection or reducing disease severity without causing excessive inflammatory damage to mammary tissue. Systemic antibody responses do not necessarily translate into adequate protection at the udder level. Furthermore, biofilm formation, intracellular persistence, immune evasion and recurrent infections, particularly associated with certain *S. aureus* strains, complicate pathogen clearance. The absence of universally validated immune correlates of protection also makes it difficult to predict vaccine efficacy using antibody titres or other laboratory parameters alone. India's diverse production systems introduce additional complexities in vaccine formulation, scheduling and field validation. Breed, age, parity, nutritional status, stage of lactation, pregnancy, heat stress, hygiene and milking practices can influence disease susceptibility and vaccine responses. Protection during the periparturient period and early lactation is particularly important. Moreover, vaccine candidates demonstrating efficacy under controlled experimental conditions may perform differently under natural field exposure involving multiple pathogens and variable environmental and management conditions. Standardized experimental challenge models, robust safety assessments and multicentric field trials are therefore essential to establish reliable efficacy and practical applicability.

Emerging technologies offer promising opportunities to overcome these barriers. Whole-genome sequencing, comparative genomics, reverse vaccinology, immunoinformatics, structural vaccinology and multi-epitope design can facilitate the identification of suitable protective antigens. Recombinant subunit, multivalent, nanoparticle-based and other advanced vaccine platforms warrant investigation, alongside appropriate adjuvants and delivery systems. However, their successful translation depends on affordability, manufacturing scalability, safety during pregnancy and lactation, ease of administration and demonstrable economic benefits to dairy farmers. A coordinated national research programme is recommended, integrating mastitis pathogen surveillance, genomic and antimicrobial resistance databases, indigenous antigen libraries, standardized vaccine evaluation protocols, validated immune correlates and multicentric field trials. Collaboration among the Indian Council of Agricultural Research (ICAR), veterinary universities, the National Institute of Animal Biotechnology (NIAB), dairy cooperatives, state animal husbandry departments, vaccine manufacturers and farmers will be critical. Importantly, vaccination should form part of an integrated udder health strategy incorporating early diagnosis, pathogen identification, antimicrobial susceptibility testing, hygienic milking, improved nutrition, herd-level surveillance and judicious antimicrobial therapy. In conclusion, bovine mastitis vaccine development in India requires a multidisciplinary, evidence-based and translational approach tailored to indigenous pathogen diversity and dairy production realities. The ultimate objective should be to develop safe, affordable and field-effective vaccines that reduce mastitis incidence, preserve milk productivity, improve animal welfare and support antimicrobial stewardship. Integrating vaccination with surveillance, diagnostics, improved farm management and precision animal health offers a sustainable pathway towards strengthening India's dairy sector and advancing the One Health agenda.



Prof. (Dr.) Neelesh Sharma

SKUAST-Jammu

Prof. (Dr.) Neelesh Sharma, PhD (South Korea) is working as Professor & Head, Division of Veterinary Medicine, Faculty of Veterinary Science & AH, SKUAST-Jammu and >23 years of experience in teaching, research and extension in the field of Veterinary Medicine and his major area of research is production diseases, mastitis, animal stem cells, nanoparticles, ethno-veterinary medicine, AMR etc. Ranked among the top 2% of scientists worldwide by Stanford University & Elsevier for three consecutive years (2023, 2024, 2025). He has handled 24 National/International projects his university has awarded him by STAR Scientist Award for excellence in research and received more than 70 National/International awards including ICAR-International Fellow, NAAS Associate, Fellow of Royal Society of Biology etc. Total 11 IPR (patent/copyright) in his credit published 15 books, 03 manuals, 12 compendiums, 02 technical bulletins, 02 Package of Practices, 185 papers in peer reviewed journals, 24 popular articles, 12 extension papers, 12 pamphlets in Hindi, 80 chapters in the books/ compendiums. His global presence is reflected by appointment of Adjunct/Visiting Professor in Brazil, Indonesia, and South Korea, with 15 scientific foreign visits. His AMR & One Health leadership reflected as member of the AMR Multi-stakeholder Partnership Platform of the quadripartite alliance (FAO, UNEP, WHO, & WOAH), and member of the "One Health Advisory Group of AMI" (Cambridge, UK) and the FAO's Global Forum on Food Security & Nutrition. Boasts an H-index of 38 and i10-index of 85, with 6822 total citations. Founder Editor-In-Chief of the Journal of Animal Research and founded the Association of Mastitis. Dr. Sharma has nurtured and documented >20 success stories of dairy farmers in Jammu and out of them one success story has been telecasted at "National Science Channel, Ministry of Science & Technology, GoI.

Ethnoveterinary Medicine and Phytotherapeutics: Validating Herbal Alternatives for Udder Health in Dairy Cattle

Presented by Prof. Neelesh Sharma

Abstract

Bovine mastitis represents a major economic and welfare challenge in dairy management, causing severe milk yield reductions and financial losses. Rooted in ancient traditions such as Ayurveda and Pashu Ayurveda, ethno-veterinary medicine provides a sustainable foundation for livestock health using plant-based phytotherapeutics. Traditional practices globally—ranging from South Asian turmeric-neem poultices and African herbal remedies to European and Mediterranean essential oil applications—utilize native flora to manage mammary inflammation. Pathophysiologically, mastitis involves bacterial invasion leading to toxin release, neutrophil recruitment, oxidative stress, and tissue fibrosis. Conventional antibiotic

therapies face significant limitations, including pharmacokinetic constraints, biofilm-mediated tolerance, intracellular persistence, and the rising threat of antimicrobial resistance (AMR). To overcome these challenges, phytochemicals such as flavonoids, terpenoids, alkaloids, and phenolic compounds offer multi-targeted antimicrobial, anti-inflammatory, antioxidant, and immunomodulatory mechanisms. Botanical families like Lamiaceae, Zingiberaceae, Alliaceae, and Meliaceae supply active bioactives that disrupt bacterial membranes, inhibit quorum sensing, and suppress pro-inflammatory pathways like NF-kappa B and COX-2. Furthermore, advanced pharmacological strategies demonstrate that combining natural compounds—such as trans-p-coumaric acid—with conventional antibiotics can successfully restore susceptibility in multidrug-resistant pathogens and dismantle stubborn biofilms. Bridging empirical tradition with evidence-based veterinary science, modern biotechnology enhances phytotherapeutic efficacy through omics platforms, host immunogenetics, nanotechnology-based controlled delivery systems, and microbiome restoration.

Keywords: Intramammary infection, biofilm production, herbal medicine, nano-therapeutics.



Dr. Ujjwal Kumar De

Senior Scientist

Indian Veterinary Research Institute

Dr. Ujjwal Kumar De is a Senior Scientist in Veterinary Medicine at ICAR-IVRI, specializing in bovine mastitis, canine parvovirus, and enteric diseases. A graduate of WBUAFS with advanced degrees from IVRI, he joined the Agricultural Research Service in 2009. His translational achievements include leading the development of an immunoglobulin therapeutic for canine parvovirus, co-developing the "Landlly" crossbred pig variety, and creating digital health platforms such as the IVRI-Vaccination Guide and Online Veterinary Clinic apps. He has also received advanced training in dairy herd mastitis management as a visiting scientist at the University of Minnesota, USA.

In addition to managing IVRI's Teaching Veterinary Clinical Complex, Dr. De contributes extensively to academic, extension, and institutional governance roles. He has authored over 120 research papers across international and national journals, mentored more than 50 M.V.Sc. and Ph.D. scholars, and leads livestock integration efforts under the Farmer's First program. His contributions have earned him numerous recognitions, including the ISVM–Intas Young Scientist Award, the DST-International Travel Support Grant, and the Indian Herbs–Sri Ramlal Agrawal Memorial Award.

Promising essential oils as phytomedicines for treatment of mastitis in dairy cows

Presented by Dr. Ujjwal Kumar De

Abstract

The objective of the present work was to develop an effective essential oil (EO) based intramammary infusion formulation for the treatment of mastitis in dairy cows. From 19 tested EOs three EOs were selected from their better antibacterial activities against Gram-positive (*S. aureus*) Gram-positive (*E. coli*) bacteria isolates from clinical mastitis cases. On the basis of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC), those three EOs also exhibited synergistic antibacterial activities against both the pathogens. A blend considering the MIC of those three EOs was prepared and its therapeutic efficacy was evaluated in the S. aureus-induced and *E. coli* induced mouse mastitis model separately. The results showed that the EO blend effectively mitigated the severity of mastitis by reducing bacterial load, infiltration of inflammatory cells and pathological damage of the mammary gland of mice. On the basis of ameliorative potential of mouse mastitis model, an EO-based intramammary formulation was prepared using an appropriate base. Three dosage forms (1X, X and 4X) of the formulation were prepared using the MIC values of each EO. After that, the

tolerance study of those dosage forms was conducted in healthy mammary quarters of lactating cows. The somatic cell count (SCC) of milk, inflammation and irritation of udder, color and consistency of milk were monitored following intramammary infusion of the formulation. The results showed no significant difference in mean $\log_{10}$ SCC/mL milk in control and 1X formulation groups, while the mean SCC value was elevated till day 6 thereafter the mean value reached to pretreatment value. However, the mean $\log_{10}$ SCC/mL milk was persistently elevated till day 9 post infusion in both 2X and 4X formulation groups. Additionally, median values of milk consistency and colour scores were higher on day 4 in the 2X formulation group and day 4 , 6 and 9 in the 4X formulation group. No significant changes in udder swelling and redness scores were noted across the groups throughout the study period. From the results of the tolerance study, the EO-based intramammary formulation at 1X concentration is safe, non-irritable and tolerable by healthy udders of lactating cows. Further, the evaluation of therapeutic efficacy of the formulation in naturally occurring mastitis cows revealed that intramammary treatment with novel EO-based formulation significantly reduced bacterial count and SCC in milk and attenuated inflammatory markers and mammary epithelial derived serum amyloid A2 in milk. Taken together, from the results of the present study, it is concluded that novel EO-based intramammary formulation will serve as a promising therapeutic option for intramammary treatment of mastitis in dairy cows.



Dr. P. Anand Kumar

Professor & Head, Dept. of Veterinary Microbiology, NTR College of Veterinary Science, Gannavaram

Dr. P. Anand Kumar is a Professor of Veterinary Microbiology at NTR College of Veterinary Science, Sri Venkateswara Veterinary University, Gannavaram, Andhra Pradesh. He earned his B.V.Sc. & A.H. from the College of Veterinary Science, APAU, Tirupati (1993), followed by both an M.V.Sc. (1995) and Ph.D. (1999) in Veterinary Immunology from the Indian Veterinary Research Institute (IVRI), Izatnagar.

With 25 years of combined teaching and research experience, Dr. Kumar specializes in the immunology of infectious diseases, immunomodulation, bovine mastitis, antimicrobial resistance (AMR), One Health, and the therapeutic potential of natural compounds and phytochemicals. Over his career, he has authored 35 peer-reviewed research publications and successfully led multiple research projects funded by various Government of India agencies.

Exploration of antibacterial and immunomodulatory properties of natural compounds and phytochemicals for adjunct therapy in mastitis of dairy animals

Presented by Dr. P. Anand Kumar

Abstract

Mastitis in dairy bovines is usually caused by bacterial pathogens. Due to emergence of antimicrobial resistance (AMR) in bacteria against the available antibiotics and undesirable effects associated with long term use of anti-inflammatory drugs, there is a dire need to explore adjunct therapy with phytochemicals and natural compounds that have antibacterial, anti-inflammatory and immunomodulatory properties

In our study, the phytochemicals quercetin and cinnamic acid had not shown any significant antimicrobial activity against clinical isolates of *Staphylococcus aureus* and *Escherichia coli* in micro broth dilution assays, but downregulated expression levels of Interleukin-6 (IL-6), IL-8 and Tumour necrosis -α (TNF- α) at varied periods of *in vitro* infection of bubaline mammary epithelial cells (BuMECs) with *S. aureus* and *E. coli*.

Young leaf and root aqueous extracts of the plant *Premna integrifolia* didn't exhibit any significant antimicrobial activity against *S. aureus*, but showed against *E. coli*. In combination with the plant extract, the *S. aureus* isolates that were resistant to amoxicillin showed sensitivity to the same antibiotic in this combination. Results of the studies on *E. coli* were in contrast with the findings of *S. aureus* as the antioxidant natural products showed antagonism on antimicrobial activity of enrofloxacin in combination. The aqueous root extract of *Premna integrifolia* exhibited anti-inflammatory activity through down regulation of genes of cytokines IL-6, IL-8 and TNF-α in *S. aureus* infected BuMECs However, the down regulation of genes of cytokines was limited to only IL-6 and IL-8 in *E. coli* infected BuMECs. Further investigation is required for application of these findings.



Dr. Vinay G. Joshi

Scientist - Senior Scale, LUVAS, Haryana

Dr. Vinay G. Joshi is a scientist at the Department of Animal Biotechnology, LUVAS, Hisar, with expertise in antimicrobial peptides, peptide-based diagnostics, and translational biotechnology. He has led multiple DBT, DST, and ICAR-funded research projects focusing on innovative diagnostics and therapeutics for animal and zoonotic diseases, particularly poultry pathogens, *Salmonella* and *Bacillus anthracis*. Dr. Joshi has published over 30 peer-reviewed research papers, authored book chapters, and holds several patents in peptide-based technologies.

Antimicrobial Peptides for Mastitis: Innovations, Challenges, and Future Perspectives.

Presented by Dr. Vinay G. Joshi

Abstract

Bovine mastitis is an inflammatory reaction in the udder of dairy animals commonly caused by infection. Various microorganisms, including bacteria, viruses, fungi, and algae, are involved. *Staphylococcus (S.) aureus*, *Streptococcus (S.) uberis, S. dysagalactiae, Escherichia (E.) coli, Klebsiella (K.) pneumoniae, Pseudomonas (P.) aeruginosa, and Mycoplasma spp.* are the major bacterial pathogens associated with mastitis (Cheng and Han, 2020). Among these bacteria, *S. aureus* is a major challenge due to its complex pathogenesis and highly adaptive mechanisms. The pathogen uses multiple mechanisms to bypass host defenses and therapeutic molecules. *S. aureus* invasion mechanisms can lead to persistent infection, complicating treatment (Clement et al., 2005). The emergence of methicillin-resistant S*. aureus* (MRSA) and biofilm formation also requires special considerations for treating *S. aureus-associated* mastitis. The complex pathogenesis of this mastitis-associated pathogen challenges classical antimicrobial therapeutic regimens. Alternatively, antimicrobial peptides (AMPs) offer an effective way to control complex mastitis problems through innovative approaches. This approach is promising because many AMPs have inherent characteristics such as broad-spectrum activity, multiple mechanisms of action, and a low likelihood of resistance development. Newer peptide designs with high sensitivity and stronger antibacterial activity are emerging as a model for mastitis treatment. Various models are available for designing AMPs; popular databases, such as the Antimicrobial Peptide Database (APD), host tools for AMP design and prediction. Generally, AMP prediction tools and models use empirical methods and machine learning (ML) approaches, or a combination of both. These platforms help with initial screening of antimicrobial activity, but the real challenge is making these AMPs compatible with biological systems. Using bioinformatics tools, a short synthetic antimicrobial peptide series, ANLP, was

designed and showed promising antibacterial activity against both Gram-positive and Gram-negative bacteria (Anu Kumari *et al.,* 2022). The ANLP peptide series is derived from the nuclear localization domain of the apoptin protein of chicken infectious anemia virus. ANLP-V3 peptide of this series showed efficient antibacterial activity against clinical isolates of *S. aureus* (MRSA) biofilm-forming bacteria in both *in vitro* and *in vivo* mouse models (Jasleen *et al.,* 2026). *S. aureus*, due to its complex structure, multi-layered protective mechanism, and zoonotic importance, has been the most preferred model to demonstrate the therapeutic abilities of AMPs. Careful AMP design can show strong activity against planktonic cells and biofilm-forming bacteria. Despite the many advantages of AMPs as alternative therapeutic molecules, practical use is limited by toxicity, proteolytic degradation, stability, delivery, and the challenge of translating laboratory findings into clinical applications, all of which require careful consideration. Finally, a review highlighting selected innovative AMP designs and emerging approaches, and offering perspectives on the future development of peptide-based therapeutics for bovine mastitis and their potential as practical alternatives to conventional antimicrobial therapy, is needed. Through innovations and peptide engineering, intracellular infections present in the chronic mastitis clinical picture can be tackled. AMP design offers many options for modules, modifications, and strategies to improve therapeutic efficiency against biofilm, intracellular growth, and multidrug resistance. A survey of these future opportunities in AMPs will help design an effective treatment regimen for a practical solution to bovine mastitis.



Dr. Anand Srivastava

Scientist-E

NIAB

Dr. Anand Srivastava received Bachelors in Science (B.Sc.) from University of Delhi, Delhi, and Masters of Science (M.Sc-Biotechnology) from Allahabad University, Allahabad, India. He did Ph.D. from Jawaharlal University (JNU) working at International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi, India. He then worked at Institut Pasteur, Paris (2008-2011) and Institut National de Transfusion Sanguine, Paris (2011-2012) as a Post-doctoral Fellow. He joined National Institute of Animal Biotechnology (NIAB) in 2013.

Area of Specialization: Host parasite interaction, Proteomics, Drug discovery, Yeast 2 hybrid, Phage display

Formononetin: A novel molecule that disrupts MRSA Biofilm via Potential SarA Associated Regulatory Modulation

Presented by Dr. Anand Srivastava

Abstract

Biofilm production is a critical component of Methicillin-resistant Staphylococcus aureus (MRSA) pathogenesis, contributing to the bacteria's resistance to conventional antibiotics.

This study describes the identification of formononetin, a bioactive chemical from Glycyrrhiza glabra L., which is effective against MRSA. Formononetin effectively suppressed biofilm formation, disrupted sessile biofilm, and reduced MRSA hemolytic activity in a dose-dependent manner. Formononetin improved the survival rate of MRSA- infected G. mellonella larvae by lowering bacterial burden and boosting melanization. Combining formononetin with antibiotics such oxacillin, ampicillin, and streptomycin resulted in a fractional inhibitory concentration index (FICI) ≤ 0.5, indicating a synergistic effect. Molecular docking experiments revealed that formononetin can interact with the global regulator, SarA, with an estimated binding score of -6.176 kcal/mol. Furthermore, the aspartate residue (D20) in SarA was found to be the interacting site for formononetin. Microscale thermophoresis and electrophoretic mobility shift assays of the SarAD20A mutant revealed a lower affinity for formononetin without compromising DNA-binding activity when compared to the wild-type SarA. Furthermore, proteome profiling of MRSA after formononetin treatment revealed substantial modification of SarA and SarA-related pathways, including scdA and agrC. Our findings suggest that formononetin has potential as a natural agent against MRSA biofilms.



Dr. Pankaj Suman

Scientist-E

NIAB

Dr. Pankaj Suman completed B.V.Sc. (2004) from Maharashtra Animal and Fishery Sciences University, Nagpur; M.Sc. (2006; Biotechnology) from Indian Institute of Technology Roorkee and Ph.D. (2011; Immunology) from the National Institute of Immunology (NII), New Delhi. He also worked as a visiting scholar at the Friedrich-Schiller University, Jena, Germany (2007-2010). Later, he worked as a Post-Doctoral Fellow (2011-2013) at NII, New Delhi, and then as Assistant Professor (2013-2014) at Amity University, Noida, Uttar Pradesh. Before joining the NIAB in 2017, he was associated with the Animal Husbandry and Fishery Resources Department, Govt. of Bihar as a Veterinary Clinician.

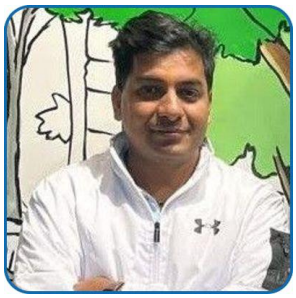
Dr. Suman's experience spans towards development of aptamer, antibodies and nanozymes based technologies for development of diagnostics and therapeutics. These technologies are being used solely or in combination to develop affordable diagnostics for animal diseases; improvement of reproductive efficiency and for enhanced digestibility of plant biomass (cellulose) in the rumen of livestock. His interest is to provide affordable solution to the clinical problems in veterinary medicine while working at the interface of animal physiology, nanotechnology, biosensing and drug delivery. Currently, his laboratory is working on biomarker discovery and development of aptamer and monoclonal antibody based point of care diagnostics for snake venom detection; development of aptamer based technologies for detection of residual antibiotics in animal products (like milk and meat) and for oestrous or pregnancy in farm animals; nanopatch for transdermal drug/hormone delivery; engineering cellulosomal enzyme complex in the form of nanozymes to enhance breakdown of cellulose (present in plant) into simple sugar moieties.

From Detection to Decision: Field-Deployable Technologies for Precision Mastitis Management

Presented by Dr. Pankaj Suman

Abstract

The future of mastitis management extends beyond treating disease after irreversible damage has occurred. It lies in detecting infections before productivity declines, identifying the most effective antimicrobial within hours rather than days, and ensuring that every treatment decision is guided by evidence. Field-deployable diagnostic technologies bridge the gap between the laboratory and the farm, empowering veterinarians and farmers with rapid, affordable, and actionable information at the point of care. By integrating early disease detection with rapid antimicrobial susceptibility testing, we can enhance animal health and welfare, reduce unnecessary antibiotic use, curb the emergence of antimicrobial resistance, and pave the way for truly precision-driven and sustainable livestock farming. This lecture will highlight the transformative role of field-deployable diagnostic technologies in enabling rapid, on-farm decision-making for mastitis management.



Dr. Paresh Sharma

Scientist-E

NIAB

Dr. Paresh Sharma received his PhD (2010) from BITS Pilani, India. He did his Post-doctoral work in Malaria Biology at the NIAID, National Institute of Health (NIH), USA from 2010-2013. He joined the National Institute of Animal Biotechnology in 2013.

Dr. Paresh has extensive research experience in the field of Microbiology, Cell Biology, Immunology and Genomics. His research interest has been focused on understanding the molecular mechanisms behind major intracellular parasitic diseases for identifying new drug treatments, diagnostic tools, and vaccines. During his PhD and Postdoctoral work he has used genetic and genomic approaches to study the host parasite interaction and molecular mechanisms using the protozoan parasites Plasmodium falciparum, Leishmania donovani and Trypanosma brucei as a model.

Proteogenomic Insights into Cell Wall Dysregulation and Oxacillin Susceptibility in Oxacillin-Susceptible mecA-Positive Staphylococcus aureus

Presented by Dr. Paresh Sharma

Abstract

Oxacillin-susceptible mecA-positive Staphylococcus aureus (OS-MRSA) presents a therapeutic challenge because it retains susceptibility to oxacillin despite harbouring the mecA gene. Here, we used integrated genomic, proteomic, expression, and phenotypic analyses to identify molecular features associated with this unusual phenotype. OS-MRSA isolates exhibited impaired biofilm formation and reduced fitness under oxacillin exposure. Whole-genome comparison of human and animal OS-MRSA isolates with MRSA identified 1,357 non-synonymous mutations across 498 genes, including 11 genes associated with cell wall-related functions, cell adhesion, and quorum sensing. Secretome analysis revealed reduced abundance of SceD and LtaS in OS-MRSA relative to MRSA, highlighting these cell wall-associated factors as candidate correlates of oxacillin susceptibility. In addition, a conserved upstream mutation in ltaS was identified across all OS-MRSA isolates, suggesting possible transcriptional modulation, and quantitative PCR confirmed differential expression of sceD and ltaS following oxacillin induction. Taken together, these findings support a model in which altered regulation of cell wall-associated processes may be linked to the OS-MRSA phenotype. However, because the study is based on comparative omics, expression profiling, and indirect phenotypic observations, these associations should be interpreted cautiously in the absence of direct lipoteichoic acid quantification and targeted mutant validation. Overall, this study provides a hypothesis-generating framework for understanding OS-MRSA adaptation to oxacillin exposure and identifies priorities for future functional investigation.



Dr. Sanjay Singh

Scientist-G, NIAB

Dr Sanjay Singh completed B.Sc. degree (Biology and Chemistry) from Ewing Christian College, Allahabad, Uttar Pradesh, India and M.Sc. degree (Biochemistry) from the Department of Biochemistry, University of Allahabad, Allahabad, Uttar Pradesh, India. He completed Ph.D. (Biotechnology/ Nanobiotechnology) from CSIR-National Chemical Laboratory (Pune University), Pune, India. Subsequently, he worked as a postdoctoral research fellow at the University of Central Florida, Orlando, USA and at Pennsylvania State University, Hershey, USA. He joined Ahmedabad University and worked as an Assistant Professor (2012 – 2017) and Associate Professor (2017 – 2021). He was also a visiting professor at RMIT University, Melbourne, Australia (2015 – 2016), University of Pennsylvania, Philadelphia, USA (2017), and University of Twente, Netherlands (2019). Dr Singh joined NIAB on 31st May 2021.

Development of GOx–CeO_2 Hybrid Nanozyme for MRSA-induced Mastitis Treatment

Presented by Dr. Sanjay Singh

Abstract

Antimicrobial resistance (AMR) poses a major global health challenge, undermining the efficacy of conventional antibiotics and complicating the treatment of bacterial infections. The emergence and dissemination of antibiotic-resistant pathogens underscore the need for alternative antibacterial strategies that minimize dependence on conventional antibiotics. Pro-oxidant nanozymes have emerged as promising candidates owing to their ability to catalytically generate reactive oxygen species (ROS), including superoxide radicals and hydroxyl radicals, which can damage bacterial structures and compromise viability. However, achieving efficient ROS generation under physiological conditions without requiring acidic pH or exogenous hydrogen peroxide (H_2O_2) remains a major challenge. Here, we developed a glucose oxidase (GOx)-conjugated cerium oxide (CeO_2) hybrid nanozyme (GOx–CeO_2 NPs) that exhibits enhanced oxidase-mimetic activity under physiologically relevant conditions in the presence of adenosine triphosphate (ATP). Notably, the system generates superoxide and hydroxyl radicals without requiring exogenous H_2O_2 or acidic pH. The hybrid nanozyme demonstrated potent antibacterial activity against methicillin-resistant Staphylococcus aureus (MRSA) and multidrug-resistant Escherichia coli, achieving >90% bacterial killing under the tested conditions. Its antibacterial efficacy was evaluated using complementary approaches, including live/dead staining, ROS (superoxide) detection, and morphological characterization by scanning electron microscopy, transmission electron microscopy, and atomic force microscopy. To investigate its therapeutic potential, an MRSA-induced murine mastitis model was established through intramammary bacterial inoculation. Intramammary administration of the hybrid nanozyme reduced the mammary bacterial burden by >80%, attenuated pro-inflammatory cytokine responses, and preserved mammary alveolar architecture. Collectively, these findings establish ATP-responsive GOx–CeO_2 hybrid nanozymes as a promising platform for ROS-mediated antibacterial therapy, combining pathogen clearance with tissue protection in experimental mastitis. This strategy may provide a foundation for developing antibiotic-sparing interventions against resistant bacterial infections, warranting further investigation into its safety, therapeutic efficacy, and translational potential.



Dr. Nagendra R. Hegde

Scientist-H

NIAB

Dr. Nagendra R. Hegde is an animal virologist and immunologist with experience in veterinary and human virology, immunology, cell biology and microbiology.

Dr.Hegde completed Bachelor of Veterinary Science (B.V.Sc.; 1989) and Master of Veterinary Science (M.V.Sc. in Veterinary Microbiology and Public Health, focussing on Virology; 1992) from the University of Agricultural Sciences, Bangalore, India, and Ph.D. (Veterinary & Biomedical Sciences, specializing in Immunology; 1998) from the University of Nebraska, U.S.A. He then worked as a Postdoctoral Fellow (Aug 1998 to Mar 2004) and as a Research Assistant Professor (Apr 2004 to May 2006) in Virology, Cell Biology, and Host-Pathogen Interaction at Oregon Health & Science University, U.S.A. Before joining NIAB, he was a Group Leader (Aug 2006 to Mar 2014) and then the Associate Director (Apr 2014 to Mar 2017) at Ella Foundation, Hyderabad, India.

Dr. Hegde's major contributions have been in virology, where he has worked on epidemiology, genomics, vaccines, and diagnostics, as well as the interaction of host cells with animal (and human) DNA and RNA viruses. In immunology, he has worked on bovine major histocompatibility complex (MHC) and cell-mediated immunity (CMI). In microbiology, he has worked on epidemiology and vaccines for pathogens that cause bovine mastitis. His research interests at NIAB include understanding the epidemiology, genomics, and biology of important livestock diseases, devising measures to protect animals from these diseases, and elucidating the fundamentals of cellular and immunological responses in bovines. He has recently focused on areas of importance to One Health, including antimicrobial resistance and zoonoses.

Good viruses vs bad bacteria

Presented by Dr. Nagendra R. Hegde

Abstract

More than 200 organisms and over 130 bacterial species have been implicated as etiologies, and as few as six to ten bacterial species are responsible for >95% of all bovine mastitis cases globally. Antibiotics continue to be used to treat mastitis, but alarming levels of antimicrobial resistance have necessitated exploring alternatives. We have initiated research on viruses that lyse the major bacterial pathogens of mastitis. Bacteriophages were isolated and initially investigated for host strain tropism and growth kinetics. Based on relatively broad tropism, short latent period and high burst size, selected phages were further characterized for pH and temperature stability, genome sequencing and activity in milk and moth larvae. We have so far isolated 88 bacteriophages: 45, 22, 10, 6, 2, 2 and 1 against *Escherichia coli*, *Enterobacter*

faecium/faecalis, *Klebsiella pneumoniae*, *Staphylococcus aureus*, *Staphylococcus chromogenes*, *Pseudomonas aeruginosa* and *Streptococcus agalactiae*, respectively. Of these, seven Escherichia, eight Enterococcus, and six Staphylococcus phages were fully characterized. These phages exhibited myovirus, siphovirus, and podovirus morphology, as well as unique genome fingerprints, and demonstrated stability across a wide range of temperatures (4°C to 50°C) and pH levels (3 to 11). Genome sequencing of 18 phages revealed that all were lytic and lacked any AMR or toxin genes. Selected phages lysed bacteria in milk and prevented bacteria-mediated pathology in *Galleria* larvae. Additionally, bacterially expressed Escherichia phage endolysins from selected phages exhibited lytic activity not only against the original host but also against several Gram-negative bacteria, demonstrating cross-species potential. These findings highlight phages and endolysins as promising alternatives to antibiotics, warranting further investigation into their utility and clinical development for the management of bacterial mastitis and other infections.



Dr. Sandeep Kushwaha

Scientist-E
NIAB

Education

Graduation (B.Sc., 2002)

University of Allahabad University, U.P., India.

Major: Biology and chemistry

Post-Graduation (M.Sc. Bioinformatics, 2005),

University of Allahabad, U.P. India

Major: Bioinformatics

Thesis: Comparative Protein Modelling and Structural Analysis of Calmodulin Protein

Ph.D. (2012)

Maulana Azad National Institute of Technology (MANIT), Bhopal, M.P., India

Major: Computational Biology and Bioinformatics

Thesis: Computational Approach to Study Nucleotide and Peptide Sequences of *Mycobacterium tuberculosis*.

Postdoc (Jan 2012-June 2014),

Department of Biology, Lund University, Lund, Sweden

Major: Computational Biology and Bioinformatics

Project: Functional and Structural diversity of microbes for carbon recycling in agricultural soils.

Appointments

Scientist-E (31st October 2019- Present),

National Institute of Animal Biotechnology, Hyderabad, India

Job profile: Develop computational resources to explore molecular mechanism of animal disease resistance and susceptibility, reproduction, bioinformatics data analysis and support.

Researcher (March 2019- Sept 2019),

Department of Biology, Lund University, Sweden

Job profile: Bioinformatics data analysis and support for running collaborative projects

Researcher (Aug 2015- Feb 2019),

Plant breeding platform, Plant Breeding, SLU Alnarp, Sweden

Job profile: Bioinformatics data analysis and support for collaborative projects between departments and SLU campuses, bioinformatics services and training courses.

Research Engineer (July 2014 – July 2015),

PlantLink, Plant Protection, SLU Alnarp, Sweden

Job profile: Bioinformatics data analysis and support for collaborative projects between SLU Alnarp and Lund University, bioinformatics services and training courses.

Decoding the Molecular Genetics of Bovine Mastitis Using Computational Biology Approaches

Presented by Dr. Sandeep Kushwaha

Abstract

Bovine mastitis is a major challenge to dairy production, causing substantial economic losses and adversely affecting animal health and milk quality. Understanding host susceptibility and pathogen-associated molecular mechanisms is essential for developing effective diagnostic and therapeutic strategies. This study aimed to establish an integrated computational framework combining multi-omics analyses to identify candidate host genes and predict host–pathogen protein interactions associated with bovine mastitis.

An integrative analysis of publicly available high-throughput studies identified 5,292 genes, 211 significantly enriched pathways, and 257 common genes across major disease-associated pathways. Uniform reanalysis of seven RNA-seq datasets using 16 computational configurations demonstrated substantial effects of gene quantification and statistical methods on analytical variability. Integrated analysis prioritised ENTPD2, PTGDS, IQGAP3, TRPV4, ALOX15B, ITGA7, and SORCS1 as candidate mastitis-associated genes. Ensemble machine learning techniques further identified host gene expression signatures associated with disease status. Metatranscriptome analysis of seven RNA-seq studies helped identify transcriptionally active bacterial taxa and their molecular signatures. Additionally, a machine learning model integrating ProtT5 protein embeddings achieved a Matthews correlation coefficient of 0.943 for predicting host–pathogen protein interactions, prioritising 15 candidate host genes for further investigation. We developed three computational resources, RNASeqMetaAnalyst, RNASeqSignatureMiner, and BoviHPIPredict, to support reproducible transcriptomic analysis, molecular signature discovery, and host–pathogen interaction prediction. These findings provide a foundation for biomarker discovery, experimental validation, and improved diagnostic and therapeutic strategies for bovine mastitis.



Dr. Ponnanna N.M.

NDDB R&D Laboratory, Hyderabad

Dr Ponnanna N. M. is a Senior Scientist and leads the R&D team at the NDDB R&D Laboratory of the National Dairy Development Board, Hyderabad. The Laboratory is NABL-accredited for bovine disease testing. Dr Ponnanna holds a Ph.D. in Biotechnology and has spent more than two decades in applied research at NDDB. He has been closely involved in establishing and strengthening the NDDB R&D Laboratory and its diagnostic capabilities, which have supported national bovine breeding programmes. His current work focuses on bovine disease surveillance, diagnostic solutions, and sustainable approaches to the management of animal-health problems of economic and One Health importance, including mastitis, antimicrobial resistance, and reproductive and respiratory infections. He has around 15 scientific publications, primarily in applied bovine infectious-disease research, including disease diagnostics, epidemiology and molecular characterisation of pathogens.

Bovine Mastitis in Indian Milksheds: Challenges, Opportunities, and the Way Forward

Presented by Dr Ponnanna N. M

Abstract

Bovine mastitis is one of the most important diseases affecting Indian dairying, with a substantial subclinical burden that frequently remains undetected and adversely affects milk production, milk quality and farmer income. Published evidence indicates a high burden in India, with pooled estimates suggesting subclinical mastitis in approximately 45% of animals. In India's cooperative dairy system, built on a smallholder production base, the major challenges to mastitis control are improper housing and milking hygiene, limited routine screening, inadequate access to timely diagnosis and antimicrobial susceptibility testing, and a treatment-centric approach that heavily leans on empirical antimicrobial use over prevention.

A retrospective analysis of laboratory records from 884 mastitis milk samples received from 18 milk unions across nine states, with antimicrobial susceptibility testing results for 560 isolates, illustrates the contours of this problem. Gram-positive organisms were predominant (93.93%), mainly non-aureus staphylococci, streptococci, *Staphylococcus aureus* and *Enterococcus spp.*, with environmental and opportunistic organisms featuring prominently alongside classical contagious pathogens. Multidrug resistance was observed in approximately one in five tested isolates, while resistance patterns varied across pathogen groups and milk unions.

These findings point to two complementary opportunities. At the farm level, much of mastitis is preventable through simple, low-cost improvements in clean milking, teat hygiene and clean, dry housing and resting environments, complemented where appropriate by scientifically evaluated non-antibiotic approaches such as ethno-veterinary medicine. At the system level, the cooperative milkshed is an under-used surveillance asset, able to aggregate diagnostic and resistance data.

The way forward is a shift from treatment-driven management towards an integrated model of prevention, early detection, appropriate diagnosis, selective antimicrobial therapy, and longitudinal surveillance. Routine CMT/SCC screening, culture and antimicrobial susceptibility testing where indicated, regionally informed antimicrobial stewardship, and standardized data capture can enable the milkshed to serve as a practical operational unit for udder-health management and antimicrobial stewardship in Indian dairying.

Keywords: Bovine mastitis; milkshed; antimicrobial resistance; antimicrobial stewardship; ethnoveterinary medicine; somatic cell count; cooperative dairy system



Dr. Chandr Shakhar

CEO & Founder, SSPL

Dr. Chandr Shakhar is a techno-commercial entrepreneur with 19+ years of experience leading animal health businesses across India and South Asia. An academic topper throughout his training, he holds a B.V.Sc. & A.H. (CVAS, RAJUVAS), an M.V.Sc. in Animal Nutrition (ICAR-JRF topper, IVRI), and a full-time PGPM in Marketing & HR (LBSIM, New Delhi). His expertise spans ruminant technical development, premix and feed formulations, global product launches, and high-impact training for veterinarians, milk cooperatives (AMUL, RCDF), and World Bank–funded initiatives. His corporate career culminated in an 8+ year tenure at DSM Nutritional Products in regional leadership roles across South Asia, alongside advisory contributions to major conferences (ANA, ANSI) and CSR projects (ITC, Heritage Foods).

Currently, he is the Founder & CEO of Suvant Solutions Private Limited (brands: *Payaswini* and *CANPLAN*), a Silver-rated startup. His venture is dedicated to transforming dairy farms and gaushalas into ecologically, financially, and socially sustainable enterprises. To achieve this, he collaborates closely with state animal husbandry departments, ICAR institutes, NGOs, and dairy cooperatives to bridge global standards with local livestock practices.

Nutritional interventions for mastitis management

Presented by Dr. Chandr Shakhar

Abstract

Mastitis is a major disease of dairy animals and an important cause of economic loss, reduced milk production, deterioration of milk quality and increased dependence on antimicrobial treatment. The nutritional management of mastitis involves strengthening the animal's natural defence mechanisms, maintaining teat and mammary tissue integrity, supporting immune-cell function and controlling oxidative stress. This technical paper presents the nutritional and management approaches described in the supplied material, with particular emphasis on vitamin E and selenium, vitamin A, beta-carotene, vitamin D, organic zinc, organic copper, organic manganese, organic cobalt, organic chromium and iodine-based teat hygiene. The approach integrates nutritional support with hygiene, environmental control, early detection, appropriate veterinary treatment and responsible use of antibiotics. Keywords: Mastitis; dairy cattle; udder health; vitamin E; selenium; vitamin A; beta-carotene; vitamin D; zinc; copper; manganese; cobalt; chromium; iodine; somatic cell count; antioxidants.



Dr. Kartikeya Krothapalli

Vitulomics, Tenali

Dr. Kartikeya K is a scientist and entrepreneur with 15 years of international research experience spanning leading U.S. universities and global research institutes. He holds a Ph.D. from Kansas State University and completed his postdoctoral training at Purdue University. He served as an internationally recruited CGIAR scientist before founding Vitulomics to advance evidence-based research in veterinary botanicals.

A Field Proven, Antibiotic Free, Phytotherapeutic Treatment for Bovine Clinical Mastitis

Presented by Dr. Kartikeya K

Abstract

Bovine clinical mastitis presents a major economic challenge to global dairy production while accelerating antimicrobial resistance (AMR) through routine antibiotic overuse. Our product MastiGold-H is a field proven, antibiotic-free topical treatment for bovine clinical mastitis, it is formulated as a polyherbal composition that leverages our proprietary plant induction technology to maximize bioactive compound concentration. While institutional evaluations by ICAR-IVRI and APAHD demonstrate high therapeutic efficacy, MastiGold-H offers a farmer-friendly topical administration that removes dependency on veterinarian availability to initiate treatment. Across 8,500+ field cases, MastiGold-H prevented usage of over 25,500 antibiotic injections, saved 340,000 Liters of milk from residue contamination, and generated ₹1.91 Crores in total savings compared to conventional antibiotic regimens. By uniting advanced phytotherapeutics, institutional credibility, and on-farm practicality, MastiGold-H delivers a proven, cost-effective, and AMR-free intervention for sustainable livestock health and dairy productivity.



Dr. Ragul Paramasivam

CEO and Co-Founder of Chimertech

Dr. Ragul Paramasivam is an immunologist, translational researcher, and entrepreneur working at the intersection of artificial intelligence, precision livestock health, biosensing, and veterinary diagnostics. He earned his Ph.D. in Immunology from Monash University, Australia, where he developed recombinant multi-epitope protein-based point-of-care diagnostics for infectious diseases. His earlier research at Monash University Malaysia focused on protein recovery and downstream bioprocessing. Before founding Chimertech, he worked at the Department of Animal Biotechnology, Madras Veterinary College, TANUVAS, contributing to projects on leptospirosis diagnostics, Toll-like receptor biology, cytokine regulation, nanoparticle-mediated immunomodulation, and veterinary biosensors under DST, DBT, and ICAR-supported programs. His international research collaborations also include work on antimicrobial resistance and infectious diseases in Ethiopia from a One Health perspective.

Dr. Paramasivam has authored more than 30 scientific publications and holds patents in diagnostic technologies. His current research focuses on integrating IoT, spectroscopy, biosensors, edge computing, and explainable artificial intelligence for early mastitis detection and predictive udder health management.

As CEO and Co-Founder of Chimertech, he leads translational research aimed at developing affordable, field-deployable technologies that improve dairy animal health, reduce antimicrobial dependence, and advance sustainable livestock production.

Beyond Subclinical Mastitis Diagnosis: An IoT- and AI-Driven Framework for Predictive Udder Health Management

Presented by Dr. Ragul Paramasivam

Abstract

Advances in precision livestock farming, biosensor technologies, and artificial intelligence (AI) are creating new opportunities to transform udder health management from episodic diagnostic assessment to continuous, data driven surveillance. While conventional and emerging diagnostic approaches have improved the identification of subclinical mammary inflammation, their ability to characterize temporal disease progression and anticipate clinically significant changes remains limited. Integrating longitudinal physiological measurements with intelligent analytical systems offers a promising pathway towards predictive and individualized udder health management. Recent developments in Internet of Things (IoT)-enabled sensing, embedded computing, and machine learning have enabled the acquisition and interpretation of multiple indicators, including quarter-level milk electrical

conductivity, temperature, somatic cell dynamics, milk yield, biochemical biomarkers, and animal behavioural parameters. The integration of these heterogeneous datasets through multimodal sensor fusion and temporal modelling may facilitate the identification of subtle physiological deviations, establishment of animal-specific baselines, and estimation of evolving mammary health risks. Approaches involving ensemble learning, deep learning, anomaly detection, and explainable AI offer complementary capabilities for interpreting complex biological variability and generating clinically relevant risk assessments. A conceptual IoT- and AI-driven framework is proposed, integrating distributed sensing technologies, longitudinal animal health records, edge-to-cloud data processing, predictive analytics, and veterinary decision support mechanisms. Field-deployable quarter-level diagnostic technologies and connected monitoring systems, including developments within Chimertech's digital dairy health ecosystem, illustrate potential avenues for translating individual measurements into continuous udder health intelligence. Particular emphasis is placed on the distinction between detecting established inflammatory changes and forecasting future clinical events, which necessitates clearly defined prediction horizons, robust diagnostic reference standards, and prospective validation. Despite considerable technological progress, challenges involving sensor reliability, biological variability, data interoperability, algorithmic generalizability, and false-alert burden continue to limit widespread clinical adoption. Addressing these limitations requires multidisciplinary integration of veterinary diagnostics, sensor engineering, computational modelling, and field-based epidemiological validation. The transition towards predictive udder health management therefore represents not merely an advancement in diagnostic instrumentation, but a broader shift towards understanding dynamic mammary health trajectories. The convergence of connected sensing and validated artificial intelligence has the potential to support earlier risk identification, targeted clinical assessment, improved antimicrobial stewardship, and more proactive, evidence-based dairy herd health management. Keywords: Bovine mastitis; Predictive udder health; Internet of Things; Artificial intelligence; Precision livestock farming; Multimodal sensor fusion; Longitudinal monitoring; Veterinary decision support.



Mr. Rajat Pandya

Co-Founder & CEO, FaunaTech, Bengaluru

Rajat Pandya is a seasoned business leader, serial entrepreneur, and co-founder & CEO of FaunaTech, with 25+ years of experience across fasteners, apparel, food & QSR, dairy, and health tech. He has built and launched businesses, driven go-to-market and product strategies, and led revenue planning and execution. At FaunaTech, he is focused on developing accessible, smartphone-connected diagnostic solutions for agriculture, animal health, and food safety. Rajat is an alumnus of Daly College, Indore, the University of Mumbai, and the Stanford Seed at Stanford Graduate School of Business.

Mastitis and Beyond: From Early Detection to Better Outcomes with Point-of-Care Diagnostics for Animal Health and Food Safety

Presented by Mr. Rajat Pandya

Abstract

Mastitis remains the costliest disease in dairy farming, often going undetected until visible symptoms appear and the damage is already done. At FaunaTech, we developed Fauna, a handheld, optics-based platform that brings cow-side diagnostics to the farm gate, measuring Somatic Cell Count (SCC) within minutes instead of days. SCC remains the most reliable early indicator of subclinical mastitis, allowing farmers and veterinarians to intervene before infection progresses, reducing yield loss and unnecessary treatment. Building on this, we are developing a dual-biomarker approach combining SCC with Lactate Dehydrogenase (LDH) to further improve early and subclinical detection, with the goal of reducing indiscriminate antibiotic use and curbing antimicrobial resistance (AMR) in dairy systems. Beyond Dairy, FaunaTech is expanding into broader food diagnostics, including pathogens such as E. coli, Salmonella, and Listeria, along with antibiotic residues, pesticide residues, aflatoxins, and other contaminants and quality markers across milk, meat, fish, and produce. This reflects a wider One Health approach, connecting animal health, food safety, and human health as one interconnected system



Dr. Roshan Naik

Director, Diagopreutic Pvt Ltd

Dr. Roshan Ratnakar Naik is the founder and CEO of Diagopreutic Private Limited, a Goa-based diagnostics company he co-founded with Lakshmi Swaroopa Naik in November 2022. He holds an MSc in Biotechnology and a PhD in Neurobiology with a background in biomarker discovery, and previously worked at Nanyang Technological University Singapore and the Max Planck Institute of Psychiatry. Drawing on his and Swaroopa Naik's expertise in enzymatic biomarker patterns and microbial characterization, the pair built a diagnostic platform capable of precise pathogen identification alongside antibiotic susceptibility testing — the foundation for Merify-4T (a cow-side subclinical mastitis test) and ESKAPE-PAS (a rapid antimicrobial susceptibility test), before extending the technology toward human diagnostics for urinary tract infections.

Rapid Mastitis Detection and Antimicrobial Stewardship for Targeted Antibiotic Treatment

Presented by Dr. Roshan Ratnakar Naik

Abstract

Subclinical and clinical bovine mastitis remains leading causes of economic loss in dairy production, driven largely by delayed diagnosis and empirical antibiotic use. Conventional diagnostics — the California Mastitis Test (CMT) and culture-and-sensitivity (C/S) assays — are either non-specific or require 48+ hours, encouraging blanket antibiotic therapy and contributing to antimicrobial resistance (AMR) while leaving farmers to absorb losses from undiagnosed infection. To evaluate a two-tier, cow-side diagnostic workflow combining Merify-4T (a patented rapid dipstick test for subclinical mastitis) with the ESKAPE-PAS kit (a patented rapid phenotypic antimicrobial susceptibility test) as a pathway to antimicrobial stewardship and improved farmer income in dairy herds. Merify-4T was evaluated against CMT on 247 raw milk samples from dairy cattle and buffaloes with suspected subclinical mastitis. Samples testing positive can be reflexed to ESKAPE-PAS, which was separately validated against gold-standard disk-diffusion C/S on 110 raw milk samples (990 antibiotic-isolate tests; 9 antibiotics; *E. coli*, n=48, and *S. aureus*, n=62) from clinical mastitis cases, returning bacterial identification and susceptibility profiles within 6 hours. Field impact was assessed through a district-level screening and treatment programme across 70 villages of Bulandshahr, Uttar Pradesh (June–December 2025), using Merify-4T to screen 3,529 milch animals, with before-and-after income data recorded for treated animals. Merify-4T showed 93.1% sensitivity, 95.7% specificity, 96.1% PPV, and 92.5% NPV (94.3% overall accuracy) relative to CMT. ESKAPE-PAS showed 95.0% sensitivity, 98.4% specificity, 99.0% PPV, and 92.2% NPV (96.3% overall accuracy) relative to disk diffusion, with 96.0% categorical (S/I/R) agreement and very major/major

error rates below 1%. In the field programme, 1,523 of 3,529 animals (43%) screened positive; 1,127 were treated, with a 99% cure rate. Across 235 animals with complete before-and-after records, average milk fat rose from 5.56% to 5.90% and milk price rose from ₹50.07 to ₹52.07 per litre (both $p<0.001$), translating directly into higher farmer income despite a slight, expected dip in raw milk volume as udder inflammation resolved.

Conclusion: Sequential use of two patented, field-deployable technologies — Merify-4T for cow-side mastitis screening and ESKAPE-PAS for same-day susceptibility profiling — compresses a diagnosis-to-treatment cycle that conventionally takes days into hours, enabling targeted antibiotic use and measurably restoring milk value and farmer income. This combined model offers a practical, scalable approach to antimicrobial stewardship in dairy production, particularly in resource-limited settings.



Dr D. J. Kalita

MVSc (Vey Medicine), MBA (Marketing)

Head -Technical & Regulatory Affairs Zenex Animal Health India Private Ltd, Ahmedabad

Dr. D J Kalita is an accomplished Animal Healthcare professional with over two decades of industry experience spanning sales, product management, technical strategy, and regulatory affairs. Throughout his career, Dr. Kalita has specialized in end-to-end product identification and development, providing crucial technical and regulatory oversight across pre-launch clinical trials, market introduction, and post-launch phases. His regulatory expertise includes managing imports, registrations, compliance, labeling, and advertising standards while working closely with regulatory bodies. He actively supports sales and marketing teams with robust technical insights. A key contributor to national veterinary standards, Dr. Kalita serves as a member of the Indian Pharmacopoeia Commission's Expert Committee for Veterinary Drugs & Biologicals and is an active member of both the Therapeutic and Biological sub-committees of the Indian Federation of Animal Health Companies (INFAH).

Title: Proteolytic Enzymes & Bioflavonoids in the management of Bovine mastitis

Presented by Dr. D J Kalita

Abstract

Mastitis is one of the most economically important diseases of dairy animals, characterized by inflammation of the mammary gland, oxidative stress, tissue damage, edema, and impaired milk production. The inflammatory response associated with mastitis often results in damage to mammary tissues and prolongs the recovery process, even after elimination of the causative pathogens. Proteolytic enzymes such as bromelain, papain, trypsin/chymotrypsin, along with the bioflavonoid rutin, have attracted considerable attention as supportive therapeutic agents due to their anti-inflammatory, antioxidant, fibrinolytic, anti-edematous, and immunomodulatory properties. These natural compounds help modulate inflammatory mediators, reduce oxidative tissue damage, improve microcirculation, facilitate removal of necrotic tissue and inflammatory exudates, and promote tissue repair and regeneration. Besides, proteolytic enzymes like bromelain have been reported to enhance the efficacy and bioavailability of certain antibiotics, potentially improving treatment outcomes in infectious conditions. The combined use of proteolytic enzymes and bioflavonoids may aid in reducing mammary gland inflammation, aids in damaged tissue healing, and restoring udder health in mastitis affected animals. These actions have been demonstrated in multiple in vitro and animal models. Although veterinary-specific evidence remains limited, available experimental and clinical findings suggest significant potential for their use as adjuncts to conventional mastitis therapy. To establish the clinical efficacy of such a combination, requires further investigation which may be a safer and effective alternative for faster healing of damaged tissues.

Keywords: Mastitis, Proteolytic Enzymes, Bromelain, Papain, Trypsin, Rutin, Mammary Tissue Repair, Inflammation, Dairy Animals, Udder Health.



Dr. Shivasharanappa Nayakvadi

Senior Scientist,

NIVEDI

Dr Shivasharanappa N is working as Senior Scientist in livestock AMR research lab (LARL) at NIVEDI, Bengaluru with 15 years of research experience. He is recipient of Fulbright postdoctoral fellowship during 2018-19 at North Carolina state University, USA where he worked on CRISPR Cas9 role in reversing antibiotic resistance in ESBL *E. coli*. His area of expertise includes bacterial epidemiology, pathology, host-pathogen interaction, AMR and CRISPR Cas. Principal Investigator in INFAAR AMR surveillance (All India Network program on AMR in animals and fisheries funded by ICAR. Co-Incharge, WOAH Reference laboratory for PPR, NIVEDI, India. Consortia member of One health and AMR in BEST Cluster consortia (Bengaluru Science and technology cluster) supported by Principal Scientific advisor (PSA) Govt of India at IISc, Bengaluru. Accessor for National Accreditation Board for Testing and Calibration Laboratories (NABL) in the field of Veterinary pathology and disease diagnosis. Mentor for Field Epidemiology training by NCDC, Govt of India and FAO Assessment Tool for Laboratories and AMR Surveillance Systems (FAO-ATLASS)

Antimicrobial Resistance in Bovine Mastitis Pathogens: An Update on Surveillance in India

Presented by Dr. Shivasharanappa N

Abstract

Bovine mastitis remains a major constraint to dairy productivity in India, with *Staphylococcus aureus*, coagulase-negative *staphylococci* (CoNS), *Mammaliococcus sciuri*, *Escherichia coli*, and *Klebsiella pneumoniae* as predominant etiological agents. Methicillin-resistant *S. aureus* (MRSA) and extended-spectrum β-lactamase (ESBL) *E. coli* isolates are increasingly reported from clinical and subclinical mastitis cases, raising zoonotic transmission concerns. National surveillance under the Indian Network for Fishery and Animal Antimicrobial Resistance (INFAAR, 2019–2022) corroborates escalating resistance in these pathogens: bovine *S. aureus* and CoNS were frequently penicillin-resistant (69–75%), with lower resistance to erythromycin and enrofloxacin, while methicillin-resistant *S. aureus* remained uncommon in cow milk (35 of 1721 isolates), indicating a low risk of milk-borne MRSA transmission. Bovine *E. coli* isolates showed marked resistance to cefotaxime (42%) with resistance consistently higher in rectal than milk-derived isolates, pointing to gut carriage as a larger reservoir than the mammary gland. Genomic studies from our group have characterized *Mammallicocus sciuri* and coliform mastitis pathogens, revealing extensive resistomes, biofilm-associated traits, and molecular signatures underlying host-pathogen interaction. Despite this expanding evidence base, harmonized, mastitis-specific surveillance integrating One Health principles remains limited. Strengthening laboratory networks, standardizing antimicrobial susceptibility testing, and linking farm-level antibiotic use with genomic resistance profiling remain critical for evidence-based policy and antimicrobial stewardship in India's dairy sector.

Key words: Bovine mastitis, INFAAR, MRSA, genomics



Dr. Nidhi Rawat

Dr. Nidhi Rawat has made significant contributions to mastitis research, particularly in the areas of pathogen surveillance, antimicrobial resistance (AMR) and alternative therapeutic strategies. Her research has focused on important mastitis-associated bacteria including *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Streptococcus spp.*, *Escherichia coli*, *Klebsiella* spp., and *Enterobacter* spp., generating valuable information on their prevalence, antimicrobial susceptibility and emerging resistance patterns, particularly in the Chhattisgarh state. Her work has also explored promising alternatives to conventional antibiotics, including medicinal plant extracts, bacteriophages, synthetic antimicrobial peptides and anti-biofilm approaches with the aim of improving mastitis management and addressing antimicrobial resistance. Collectively, her research contributes to strengthening mastitis control, antimicrobial stewardship, animal health and food safety within a One Health framework.

Antimicrobial Resistance in Bovine Mastitis: The Chhattisgarh Scenario and Alternative Therapeutic Strategies

Presented by Dr. Nidhi Rawat

Abstract

Bovine mastitis is a major infectious disease of dairy animals causing economic losses and impaired animal health. The emergence of antimicrobial-resistant pathogens and zoonotic microorganisms necessitates integrated approaches for disease control. The present work investigated the etiological diversity, antimicrobial resistance, virulence determinants and alternative therapeutic strategies for control of bovine mastitis in Chhattisgarh state.

Bovine mastitis showed considerable etiological diversity, with *Staphylococcus aureus* predominating in both subclinical and clinical cases, followed by *Escherichia coli*. Clinical mastitis was additionally associated with *Pseudomonas aeruginosa*, *Klebsiella* spp., *Candida* spp., *Streptococcus* spp. and *Aspergillus* spp. Mastitis-associated *S. aureus* exhibited antimicrobial resistance, including prevalence of methicillin-resistant *S. aureus* (MRSA). *Pseudomonas aeruginosa* exhibited multiple virulence attributes, including haemolysis, phospholipase C, DNase and gelatinase production. Detection of *Listeria monocytogenes* in dairy milk further highlighted the potential zoonotic risk. Alternative and adjunctive antimicrobial strategies were explored, using bacteriophages, plant-derived compounds and antimicrobial peptides. Methanolic *Hemidesmus indicus* root extract (MHIR) enhanced the antimicrobial activity of amoxicillin and clindamycin against MRSA. MHIR exhibited synergistic antimicrobial interactions with amoxicillin in 58.33% and clindamycin in 83.33% of isolates. Methanolic *Piper*

betel leaf extract inhibited MDR *S. aureus*, *P. aeruginosa* and *E. coli*, with mean MICs of 5.32, 7.19 and 5.63 mg/mL, respectively. Lytic bacteriophages recovered from dairy-farm wastewater showed activity against *E. coli* and *P. aeruginosa*. A phage cocktail comprising of *B. Subtilis*, *E.coli* and *P.aeruginosa* phage achieved clinical recovery in 66.66% of treated mastitic animals. The synthetic antimicrobial peptide 6K-F17 demonstrated a lower MIC (138.59 ± 13.59 µg/mL) than ciprofloxacin (201.09 ± 13.01 µg/mL) while their combination further reduced MIC values.

Overall, these findings support integrated alternative strategies to reduce dependence on conventional antibiotics and improve sustainable control of bovine mastitis.

Key words: Bovine mastitis, Antimicrobial resistance, Alternative antimicrobial strategies, Chhattisgarh



Dr. A. Manimaran

Senior Scientist, ICAR-NDRI, Bangalore

Dr. A. Manimaran completed BVSc from Madras Veterinary College (TANUVAS) in 2005, and Master's and Doctoral degrees in Veterinary Pharmacology from ICAR-Indian Veterinary Research Institute (IVRI), IzatNagar, Bareilly (UP) in 2008 and 2014, respectively. His career started as Scientist at ICAR-NDRI, Karnal (2010-2014), after which He joined SRS of ICAR-NDRI, Bengaluru and is currently working as Principal Scientist. His research area includes transition cow biology and bovine udder health management. Dr. A. Manimaran has published over 100 research papers/ reviews/ book chapters/ technical articles in journals of national and international repute and presented his work in more than 20
national/ international conferences. He has been involved in 16 different institutional and external funded projects, contract research projects as 'PI and Co-PI' and also guided 11 Master's and 3 doctoral dissertations. Dr. A. Manimaran is a Visiting scholar of University of Illinois Urbana-Champaign (UIUC), USA and recipient of Prof. V. V. Ranade Young Scientist Award (2016) from Indian Society of Veterinary Pharmacology and Toxicology (ISVPT), Associate Fellow of ISVPT (2021), National Academy of Dairy Science, India (2020) and Indian Society of Ethno Veterinary Herbal Research (ISEVHR, 2026). He also
received a few awards for best paper and posters during various conferences. Advancing antimicrobial stewardship in bovine mastitis: from clinical assessment to treatment decision

Title: Advancing antimicrobial stewardship in bovine mastitis: from clinical assessment to treatment decision

Presented by Dr. A. Manimaran

Abstract

Antimicrobial resistance (AMR) is one of the greatest global challenges for humans, animals and environmental health. Antimicrobial use (AMU) in the livestock sector is one of the important contributory factors for the development and spread of AMR. Bovine mastitis is one of the most common diseases and accounts for >80% of AMU in dairy animals, emphasizing the need for antimicrobial stewardship. Refining mastitis treatment protocol (e.g., culture-based therapy) is one of the strategies for improving antimicrobial stewardship in dairy farms. Understanding the existing treatment strategies provides scope for evidence-based refinement of mastitis treatment protocol. Moreover, monitoring and surveillance of AMU at farm level provides great opportunity for characterization of AMU and support antimicrobial stewardship in food producing animals. To be specific, AMU data from prescription records of veterinarians are more accurate and reliable than other sources such as farmers, farm workers, para veterinarians, and sales representatives of pharmaceutical companies. Several challenges (e.g., limited diagnostics), limitations (e.g., economic constraint) and regulatory gaps (e.g., over the counter availability of antibiotics) leads to inappropriate AMU in veterinary practice. On the other hand, Knowledge, Attitudes, and Practices (KAP) studies are necessary to identify those drivers for non-prudent AMU by veterinarians. The purpose of this presentation is to discuss our findings about characterization of clinical condition and treatment decision in bovine mastitis, along with KAP of veterinarians in relation to AMU and AMR for improving antimicrobial stewardship in dairy animals.



Dr. Sameer Shrivastava

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Dr. Sameer Shrivastava is a Principal Scientist at the ICAR–Indian Veterinary Research Institute (Deemed University), Izatnagar, Uttar Pradesh, and serves as Incharge of the Veterinary Immunology Section. He holds a BVSc & AH (1999) from J.N. Krishi Vishwa Vidyalaya, Jabalpur; an MVSc in Molecular Biology and Biotechnology (2002) from G.B. Pant University of Agriculture & Technology, Pantnagar; and a PhD in Animal Biotechnology (2006) from IVRI, Izatnagar. He has also served as an R&D Manager at Span Diagnostics, Surat. He has over 20 years of experience in research and academics, particularly in Animal Biotechnology, Veterinary Immunology, Infectious Diseases, Biosensors, Cancer Biology, Synthetic Peptide Biology and Artificial Intelligence applications in drug discovery.

Dr. Shrivastava has made significant contributions to immunodiagnostics, biosensors, synthetic Mastitis Pathogenesis in Cattle. Mastitis Pathogenesis in Cattle and antimicrobial peptides, cancer biomarkers, vaccines, biomaterials, and AI-based diagnostics. He has developed synthetic peptide antigens and antibody-based assays for PPR, Bluetongue, Brucellosis, CPV, Listeriosis, and bovine pregnancy diagnosis, resulting in two granted patents and three additional filings. He has worked in the area of immuno-biosensors, surface plasmon resonance sensors, electrochemical sensors, multiplex bead-based assays, lateral flow diagnostics, and thermostable vaccine formulations. His work also includes antimicrobial peptide discovery, AMP hydrogels, surgical biomaterials, reconstructive scaffolds, nano-vaccine platforms, and AI-driven systems for histopathological diagnosis, antimicrobial peptide prediction, livestock facial recognition, and public web servers with curated biological datasets.

As a researcher, he has led 08 externally funded projects as Principal Investigator and 16 as Co-Principal Investigator, supported by NASF, ICAR, DBT, NAIP, and BBRC, generating grants exceeding ₹25 crore. These projects enabled the establishment of GLP-compliant laboratories, biosensor units, animal housing facilities, smart classrooms, COVID-19 diagnostic laboratories, and advanced research infrastructure in microscopy, biosensing, molecular biology, proteomics, and computational sciences.

In academics, he has taught undergraduate, postgraduate, and doctoral courses in Animal Biotechnology and Veterinary Immunology since 2006 and has guided 04 PhD scholars and 04 MVSc students as major advisor, and over 75 students as co-guide. He has received advanced training in biosensors at Wageningen University, Netherlands, and University of Glasgow, UK, and trained over 400 professionals through national and international programs. He has served as Course Director and Coordinator for several ICAR, DST, and DBT-sponsored Winter Schools, Short term courses, Karyashalas, and Gyanshalas.

Dr. Shrivastava has published over 90 peer-reviewed research papers, more than 50 book chapters, 05 books, over 25 compendium chapters, 15 training manuals, and more than 25 general articles. His work has been widely cited and has an h-index of 23 and an i10-index of 42. He has delivered over 60 invited lectures and presented more than 50 papers at national and international conferences.

His work has been recognized through numerous awards, including the prestigious ICAR–Lal Bahadur Young Scientist Award, Alfred Lingard Award, Pfizer Gold Medal, Pfizer Veterinary Award, Shri RK Gambheer Award and Medal of University, Dr. CM Singh Award, Dr. MN Kulkarni Award, Gold Medal from the Indian Society for Veterinary Surgery, and the NAIP Overseas Visiting Fellowship to Wageningen University, along with fellowships from CSIR, DBT, NATP, and ICAR. He is a Fellow of the Indian Society for Veterinary Immunology & Biotechnology (ISVIB), Indian Association of Veterinary Microbiologists Immunologists and specialist in Infectious diseases (IAVMI), a Member of the American Peptide Society, and serves as Associate Editor and reviewer for several high-impact journals. Overall, he is a nationally and internationally recognized scientist with strong translational impact on disease diagnostics, animal health, and AI based precision livestock management.

Mastitis Management Beyond Antibiotics: Discovering Novel Antimicrobial Peptides from Natural Sources and Artificial Intelligence-Driven Approaches to Combat AMR

Presented by Dr. Sameer Shrivastava

Abstract

Bovine mastitis remains one of the most important infectious diseases affecting dairy production, animal health, and milk quality and safety, imposing an estimated annual economic loss of ₹7,165.5 crore in India. Antimicrobial therapy remains central to mastitis management and represents a major use of antibiotics in dairy animals, with studies reporting that approximately 47–67% of antibiotic use is associated with mastitis management. The growing burden of antimicrobial resistance (AMR), treatment failures, antimicrobial residues, and dependence on antibiotics has created an urgent need for alternative therapeutics. Antimicrobial peptides (AMPs), as evolutionarily conserved components of innate immunity, offer considerable promise because of their rapid antimicrobial activity, membrane-targeting mechanisms, and, in several cases, immunomodulatory and antibiofilm properties.

Nature represents an enormous and largely unexplored reservoir of AMPs. These molecules occur in diverse biological sources, including animal secretions and excretions, skin secretions, saliva, plasma, milk, mucosal secretions, and venoms. Remarkable examples include AMPs from frogs, scorpions, spiders, and reptiles. The Komodo dragon, for example, has yielded numerous cationic peptides from plasma, including histone-derived AMPs with activity against important bacterial pathogens. The peptide VK25 inspired the development of DRGN-1, demonstrating the potential of naturally derived peptides as therapeutic candidates. Similarly, amphibian skin secretions and scorpion and spider venoms contain diverse antimicrobial peptides with antibacterial, antifungal, antibiofilm, and immunomodulatory properties.

Despite this immense natural diversity, conventional AMP discovery is laborious and expensive. Many peptides occur at low abundance or remain hidden within precursor proteins, while purification, structural characterization, and biological validation require substantial time and resources. Moreover, antimicrobial activity alone does not establish therapeutic potential; candidates must be assessed for cytotoxicity, hemolysis, stability, protease susceptibility, serum and salt tolerance, antibiofilm activity, pharmacokinetics, and potential for resistance development. Thus, experimentally exploring the vast natural AMP repertoire one molecule at a time is impractical.

Artificial intelligence (AI), machine learning, and deep learning are providing a transformative solution. AI-based approaches can screen thousands to millions of sequences and identify potential antimicrobial regions based on sequence–activity relationships, enabling a predict–prioritize–synthesize–validate workflow. Our group's work includes Deep-ABPpred, developed for identifying antibacterial peptide segments within larger protein sequences, followed by AniAMPpred, which extended computational AMP discovery across animal proteins and genomes. The StaBle-ABPpred framework further incorporated stacked ensemble learning, biLSTM, and attention-based approaches for robust antibacterial peptide prediction. Related AI-driven work has also been extended towards antifungal, antiviral, and anticancer peptide discovery.

A striking example of this philosophy is Pepholin, a novel 12-amino-acid peptide identified from a bacteriophage holin protein through AI-assisted screening and subsequent experimental validation. Pepholin demonstrated antibacterial and antibiofilm activity against multidrug-resistant *Pseudomonas aeruginosa*, highlighting how AI can uncover antimicrobial candidates from unconventional protein sources.

For mastitis, this convergence of natural-product discovery, peptide engineering, and AI offers an exciting translational opportunity. Selected AMPs could potentially be developed as local intramammary therapeutics against major mastitis pathogens, including *Staphylococcus aureus*, *Streptococcus* spp., and pathogenic *Escherichia coli*. Local delivery may facilitate high concentrations at the site of infection while limiting systemic exposure. Although extensive in-vivo, formulation, safety, efficacy, and milk-residue studies are still required, AI-guided AMP discovery could contribute substantially to reducing antibiotic dependence, combating AMR, and advancing the goal of safe, sustainable, and antibiotic-responsible production of clean milk.



Dr. Sachinandan De

ICAR-National Professor, Animal Biotechnology Division, National Dairy Research Institute, Karnal, Haryana

Dr. Sachinandan De is an ICAR-National Professor in the Animal Biotechnology Division at NDRI Karnal. He holds a B.V.Sc. & A.H. from BCKV as well as an M.V.Sc. and Ph.D. in Animal Biotechnology from IVRI Izatnagar, complemented by post-doctoral training at Washington State University (USA) and Uppsala University (Sweden). Advancing through roles as Scientist, Senior Scientist, and Principal Scientist (2008–2024), he has led 20 externally funded research projects, mentored 40 postgraduate scholars (20 M.V.Sc. and 20 Ph.D.), and authored over 168 peer-reviewed international publications in functional genomics and molecular diagnostics. His achievements include securing 3 Indian patents and developing 7 field-deployable DNA and PCR-based technologies—ranging from milk and meat species authentication to A1/A2 milk testing and bovine genetic disease detection—earning him elected fellowships with NAAS, NAVS, ISVIB, and NADS.

Extra-intestinal uropathogenic E. coli: an important pathogen of mastitis in dairy animals

Presented by Dr. Sachinandan De

Abstract

Bovine mastitis is an inflammatory condition of the mammary gland primarily driven by microbial infection. Pathogens are either contagious or environmental pathogens, along with minor or opportunistic pathogens. Contagious pathogens primarily reside on infected udder skin, teat lesions, or within the mammary gland itself. Environmental microbes originate from the cow's surroundings (bedding, soil, manure, water). Exposure occurs primarily between milkings or during the dry period when teat canals are open or compromised. Coliforms (Escherichia coli, Klebsiella pneumoniae, Enterobacter spp.) environmental Streptococci and Enterococci. Escherichia coli is traditionally viewed as an important environmental pathogen that causes transient, acute clinical mastitis. However, the emergence of ESBL-producing E. coli in veterinary settings represents a significant challenge for animal health, food safety, and public health (One Health). Human, animal, bird, and environmental *E. coli* populations are connected through plasmids, insertion sequences, and transposons, emphasizing the need for integrated One Health surveillance focused not only on the resistance gene itself but also on its mobile genetic context. Human-derived isolates had the greatest abundance and diversity of resistance genes. Animal and bird isolates also contributed substantially, while birds showed the highest level of insertion-sequence-associated ARGs relative to their sample number. Aminoglycoside and β-lactam resistance were dominant. Frequently detected genes included *aph(6)-Id*, *aph(3″)-Ib*, *blaTEM*, *blaCTX-M* variants, and *blaNDM*; these genes compromise

important antibiotic classes, including cephalosporins and carbapenems. Three high-risk *E. coli* lineages dominate global cephalosporin/carbapenem resistance. ST131 (phylogroup B2) was the single most represented lineage at 33.3%, followed by ST10 (12%) and ST410 (6.7%). ST131 expanded rapidly after 2008, peaked around 2019–2020, and was strongly linked to human infections, *bla*CTX-M-15 and *bla*NDM-5 mark two distinct eras of resistance evolution *bla*CTX-M-15 was the single most prevalent resistance gene overall (representing nearly 44% of all *bla*CTX-M variants) and became dominant from the mid-2000s onward, tightly linked to ST131's global spread. Carbapenem resistance told a different story: *bla*NDM-5 overtook *bla*NDM-1 after 2010 and became the leading carbapenemase by the 2020s (26.38% of resistance genes by 2024), driven largely by its association with ST167 and highly conjugative IncX3 plasmids. Mobile genetic elements were major drivers of potential ARG dissemination. The insertion sequences IS26 and ISVsa3 were associated with diverse resistance genes, while transposon Tn2 was widespread and commonly linked to IncFIB plasmids carrying *blaTEM* variants. Close physical proximity between ARGs and mobile elements indicates a high potential for horizontal gene transfer. Nearly half of the identified IS–ARG combinations were within 3 kb, and many important combinations—such as *blaNDM-5–IS5* and *blaCTX-M–ISEc9*—were located within 200 bp, supporting their possible movement as transferable genetic units. Resistance patterns are strongly geography- and host-specific Asia was dominated by *bla*NDM-5 and *bla*CTX-M-15/14/27/55; Europe showed high *bla*CTX-M-15/*bla*OXA-1/*bla*OXA-48 frequencies; North America carried more *bla*KPC and *bla*CMY-2. Phylogroup B2 (largely human-associated) carried the strongest combined ESBL/carbapenemase signature, while phylogroups A and B1 — more common in animals, birds, and the environment — showed their own resistance gene profiles, reflecting how ecological niche shapes which resistance genes a lineage accumulates.

International transmission networks show sustained, decades-long global spread, not isolated outbreaks Bayesian phylogeographic analysis of 863 ST131 genomes identified 1,482 inter-country transmission routes, with the strongest links between Japan–USA (156 genomes) and USA–Canada (113 genomes), and major hubs including the USA, UK, Japan, Australia, and Czech Republic. Some routes date back to the mid-1980s, while newer connections involving Bangladesh and Vietnam since the mid-2000s signal South/Southeast Asia's growing role as a resistance reservoir: reinforcing the importance for coordinated One Health surveillance across environmental, animal, and human sectors, since untreated wastewater, hospital discharge, and livestock runoff all sustain global dissemination.



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Dr. Bhaskar Ganguly is a veterinary scientist and researcher, working at the intersection of conventional veterinary practice and contemporary science. He currently works at Indian Immunologicals Limited, Hyderabad, where his professional interests encompass vaccines and One Health. Previously, he headed clinical research at Ayurvet Limited, Baddi.

His research interests span livestock vaccines, One Health and AMR, phytotherapeutics, and the application of bioinformatics to investigate host-pathogen interactions and disease mechanisms. His scientific contributions include research on infectious bursal disease, bovine herpesvirus, canine transmissible venereal tumour, and plant-derived bioactives for veterinary applications. He holds a patent for a topical barrier film-forming formulation for prevention of mastitis. He has to his credit first-in-the-world computational pipelines for elucidating molecular mechanisms of complex veterinary herbal formulations. Based on his work, he was invited by the UN-FAO as a consultant on alternative practices for reducing AMR in livestock.

His publications cover empirical studies on the properties of Withania somnifera, computational studies on host and pathogen biology, mechanistic studies in veterinary phytogenics, and studies on infectious bovine rhinotracheitis vaccine testing and epidemiology. He is regarded as an international authority on canine transmissible venereal tumour and authors a chapter on the same in MSD Veterinary Manual.

Rethinking Bovine Mastitis in India: Beyond the Conventional Paradigm of Infection, Diagnosis and Economic Losses

Abstract

Conventional veterinary literature often portrays bovine mastitis as a predominantly insidious disease, causing substantial production losses. However, much of this understanding originates from Western dairy systems with relatively uniform cattle populations and predominantly temperate agroclimatic conditions. In India's subtropical environment, mastitis can be clinically aggressive, including gangrenous and necrotising forms. Animals surviving such episodes may remain unproductive in infirmaries, shifting the economic burden from individual farmers to society. Thus, subclinical mastitis dominates reported economic losses only because of its prevalence, not persistence.

Understanding this disease burden requires examining the factors that may have contributed to it. Genetic selection for yield, disregarding resistance and udder anatomy, alongside intensive management practices restricting natural movement and grazing, deserve greater scrutiny. Mastitis research must also move beyond an exclusively pathogen-centric approach.

Our understanding of the disease must evolve towards one of mammary dysbiosis; organisms isolated from affected udders reflect environmental microbial populations exploiting an altered mammary microenvironment, not initiating the disturbance. Nutritional inadequacies, metabolic disturbances, stress, and restricted exercise may contribute to this disruption.

Diagnostic paradigms require similar reconsideration. Somatic cell count (SCC) indicates inflammation, not necessarily intramammary infection. Systemic inflammatory conditions, including metritis, may influence milk SCC, warranting investigation of sterile mammary inflammation and India-specific thresholds and classifications. Treatment strategies should consider mammary physiology, clinical evidence, and affordability. Cooling poultices, though not therapeutically equivalent, reduce inflammation, necessitating comparative appraisal of claims. Antimicrobial peptides and resolvins produced endogenously reflect intrinsic defence and resolution mechanisms that resonate with traditional systems of knowledge, contrasting with Western practices of intramammary applications; such applications should be discouraged and reserved as a last resort, where clinically justified. Finally, diagnostics and therapeutics must reflect farmers' actual margins, sometimes merely ₹4-5/litre. Low-cost pH strips and modified CMT using household detergents (less than ₹2 per animal per instance, offering 60-70% accuracy) may offer greater practical utility than expensive, more accurate alternatives.

India needs a context-sensitive, biologically sound, and economically viable mastitis research paradigm integrating host genetics, nutrition, microbial ecology, immunophysiology, and animal welfare.

Oral Presentations

S.No.: 1

Abstract Title:	**Outer Membrane Vesicles: Multifaceted Roles and Their Impact on Bacterial Multidrug Resistance**
Authors:	M. V. Jagannadham, Bina Agarwal and Boga Ramesh
Corresponding Author:	First
Presenting Author:	Federation of Asian Biotech Associations

Abstract Text:

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Outer membrane vesicles (OMVs) are continuously released from bacteria and play roles in intracellular signalling, gene transfer, and defences. Recent studies highlight OMVs' significant contribution to bacterial multidrug resistance. This study investigates OMVs' protective effects against membrane-active antibiotics and their role in handling antibiotic resistance. Minimum inhibitory concentrations (MIC) were determined using bacterial growth assays in a 96-well plate with various antibiotics. Bacteria were grown in antibiotics above MIC with varying OMV concentrations from different bacteria. Proteomics of OMVs from Escherichia coli (E. coli) and Acinetobacter baumannii (normal and antibiotic-resistant strains) involved protein extraction, trypsin digestion, and LC-coupled mass spectrometry. The impact of indole derivatives on bacterial growth of drug-resistant and sensitive strains was also examined. E. coli OMVs protected bacteria against colistin and melittin but not ciprofloxacin, streptomycin, or trimethoprim. Proteomics revealed peptidases and proteases in E. coli OMVs that degrade melittin. In A. radioresistens, OMVs contained proteins related to biofilm formation, quorum sensing, and cytotoxicity. Comparative proteomics of A. baumannii strains showed that resistant strains had more antibiotic-conferring proteins in their OMVs than sensitive strains. Growth assays indicated that OMVs from both strains provided antibiotic protection. Indole derivatives decreased the MIC for antibiotics, suggesting reduced OMV production and increased antibiotic activity. OMVs sequester or degrade antibiotics, lowering their effective concentrations and protecting bacteria. The protective effect of OMVs depends on the antibiotic's mechanism. Indole derivatives may reduce OMV production, and potentially

increase antibiotic activity. These findings highlight OMVs' role in drug resistance and the need for further research to combat antibiotic resistance

S.No.: 2

Abstract Title:	**Bioactive Compounds as Alternative Therapeutics for Staphylococcus aureus-Associated Bovine Mastitis: An Integrated Ethno-veterinary study**
Authors:	Sriram Vamshi Krishna1, Srijita Ari2, Pramit Bandyopadhyay3, Arnim Banerjee4, Anindya Sundar Panja5
Corresponding Author:	Sriram Vamshi Krishna
Presenting Author:	Sriram Vamshi Krishna, P.V.Narsimha Rao Telangana Veterinary University, Hyderabad

Abstract Text:

Bovine mastitis is one of the economically important infectious disease of dairy cattle resulting in reduced milk production and affecting milk quality. Staphylococcus aureus is responsible for 25% of all bovine mastitis pathogens worldwide. S. aureus can cause persistent mastitis attributable to factors such as bacterial adhesion and colonization, immune evasion, and resistance to antimicrobial agents. In this study, an in-silico method was used to find phytochemicals that have the potential for multi-target activity against S. aureus. Three functionally important proteins were chosen as molecular targets i.e β-lactamase, ClfA, and protein A from S. aureus, which confers resistance to β-lactam antibiotics by hydrolysing susceptible β-lactam antibiotics. These targets were picked to cover three different aspects of S. aureus pathogenicity: adhesion/colonization, immune evasion, and antimicrobial resistance. Total 74 active compounds were examined, where Asiatic acid (PubChem CID 119034) and Andrographolide (PubChem CID 5318517) were chosen on the basis of their relatively favourable molecular docking results for the three targets. Asiatic acid, a pentacyclic triterpenoid showed docking scores (-8.0±0.35 kcal/mol) for β-lactamase, ClfA, and immunoglobulin G-binding protein A, respectively. Andrographolide, the main diterpenoid lactone of Andrographis paniculata, had docking scores (-8.3±0.35 kcal/mol) against the same targets. Molecular dynamics simulations also confirmed the stability of the phytochemical–protein complexes formed, as shown by the relatively stable RMSD and RMSF values during the simulation period. The results indicate that Asiatic acid and Andrographolide have promising multi-target binding abilities against the proteins associated with S. aureus which needs further invitro validation.

S.No.: 3

Abstract Title:	**Genomic and Phenotypic Characterization of Lytic Bacteriophages Active Against Multidrug-Resistant Acinetobacter baumannii Clinical Strains**
Authors:	Komal Ghonse
Corresponding Author:	Santosh Koratkar
Presenting Author:	Komal Ghonse; Symbiosis School of Biological Sciences, Symbiosis International (Deemed) University, Pune, Maharashtra, India

Abstract Text:

Multidrug-resistant (MDR) Acinetobacter baumannii has emerged as a major challenge in healthcare settings because of its limited susceptibility to available antibiotics. Bacteriophages offer a potential alternative approach due to available antibiotics. Bacteriophages offer a potential alternative approach due to their ability to selectively infect and lyse bacterial cells. However, differences in host specificity and genomic characteristics can influence their applicability for phage-based interventions, host range, morphology, and genomic features of bacteriophages active against clinical MDR A. baumannii isolates. Sixty-five clinical A. baumannii isolates were used for bacteriophage isolation from environmental samples by enrichment. Isolated phages were purified through successive rounds of plaque purification. The lytic spectrum of each phage was determined by testing against the complete panel of clinical A. baumannii isolates. Representative phages were examined by transmission electron microscopy (TEM) to determine their morphological characteristics. Whole-genome sequencing was performed for all purified phages, followed by genomic and comparative sequence analysis to assess genome organization, genetic diversity, and the presence of genes associated with antimicrobial resistance, virulence, and lysogeny. Twenty distinct bacteriophages with lytic activity against clinical MDR A. baumannii isolates were isolated and purified. The phages displayed considerable variation in host specificity, with individual phages lysing 7-31% of the tested clinical isolates. TEM analysis demonstrated morphological variation among the representative phages, with phages showing characteristics associated with the Myoviridae and Podoviridae morphotypes. Genome sizes ranged from 35 to 150 kb, while GC content varied between 30% to 45%. Comparative genomic analysis revealed considerable genetic diversity among the isolated phages. The analyzed lytic phages lacked detectable antimicrobial resistance and virulence-associated genes, supporting their potential suitability for further evaluation. Genomic analysis also enabled the identification of lysis-associated and other phage functional genes, providing insights into the biological characteristics of the isolated phages. The study demonstrates substantial phenotypic and genomic diversity among bacteriophages targeting clinical MDR A. baumannii. Differences in host range, morphology, genome size, and genetic composition highlight the importance of comprehensive phage characterization before therapeutic application. The characterized phages provide a valuable

resource for further investigation of phage–host interactions and the development of phage-based strategies against MDR A. baumannii infections.

S.No.: 4

Abstract Title:	**PhaGenome: An Integrated Web Server for Bacteriophage Genome Characterization Targeting Bovine Mastitis Pathogens**
Authors:	Sophia Inbaraj
Corresponding Author:	N/A
Presenting Author:	Sophia Inbaraj

Abstract Text:

Bacteriophage genome characterization currently requires researchers to manually combine several disconnected tools for homology search, genome annotation, taxonomic classification, safety screening, and lifestyle prediction. The gap led to the development of PhaGenome, a free, integrated web server that performs all of those analyses on submission of assembled phage genome. Upon a single submitted genome, PhaGenome performs BLAST-based identification against NCBI RefSeq Viral genomes, full structural and functional annotation using Pharokka v1.8 (Pharokka/PHROGs) with publication-ready circular genome maps, tRNA gene detection using tRNAscan-SE 2.0, antimicrobial resistance and virulence factor screening (CARD/VFDB), lytic/lysogenic lifestyle prediction using BACPHLIP v0.9.6, receptor-binding protein identification using PhageRBPdetect (HMM domain-based), and bacterial host prediction (PHP). In preliminary testing across NCBI submitted phage genomes targeted against mastitis pathogens, PhaGenome could able to classify a known lysogen (Enterobacteria phage lambda) and made biologically consistent lytic calls for phages against Pseudomonas, Staphylococcus aureus, coagulase-negative staphylococci, Streptococcus spp., and Escherichia coli with top blast hit, detection of tRNA, virulence and antimicrobial resistant genes, phage annotation and readily downloadable genome map and results as outputs. The BLAST top hits were benchmarked against the independent VIRIDIC and taxmyPHAGE tools. Thus, PhaGenome offers a single-submission alternative to fragmented phage genomics workflows, with particular relevance to clinical, biocontrol and food-safety applications and is available at https://sophievet07.github.io/PhaGenome/.

S.No.: 5

Abstract Title:	**Clinical and therapeutic efficacy of certifies intraday infusion in dry cow therapy**
Authors:	Dr.J.Jyothi,Dr.Rahul J,Dr.Sachin,Dr.Ch.Harikrishna
Corresponding Author:	Dr.J.Jyothi
Presenting Author:	Dr.J.Jyothi, PVNRTVU

Abstract Text:

Mastitis remains one of the most economically significant diseases in dairy cattle, particularly during the dry period when subclinical infections often go unnoticed and manifest after parturition. The present study evaluated the clinical and therapeutic efficacy of ceftiofur hydrochloride intramammary infusion administered at drying-off in preventing and treating mastitis. A total of 30 dairy cows were randomly divided into two groups: control (n=10) and treatment (n=20). Parameters including Somatic Cell Count (SCC), California Mastitis Test (CMT), and bacteriological examination were assessed on day 0, 7, and 28 postpartum. The treatment group showed a marked reduction in SCC and CMT scores compared to the control group, along with reduced bacterial load. Ceftiofur demonstrated good efficacy against common mastitis pathogens such as Staphylococcus, Streptococcus, and E. coli. The study concludes that ceftiofur intramammary infusion at drying-off is effective in reducing the incidence of mastitis and improving udder health.

Keywords

Dry cow therapy, Mastitis, Ceftiofur, Somatic cell count, California mastitis test, Intramammary infusion

S.No.: 6

Abstract Title:	**Caprine Mastitis-Two case reports**
Authors:	NANDANI KUMARI, SUNITA KUMARI MURMU, PAWAN KUMAR VERMA, SHAILENDRA KUMAR RAJAK, SHREYA SINHA AND SWATI SAHAY
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Abstract Text:

Caprine Mastitis – Two case reports#

(Dr. Nandani Kumari1*, Dr. Sunita Kumari Murmu2, Dr. Pawan Kumar Verma3 and Dr. Shailendra Kumar Rajak4, Dr. Shreya Sinha5 and Dr. Swati Sahay6)

Two cases of mastitis in goats at IFSR, C.V.Sc. and AH were observed during last monsoon (July, 2025). One belonged to cross bred of Black Bengal (CBBB) and was of over five years of age while the other was of Barbari breed (BB) which was bought recently from outside and was witnessed with watery and clotted milk discharge in both the cases along with intermittent pyrexia. The udder was swollen, inflamed and seemed painful on touching. The treatment was done in three phases for both of them. Both had recent born kids so it was even more important to treat them but at the same time care and survival of new born kids were to be ensured. During the whole phase of treatment, kids of both the goats (affected with mastitis), BB and CBBB, were fed on cow's milk at standard feeding regimen and kept away from their dams and prevented from suckling. Antimicrobial susceptibility testing of the milk of infected goats showed that the causative organisms were resistant to 10 Microgram (µg) concentration of Penicillin G and 30 µg concentration of minocycline while it was sensitive to Amoxycillin (10 µg), Ofloxacin (5 µg), Trimethoprim (5 µg), Clindamycin (2 µg), Vancomycin (30 µg) and Azithromycin (15 µg). Microscopic examination of the culture of milk from BB and CBBB, affected with clinical mastitis, showed Gram-positive cocci in clusters in both the cases. First and second phase of treatment were partially successful while the third phase was finally completely successful for both the breeds but the udder size of BB returned to normal while the udder size of CBBB although remained distended, the milk became normal in texture and the inflammation subsided. In the first phase (Day-1 to Day-5), treatment was done for five days with Ceftiforce Tazo (Intramuscular) and Pendistrin SH (intramammary) along with Meglugesic (5% w/v by Intramuscular route). Although the inflammation and swelling reduced but the milk still was watery and clotted and inflammation didn't completely subside. Second phase of treatment (6th, 7th and 8th day) included Inimox injection (Intramuscular) along with Meloxicam (Intramuscular) and Inflamin ointment (topical application). The treatment continued for three days but still there was not complete relief. In the third phase (from 9th day onwards) with two phases of treatment unsuccessful and the prevailing underlying risk of teat fibrosis if the case became chronic, Amikacin injection was used by intramammary route (2ml of Amikacin injection with concentration of 250 mg/ml + 1 ml Distilled water + 0.5 ml Dexona) along with Belamyl injection (Intramuscular route) for next three days (for 9th, 10th and 11th day). During this phase, there was improvement in milk as well and on 10th-11th day, the inflammation subsided and milk also returned towards normalcy. Mastitis although rare in meat type goats, it can occur in milk type or dual- purpose goats, either with good milk yield. In the farm, as the treatment for mastitis was not common, the drug resistance was less and was limited to two drugs out of a total of eight tested. The clinical response to intramammary amikacin despite the identification of Gram-positive cocci may indicate the possibility of additional undetected bacterial involvement.

Key Words- Caprine Mastitis, Pendistrin SH, Antimicrobial Susceptibility, Gram-positive cocci, clinical mastitis.

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[#-Note the case report is based on treatment of mastitis in two goats at IFSR, C.V.Sc. and AH, BAU]

S.No.: 7

Abstract Title:	**CLINICAL INSIGHTS TO THE DIAGNOSIS AND MANAGEMENT OF PREPARTUM MASTITIS IN GOATS**
Authors:	K. Lakshmi, R.Suresh, Sujatha Singh, K.Padmaja, S.Ayodhya, Dhileep K, Deepika A, Nikhil and Madhuri 8
Corresponding Author:	Dr.K.LAKSHMI
Presenting Author:	Dr.K.LAKSHMI, Professor, Department of Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar, PVNRTVU, Hyderabad, Telangana, India.

Abstract Text:

Prepartum mastitis is a clinically important but under-studied condition in dairy goats, with direct implications for kid survival, colostrum quality and future lactation performance. This study was carried out on goats presented to the Veterinary Clinical Complex, College of Veterinary Science, Rajendranagar to determine the incidence, clinical presentation, bacteriological profile and response to antibiogram-guided therapy in affected does. Out of 220 pregnant does of late gestation screened through clinical examination and physical and chemical evaluation of mammary secretions, 16 were found positive, and 12 were confirmed as true cases of prepartum mastitis on detailed clinical workup. Bacteriological culture of mammary secretions from confirmed cases identified Escherichia coli, Staphylococcus spp, Klebsiella spp., Proteus spp., as the predominant isolates, based on colony morphology, Gram's staining and biochemical characterization. Antibiotic sensitivity testing was carried out for each isolate to guide treatment selection. The 12 confirmed cases were divided into two treatment groups of six animals each and treated accordingly, along with supportive care. All animals recovered clinically, with resolution of udder inflammation and normal mammary secretions on follow-up, confirming that antibiogram-guided therapy was effective in the management of prepartum mastitis in goats. The predominance of Gram-negative environmental organisms points to a need for better periparturient udder hygiene, while the good clinical response reinforces the value of culture-based, sensitivity-directed treatment over empirical antibiotic use — a consideration that carries added weight amid rising antimicrobial resistance in livestock.

S.No.: 8

Abstract Title:	**Bacteriological and Molecular Detection of Mastitis-Associated Bacterial Pathogens and Their Antimicrobial Resistance Profiles in Domestic Animals**
Authors:	Vyshnavi D, Ramya P, Naresh O, Manasa K, Vaishnavi K, Sneha M, Gopala L, Vamshi Krishna S and Sonali M*
Corresponding Author:	Sonali M
Presenting Author:	Dr. Sonali Menamvar, Associate professor, Dept of Veterinary Microbiology, College of Veterinary science, Rajendranagar, P.V.Narsimha Rao Telangana Veterinary University, Hyderabad

Abstract Text:

ABSTRACT:

Mastitis is an economically important inflammatory disease of the mammary gland in domestic animals, predominantly associated with bacterial infections and increasingly complicated by antimicrobial resistance (AMR). The present study aimed to isolate and characterize bacterial pathogens associated with clinical and subclinical mastitis in bovine, ovine, and canine species, with particular emphasis on the molecular confirmation of Escherichia coli and the assessment of antimicrobial susceptibility profiles. A total of 106 aseptically collected milk samples, comprising 73 bovine, 23 ovine, and 10 canine samples, were processed using conventional bacteriological techniques. Primary isolation was performed on blood agar, mannitol salt agar, and eosin methylene blue agar, followed by microscopic examination and biochemical characterization. Molecular confirmation of E. coli was performed using polymerase chain reaction (PCR) targeting the uidA gene. Antimicrobial susceptibility testing (ABST) was conducted using multiple antimicrobial agents commonly employed in veterinary practice. Based on the combined cultural, microscopic, biochemical, and molecular findings E. coli was identified in 17.9% of the samples Staphylococci in 51.8%, mixed infections involving E. coli and Staphylococci in 15.9%, and other bacterial pathogens, including Klebsiella spp. and Streptococcus spp., in 12.26%. Antimicrobial susceptibility profiling revealed heterogeneous resistance patterns among the isolates, with resistance reported against multiple antimicrobial classes, including tetracyclines, penicillins, cephalosporins, and aminoglycosides. Nevertheless, susceptibility to gentamicin and selected agents, including doxycycline, was observed in individual isolates. These findings demonstrate the diversity of bacterial etiological agents associated with mastitis across the investigated animal species and highlight the importance of integrated bacteriological diagnosis, molecular confirmation, and isolate-specific antimicrobial susceptibility testing for evidence-based therapeutic decision-making. The detection of resistance to multiple antimicrobial classes further emphasizes the need for systematic AMR surveillance and antimicrobial stewardship in veterinary practice to support effective mastitis management and mitigate the potential dissemination of resistant bacterial pathogens.

S.No.: 9

Abstract Title:	**Effect of antibiofilm agents on mastitis causing staphylococcus species**
Authors:	Shiva Jyothi.J, Kalyani putty
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Effect of Antibiofilm Agents on Mastitis-Causing Staphylococcus Species
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Abstract:

Bovine mastitis remains a major challenge to dairy production, with *Staphylococcus aureus* being an important pathogen associated with persistent and recurrent intramammary infections. The ability of this organism to form biofilms contributes to its persistence within the mammary gland and may reduce susceptibility to antimicrobial treatment. Consequently, antibiofilm agents represent a promising complementary approach to conventional antimicrobial therapy. Clinical mastitis isolates were evaluated using Congo red agar, the microtiter plate assay and polymerase chain reaction targeting the *icaD* gene for their ability to form Biofilm. The ability of these bacteria to form biofilms contributes to their persistence, antimicrobial tolerance, and treatment failure.The present study evaluated the in vitro antibiofilm activity of ursolic acid and resveratrol against mastitis-causing *Staphylococcus* species. Biofilm inhibition was assessed at different concentrations of the test compounds by measuring their effects on biofilm formation. Ursolic acid demonstrated 39.43% biofilm inhibition at a concentration of 60 µg/mL. Resveratrol exhibited 24.56% inhibition at 30 µg/mL, whereas an inhibition rate of 12.69% was observed at 100 µg/mL. These findings indicate that both compounds exhibited antibiofilm activity under the tested conditions, although the observed inhibition varied with the compound and concentration. Ursolic acid showed the highest reported inhibition among the tested treatments. The findings suggest that plant-derived bioactive compounds may have potential as complementary approaches for controlling biofilm formation by mastitis-associated *Staphylococcus* species. Further validation using diverse clinical isolates and appropriate in vivo studies will be essential to establish practical applicability. Overall, antibiofilm research may contribute to developing complementary approaches for managing persistent bovine mastitis, improving udder health and supporting responsible antimicrobial use in dairy cattle.

Poster presentations

S.No.: 1

Abstract Title:	**Bovine clinical mastitis in Theni district, Tamil Nadu: A report of antimicrobial susceptibility and multidrug resistance among bacterial pathogens**
Authors:	Ranjani Rajasekaran, Balakrishnan Govindan, Chitradevi Somasundaram, Ranjithkumar Murugesan, Kalaivanan Murugesan, Padmanath Krishnan, Sasikumar Sethuraman, Senthilkumar Alagesan
Corresponding Author:	Ranjani Rajasekaran
Presenting Author:	Ranjani Rajasekaran, Department of Veterinary Microbiology, Veterinary College and Research Institute, Theni, Tamil Nadu Veterinary and Animal Sciences University.

Abstract Text:

Bovine clinical mastitis is an important cause of production loss in dairy cattle, and antimicrobial resistance among mastitis-associated pathogens can complicate treatment. The present study was undertaken to determine the antimicrobial susceptibility patterns and multidrug resistance (MDR) among bacterial pathogens associated with clinical mastitis in dairy cows in Theni district, Tamil Nadu. A total of 50 milk samples collected from dairy cows with clinical mastitis during January 2025 to June 2026 were subjected to bacteriological examination and antimicrobial susceptibility testing by the Kirby–Bauer disc diffusion method. Bacterial pathogens were recovered from 39 (78.00%) samples, comprising Staphylococcus aureus (19; 48.72%), Escherichia coli (12; 30.77%) and Streptococcus spp. (8; 20.51%). Among S. aureus, susceptibility was highest to cotrimoxazole (89.47%), while 57.89% were resistant to cefoxitin. Streptococcus spp. showed 100% susceptibility to levofloxacin, ofloxacin, ampicillin, penicillin and chloramphenicol. E. coli showed complete resistance to amoxicillin-clavulanic acid and ampicillin. Overall, MDR was detected in 29 (74.36%) isolates, including 100% of E. coli, 75.00% of Streptococcus spp. and 57.89% of S. aureus. The findings highlight substantial antimicrobial resistance among mastitis-associated pathogens and emphasize the importance of antimicrobial susceptibility testing and judicious antimicrobial use for effective mastitis management.

S.No.: 2

Abstract Title:	**Development of Pro-Oxidant Hybrid Nanozymes for Resistance-Independent Antibacterial Therapy**
Authors:	Aishwarya J, Pradeep Singh, Divya Mehta, and Sanjay Singh*
Corresponding Author:	Sanjay Singh
Presenting Author:	Aishwarya J

Abstract Text:

The growing burden of antimicrobial resistance (AMR) among mastitis-associated pathogens, particularly S. aureus and E. coli, complicates disease management by reducing antibiotic efficacy, increasing treatment failure and recurrent infections. Extensive antibiotic use promotes AMR, contributes to antibiotic residues in milk, and limits treatment options against resistant strains. In this context, nanomaterials, particularly nanozymes that mimic the catalytic functions of natural enzymes, have emerged as an alternative to antibiotics with broad-spectrum antibacterial potential. Although peroxidase enzyme-mimicking nanozymes have shown excellent antibacterial activity through the catalysis of reactive oxygen species (ROS) such as hydroxyl, their dependence on acidic pH and external H_2O_2 limits their effectiveness under physiological conditions. Therefore, in this work, we have developed glucose oxidase-conjugated cerium oxide nanoparticles (GOx-CeO2 NPs) exhibiting oxidase enzyme-like activity at physiological pH in the presence of ATP without the need of exogenous H2O2 and acidic pH. GOx, in presence of glucose, produces H2O2 that decomposes into O2, facilitating oxidase-like activity and superoxide generation by CeO2 without exogenous H2O2. The hybrid nanozyme showed >98% and >91% inhibition to methicillin-resistant S. aureus (MRSA) and multidrug-resistant E. coli (ECR), respectively. Live-dead analysis showed approximately >85% and >80% dead cells, while DCFDA staining revealed 11.5-fold and 11.2-fold increase in overall intracellular ROS in MRSA and E. coli, respectively. The imaging of superoxide radicals, using DHE, revealed 24 and 19-fold increase in exposed MRSA and E. coli cells, respectively. SEM imaging showed complete loss of bacterial morphology supported with leakage of cytoplasmic content. The hybrid nanozyme was also able to significantly (~90%) inhibit the biofilm formation as evidenced by crystal violet staining in MRSA and in E. coli. Overall, the hybrid nanozyme exhibited strong antibacterial and antibiofilm activity, highlighting their potential use in developing resistance-independent antibacterial therapy against antibiotic-resistant pathogens causing mastitis.

S.No.: 3

Abstract Title:	**Targeting c-di-AMP Signaling to Weaken Antibiotic Resistance and Biofilm Persistence in Staphylococcus aureus: Implications for Mastitis Therapy" Authors**
Authors:	Niti Kumari1,2, Itishree Jali1,2, Priyanka Garg1, Repally Ayanna1, Vinay Bhaskar1 Vasundhra Bhandari1,3, Shailesh Sharma1,2, Bappaditya Dey1,2*
Corresponding Author:	Bappaditya Dey
Presenting Author:	Niti Kumari

Abstract Text:

Methicillin-resistant Staphylococcus aureus (MRSA) is an important bacterial pathogen associated with persistent infections and presents a major therapeutic challenge due to its resistance to β-lactam antibiotics and ability to form persistent biofilms. These characteristics are also relevant to S. aureus-associated mastitis, where antimicrobial resistance and biofilm-associated persistence can complicate effective therapy. Recent studies have implicated the bacterial second messenger cyclic di-adenosine monophosphate (c-di-AMP) in modulating cell wall dynamics, antibiotic resistance, biofilm formation, and host–pathogen interactions. In this work, we investigated the functional contribution of c-di-AMP signaling to methicillin resistance and biofilm formation in MRSA clinical isolates, with a specific focus on the diadenylate cyclase enzyme DacA. We found that sub-inhibitory methicillin exposure and biofilm-inducing conditions resulted in elevated c-di-AMP levels and increased expression of dacA and other genes associated with the c-di-AMP regulatory network. Elevated c-di-AMP production was also associated with activation of the STING pathway in macrophages, enhancing IFN-β responses while suppressing IL-1β production, thereby modulating innate immune responses. Through in silico screening of FDA-approved drug libraries, we identified candidate compounds targeting the DacA active site. Selected compounds were experimentally validated for their ability to reduce intracellular c-di-AMP levels, sensitize MRSA to methicillin, and modulate macrophage immune responses. These compounds also exhibited favorable predicted ADMET profiles and minimal cytotoxicity in mammalian cells. Collectively, our findings establish a functional link between c-di-AMP signaling, methicillin resistance, and biofilm persistence in MRSA, and demonstrate that pharmacological targeting of DacA may provide an adjunctive strategy to enhance β-lactam efficacy. This approach may have potential relevance for controlling biofilm-associated and antibiotic-resistant S. aureus infections, including those relevant to mastitis.

S.No.: 4

Abstract Title:	**Development of a Novel ureE-Targeted PSR Assay for Rapid Detection of Acinetobacter baumannii**
Authors:	Pinapathina Sai Phani Chandu, Rajesh Kumar, Rahul Ganpatrao Kadam, and Rajat Varshney
Corresponding Author:	Pinapathina Sai Phani Chandu and Rajat Varshney
Presenting Author:	Pinapathina Sai Phani Chandu, Banaras Hindu University.

Abstract Text:

Opportunistic and multidrug-resistant pathogens associated with bovine mastitis pose substantial challenges to effective targeted treatment and antimicrobial stewardship. Acinetobacter baumannii, an emerging multidrug-resistant mastitis-associated pathogen, necessitates rapid and reliable species-level identification. Conventional culture and biochemical methods are laborious, time-consuming, and dependent on viable microorganisms, while PCR-based assays require thermocyclers, limiting their application in resource-constrained veterinary diagnostic laboratories. Therefore, a novel ureE-targeted Polymerase Spiral Reaction (PSR) assay was developed and optimized for rapid detection of A. baumannii. Species-specific primers for conventional PCR and PSR were designed using the ureE gene sequence of A. baumannii (Gene ID: 92892978). Primer specificity was evaluated against A. baumannii and other bacterial species. The PSR assay was optimized for $MgSO_4$, betaine, dNTPs, Bst DNA polymerase, reaction temperature, and incubation time. Under optimized conditions, characteristic ladder-like amplification was obtained at 62 °C within 90 min, with high analytical specificity and no cross-reactivity. The PSR assay exhibited a limit of detection of 0.112 fg/µL. Incorporation of uracil-DNA glycosylase (UDG) effectively controlled carry-over contamination and improved assay reliability. Consistent amplification was achieved using DNA extracted by a simple heat–cold shock method from bacterial cultures and under minor temperature variations during water-bath incubation. SYBR Green, I facilitated direct visual detection through an orange-to-green colour transition, eliminating agarose gel electrophoresis. This first reported ureE-targeted PSR assay for A. baumannii, integrating UDG-mediated contamination control, visual detection, and water-bath compatibility, offers a simplified approach for rapid surveillance in resource-limited veterinary diagnostic settings and shows potential as a point-of-care test.

S.No.: 5

Abstract Title:	**Development of Biodegradable Microneedle Patch for Targeted Treatment of Bovine Subclinical Mastitis**
Authors:	Sagar Patel
Corresponding Author:	Prof (Dr.) Vaibhav Bhatt
Presenting Author:	Sagar Patel, Prof (Dr.) Vaibhav Bhatt & School of Applied Sciences & Technology, Gujarat Technology University

Abstract Text:

Bovine subclinical mastitis (SCM) significantly impacts dairy productivity and contributes to excessive antibiotic usage, accelerating antimicrobial resistance (AMR). This study presents the development of a gentamicin-loaded biodegradable microneedle patch designed for targeted and minimally invasive treatment of SCM in cattle. Milk samples collected from various dairy regions were screened using the California Mastitis Test, followed by microbial isolation, biochemical characterization, VITEK identification, and molecular confirmation of predominant Gram-positive and Gram-negative pathogens, including Staphylococcus aureus, Staphylococcus haemolyticus, and Escherichia coli. A veterinary-specific microneedle system was designed using CAD modeling based on bovine skin parameters. A 3D-printed male master mold was fabricated via SLA printing with optimized needle height and angle configurations, and a corresponding female mold was developed using PDMS casting. Biodegradable polymers including polyvinyl alcohol (PVA), chitosan, and poly (methyl vinyl ether-alt-maleic acid) were optimized to achieve adequate mechanical strength and penetration capability. This localized delivery approach aims to reduce antibiotic dosage, minimize milk residues, and support responsible antimicrobial stewardship in livestock systems.

S.No.: 6

Abstract Title:	**Longitudinal microbial and inflammatory profiling of bovine mammary quarters: insights into progression from subclinical to clinical mastitis**
Authors:	SK Dash, R Akhila, Roshni S, VS Bahekar, KSNL Surendra, HN Gonuguntla, NM Ponnanna
Corresponding Author:	SK Dash
Presenting Author:	Sandeep Kumar Dash, Scientist-II (Animal Health) NDDB R&D Laboratory, Gachibowli, Hyderabad, India

Abstract:

Bovine subclinical mastitis (SCM) is an inflammatory intra-mammary condition that occurs without visible abnormalities of the udder or milk and may persist over time before progressing to clinical mastitis (CM). SCM is 15–40 times more prevalent than CM and accounts for the majority of udder-infection losses in India. Yet, a single-time-point diagnosis often fails to capture the temporal changes in inflammatory indicators and bacterial recovery that precede clinical disease. To characterize longitudinal changes in the California Mastitis Test (CMT) score, somatic cell count (SCC) and bacterial profile of bovine mammary quarters, and to describe pathogen dynamics associated with progression from subclinical or infected states to clinical mastitis in a commercial dairy farm. A six-month longitudinal study was conducted on a dairy farm. Quarter milk was collected aseptically at ~15-day intervals over 12 batches from 47 analytical quarters. Each sample was screened by CMT (N/+1/+2/+3), enumerated for SCC on a Foss BacSomatic, cultured on blood agar (5% CO_2, 37°C, 24–72 h), Gram-stained on the PREVI Color Gram, and identified with the VITEK 2 Compact. Quarters were classified based on clinical signs, SCC, CMT score, and bacteriological culture as healthy, intra-mammary infected, subclinical mastitis, chronic SCM, or clinical mastitis. Of the 47 quarters evaluated over the 6-month period, 17 remained healthy, 7 remained intra-mammary infected, 9 remained as SCM, 7 as chronic SCM, 6 progressed to CM, and 1 remained inconclusive. Median SCC increased with CMT intensity (0.45, 1.58, 6.64 and 21.39 lakh cells/mL for N, +1, +2 and +3, respectively). Staphylococcus was the dominant genus (29.5% of isolates); the S. aureus proportion within Staphylococcus rose from 14% in CMT-negative to 50% in CMT +3 samples. Progression cases were characterized by repeated recovery of S. aureus, non-aureus staphylococci and/or Klebsiella pneumoniae. In one quarter, S. aureus was isolated in 10 of 11 sampled batches with SCC ranging from 7.9 to 143.24 lakh cells/mL. Repeated, quarter-level, integrated tests, namely, CMT, SCC and culture, revealed heterogeneous inflammatory and microbial trajectories and identified S. aureus as the principal pathogen associated with SCM-to-CM progression in the studied farm. These findings support pathogen-informed surveillance of high-risk quarters.

S.No.: 7

Abstract Title:	**Subclinical Mastitis in Buffaloes: A Diagnostic and Therapeutic Study**
Authors:	T. Ottalwar., B Roopali*., M.Roy., S.Roy
Corresponding Author:	Dr. B Roopali
Presenting Author:	Dr. B Roopali

Abstract Text:

Subclinical mastitis (SCM) is a major cause of economic loss in the dairy industry due to its insidious nature and absence of overt clinical signs, complicating timely diagnosis. Field-level data on diagnostic accuracy, etiology, haematobiochemical alterations, and evidence-based therapy for bubaline SCM remain limited. A total of 1650 lactating buffaloes (1174 organized and 476 unorganized dairy farms) from Durg, Rajnandgaon, Raipur and Bilaspur districts of Chhattisgarh were screened for SCM using the Modified California Mastitis Test (MCMT), corroborated by somatic cell count (SCC) and Milk Amyloid A (MAA) as an acute-phase inflammatory marker. Milk from MCMT-positive animals was processed for bacteriological isolation. Haematobiochemical profiles, micro-minerals (Cu, Co, Se, Zn) and antioxidant enzymes (SOD, GPx, catalase) were compared between SCM-positive and healthy buffaloes, along with efficacy of five therapeutic protocols.

MCMT identified 41.40% of buffaloes as SCM-positive, with SCC ranging 1.34–3.89 × 10^5 cells/ml, confirming agreement between diagnostic indices. MAA was significantly elevated ($p<0.01$) in SCM-positive animals and correlated positively with SCC, supporting its use as a sensitive early biomarker. Mixed bacterial infections predominated, led by Staphylococcus spp., followed by Streptococcus spp., E. coli, Pseudomonas spp. and Proteus spp. Haemoglobin declined non-significantly ($p>0.05$), while leucocyte count and neutrophil percentage rose significantly ($p<0.01$). Serum total protein and globulin increased significantly ($p<0.01$). Antioxidant enzymes and micro-minerals showed non-significant increases ($p>0.05$). Milk fat, lactose and SNF decreased significantly ($p<0.01$), while protein content rose. Among therapies, oral Achyranthes aspera extract (400 mg/kg BW, 7 days) gave the highest recovery (80%), followed by a herbal spray of Ocimum sanctum, Cymbopogon citratus and Curcuma longa (70%). MCMT combined with SCC and MAA offers a rapid, reliable diagnostic approach for bubaline SCM, while phytotherapeutic interventions present promising, antibiotic-sparing alternatives towards subclinical mastitis.

Keywords: Subclinical mastitis, california mastitis test, somatic cell count, milk amyloid A, Achyranthes aspera

S.No.: 8

Abstract Title:	**Development of LAMP assay for detection of Klebsiella pneumoniae and associated antimicrobial resistance genes in bovine mastitis**
Authors:	Daravath Ramakrishna, S. Malmarugan, S. Rajalakshmi, R. Manikandan and P. Annal Selva Malar
Corresponding Author:	Rajalakshmi S
Presenting Author:	Daravath Ramakrishna, MVSc research scholar, Dept of Veterinary Microbiology, Veterinary College and Research Institute, Tirunelveli, Tamil Nadu

Abstract Text:

Klebsiella pneumoniae, is viewed recently under the One Health lens, as one of the environmental coliforms, associated with mastitis in dairy cattle and one of the 'ESKAPE' pathogens, responsible for nosocomial infections and antimicrobial resistance (AMR). The rapid and early diagnosis of K. pneumoniae -associated bovine mastitis and assessment of any associated AMR would be major milestones in reducing the risk of multidrug resistance and treatment failure. This study involved the molecular detection of K. pneumoniae in bovine mastitis samples, using PCR targeting the yhaI gene, followed by development and evaluation of a loop-mediated isothermal amplification (LAMP) assay for the rapid diagnosis of Klebsiella-associated bovine mastitis in various blocks of Tirunelveli district of Tamil Nadu. The K. pneumoniae–specific (yhaI) LAMP assay was 100% specific and sensitive in the rapid detection of target gene in the pure cultures (26%) from a total of 116 bovine mastitis samples, than the culture methods. This optimized LAMP assay had the lowest limit of detection of upto 60ag/µl, with a better detection efficiency of 10 5 times than PCR assay. The colorimetric LAMP assays were more sensitive in detecting the betalactam-resistant (bla-TEM, bla-SHV) isolates of K. pneumoniae from the pure cultures, over the existing reference methods (susceptibility tests, AMR gene-specific PCR). Hence, the standardized LAMP assays may serve as rapid, cost-effective diagnostic tools for the detection of K. pneumoniae and associated β-lactam resistance, thereby facilitating appropriate therapeutic strategies for effective control of bovine mastitis.

S.No.: 9

Abstract Title:	**Spatial Mapping of Antimicrobial Susceptibility Profiles and Resistance Trends in Livestock Pathogens: A Regional Antibiogram for Karimnagar District, Telangana**
Authors:	Sai Manohar Peela1, Syed Meraj Ahmed Ismail2*, Santosh kumar R. Jadhav3, Sachin Joshi4, B. Shivarudrappa5
Corresponding Author:	Syed Meraj Ahmed Ismail
Presenting Author:	Syed Meraj Ahmed Ismail- Thematic Programme executive- BAIF - South region

Abstract Text:

Abstract

Antimicrobial resistance (AMR) in veterinary medicine poses a severe threat to animal productivity, dairy economics, and public health through potential food-chain transmission. Bovine mastitis and polybacterial livestock infections in rural production systems are frequently managed with empirical, non-specific antimicrobial therapy due to a lack of localized diagnostic infrastructure. This study conducted a regional antimicrobial susceptibility surveillance across key livestock clusters in Karimnagar district, Telangana, to construct a localized antibiogram. Milk samples and bacterial isolates from n = 71 animals were subjected to in-vitro antibiogram testing via the modified Kirby-Bauer disc diffusion method against a panel of 14 veterinary antimicrobials. Furthermore, n = 23 colony isolates (Escherichia coli n = 11, Streptococcus spp. n = 9, Klebsiella spp. n = 3) were selectively cultured on Eosin Methylene Blue (EMB) and Mannitol Salt Agar (MSA) to assess species-specific resistance patterns. The overall antibiogram demonstrated that Enrofloxacin (mean zone of inhibition: 17.03 ± 6.13 mm; 69.0% sensitive) and Clavulanic Acid / CPC (16.56 ± 5.34 mm; 69.0% sensitive) possessed the highest therapeutic potency. Moderate activity was observed for Levofloxacin (14.80 mm), Chloramphenicol (14.31 mm), Gentamicin (13.68 mm), and Sulbactam (13.24 mm). Conversely, widespread clinical resistance was recorded for Erythromycin (5.69 ± 4.98 mm; 80.3% non-sensitive) and Amoxicillin (5.99 ± 5.12 mm; 81.7% non-sensitive), followed by Ceftizoxime (7.76 mm) and Oxytetracycline (8.23 mm). Density distribution violin plots revealed pronounced bulges at 0 mm zone diameters across multiple drug classes, confirming a high prevalence of multi-drug resistant (MDR) phenotypes, with 74.6% of animals exhibiting a Multiple Antibiotic Resistance (MAR) index > 0.2. An epidemiological Knowledge, Attitudes, and Practices (KAP) survey (n = 54 farms) revealed that 68.5% of farmers relied on lay technicians rather than veterinary doctors (31.5%) for prescribing therapeutics, while 100% of surveyed producers reported zero prior awareness of AMR. These findings underscore the urgent need for prescription stewardship and localized antibiograms to curb AMR dissemination under a One Health framework.

S.No.: 10

Abstract Title:	**Unravelling Cattle Mastitis: Correlating Farmer Metadata, Antimicrobial Susceptibility, and Milk Microbiome Genome Sequences.**
Authors:	Santosh Jadhav, Anurag Shukla
Corresponding Author:	Santosh Jadhav
Presenting Author:	Santoshkumar Jadhav, BAIF Development Research Foundation

Abstract Text:

Background: Bovine mastitis remains a critical economic and health challenge in the dairy industry, requiring rapid diagnosis and targeted management strategies. Traditional culture methods often delay targeted treatment, highlighting the need for workflows that integrate comprehensive farm-level data with advanced molecular diagnostics.

Objectives: This study aims to build a multi-dimensional surveillance framework for cattle mastitis by correlating farm-level metadata, animal phenotypes, and antimicrobial susceptibility profiles with high-resolution metagenomic sequencing of milk samples.

Methods: We collected comprehensive epidemiological data, including animal history, farmer details, and prior medication logs, alongside matching milk samples from mastitis cows. Milk samples underwent standard culture and antimicrobial susceptibility testing (AST). Total DNA was isolated from the milk samples to perform 16S rRNA gene PCR, followed by real-time long-read Nanopore sequencing and shotgun metagenomic analysis to characterize the full microbial and antimicrobial resistance profiles.

Results: Preliminary analysis successfully linked farm management risk factors and clinical phenotypes to specific pathogen profiles. Nanopore sequencing provided rapid, high-resolution identification of both major and unculturable mastitis pathogens. Furthermore, metagenomic sequencing revealed complex polymicrobial communities and critical antimicrobial resistance (AMR) genes that closely mirrored phenotypical culture-based AST results.

Conclusion: Integrating on-farm metadata with advanced Nanopore sequencing provides a powerful tool for bovine mastitis surveillance. This approach bridges the gap between field epidemiology and molecular diagnostics, offering dairy veterinarians and farmers a more holistic, precise pathway toward effective mastitis control and informed antimicrobial stewardship.

S.No.: 11

Abstract Title:	**GIMLeC: A Lineage-Specific Immortalized Goat Mammary Luminal Epithelial Cell Line as an In Vitro Model for Mastitis Research**
Authors:	Goutam Ulgekar, Dewanshu Sharma, Soma Behera, Amisha Bhattacharya, Amit Pal, Nirmalya Ganguli
Corresponding Author:	Goutam Ulgekar
Presenting Author:	Goutam Ulgekar

Abstract Text:

Mastitis is the most costly disease of dairy animals, and the mammary epithelium is the first line of defense against invading pathogens. In vitro mastitis research still relies largely on primary mammary epithelial cells or on non-ruminant cell lines. Primary cells senesce

quickly, vary between donors, and are mixed with myoepithelial cells. Rodent and human cell lines do not reflect ruminant mammary biology. We developed GIMLeC, a goat-origin immortalized mammary luminal epithelial cell line. We inserted goat telomerase reverse transcriptase (gTERT), with a puromycin-resistance cassette, in frame into the luminal- specific cytokeratin-19 (KRT19) locus using a CRISPR/Cas9 microhomology-mediated end- joining (PITCh) strategy. Because the immortalizing gene is expressed only from a luminal locus selection removed myoepithelial cells and enriched a pure luminal population. Junction PCR, sequencing and slot blot confirmed site-specific integration, and qTRAP showed raised telomerase activity. GIMLeC kept proliferating up to passage 27 and retained luminal markers (KRT8, KRT18, EpCAM). α-SMA was absent, and vimentin stayed low, so there was no myoepithelial contamination or epithelial–mesenchymal transition. To test GIMLeC as a mastitis model, we challenged the cells with Escherichia coli lipopolysaccharide (LPS; 2.5 and 5 µg/mL for 6 h), the TLR4 ligand that drives Gram-negative coliform mastitis. LPS significantly upregulated the chemokines CXCL6 and CXCL8 and the cytokine TNF-α, showing that the cells' innate inflammatory signaling is intact. GIMLeC offers a stable, reproducible, and ruminant-relevant platform for studying host–pathogen interactions in the udder and for screening anti-inflammatory and antimicrobial candidates. It also reduces the need for primary tissue from animals.

S.No.: 12

Abstract Title:	**A rapid and portable device to perform on-site Antimicrobial Sensitivity Testing in raw milk samples to treat mastitis**
Authors:	Muskan
Corresponding Author:	Dr. Pankaj Suman
Presenting Author:	Muskan, National Institute of Animal Biotechnology

Abstract

Mastitis is a major contributor to productivity loss in the dairy industry and is primarily caused by bacterial infections of the mammary gland. One of the critical barriers to effective mastitis management is the delay in initiating appropriate antibiotic therapy, largely due to the unavailability of rapid antimicrobial sensitivity testing (AST) at the point of care. Traditional AST methods require up to 72 hours, during which empirical treatment may exacerbate antimicrobial resistance (AMR) among mastitis-associated pathogens.

To address this urgent need, we have developed a rapid, field-deployable AST device designed for resource-limited and on-farm settings. The platform integrates a redox-based colorimetric detection system with a compact, battery-operated incubator. This setup enables visual detection of bacterial growth and antibiotic susceptibility within two hours, using a specially formulated medium that enhances microbial metabolism and produces an easily interpretable colour change. The device is highly sensitive, capable of detecting bacterial concentrations as low as 750 CFU/µl. It features a single-step protocol requiring only sample addition, enabling use by minimally trained personnel without laboratory infrastructure. Validation studies showed a high correlation with conventional disc diffusion assays, ensuring diagnostic reliability. All reagents are stable at ambient temperatures, eliminating the need for refrigeration and making the device particularly suited for remote and rural deployment.

In conclusion, this low-cost, portable AST device represents a significant advancement in the timely diagnosis and targeted treatment of mastitis. Its application supports rational antibiotic use in livestock, contributing to AMR mitigation. Ongoing work aims to extend this technology to human clinical diagnostics, promoting responsible antimicrobial stewardship across sectors.

S.No.: 13

Abstract Title:	**Somatic Cell Count Threshold and Genome-Wide Screening for Mastitis-Related Loci in Endangered Toda Buffaloes**
Authors:	S. Mubha Sheer Jan A. Gopinathan, S.M.K. Karthickeyan, N. Prema, J. Selvamani
Corresponding Author:	MUBHA SHEER JAN S
Presenting Author:	MUBHA SHEER JAN S, Department of Animal Genetics and Breeding, Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Chennai, Tamil Nadu, India

Abstract Text:

The present study evaluated somatic cell count (SCC) threshold for assessing udder health and identified genomic regions associated with somatic cell score (SCS) in Toda buffaloes, known for resistance to mastitis. Milk samples from 200 Toda, 23 Bargur and 21 mastitis-affected graded Murrah buffaloes were evaluated by direct microscopic and TANUCHEK SCC kit methods. SCC values were transformed to SCS and subjected to receiver operating characteristic (ROC) analysis. Genome-wide genotypes generated using the MAHISHCHIP SNP array were subjected to individual and marker-level quality control in PLINK. Following SNP genotyping and quality control, 188 Toda buffaloes and 55,965 SNPs were retained for association analysis using linear regression adjusted for parity and lactation stage. Mean SCC was 75.85 ± 0.99, 76.25 ± 2.16 and 532.38 ± 80.55 × 10^3 cells/ml in Toda, Bargur and mastitis-affected graded Murrah buffaloes, respectively. An SCC threshold of 177,500 cells/ml yielded 100% sensitivity and specificity, with an area under the curve of 1.000. Genome-wide analysis identified 49 suggestive associations ($P < 0.002$), with the strongest signals within BTBD9 ($P = 2 \times 10^{-5}$; $\beta = -0.142$) and GABRG2 ($P = 3 \times 10^{-5}$; $\beta = -0.198$). Variants within MYRFL and near PANX3 and CACUL1 overlapped SCS-related QTL regions. However, none of the SNPs exceeded the Bonferroni-corrected genome-wide significance threshold, indicating their putative association and requiring validation in larger populations. Overall, the SCC threshold of 177,500 cells/ml provides a preliminary population-specific SCC threshold and genomic baseline for mastitis resistance in Toda buffaloes.

Keywords: Toda buffalo; mastitis resistance; somatic cell count; genome-wide association

S.No.: 14

Abstract Title:	**Development of AI-enabled Non-Invasive Field Screening Method for Bovine Mastitis Disease Management**
Authors:	Mr. Santosh , Dr. Sandeep kushwaha
Corresponding Author:	—
Presenting Author:	Mr. Santosh , JRF , NIAB Hyderabad

Abstract Text:

Title : Development of AI-enabled Non-Invasive Field Screening Method for Bovine Mastitis Disease Management

Background: Bovine mastitis remains a major challenge to the dairy industry. Conventional diagnostics use California Mastitis Test (CMT), somatic cell count (SCC) and milk culture. These tests are slow, expensive, time-consuming, or prone to inter-operator variability. The effective mastitis management requires a field friendly early screening method for subclinical mastitis (SCM). Therefore, this study aims to evaluate the application of infrared thermography (IRT) for the detection of bovine mastitis.

Methods: Quarter-wise milk samples from 40 lactating HF-Cross cows were collected and analyzed for Somatic Cell Count (SCC) using an Ekomilk analyzer. Smartphone-attached Topdon TC001 thermal cameras were used to generate quarter images of each cow. An automated computer vision pipeline was employed for pixel-temperature matrix generation teat segmentation and extract the teat skin surface temperature (TSST) and udder surface temperature (USST) directly from calibrated thermal images. Extracted thermal statistics were regressed against log10 SCC using linear mixed-effects models, ElasticNet, SVR, and gradient-boosted trees. All models were evaluated using strict cow-grouped cross-validation.

Results: This study evaluated individual quarters comprising healthy, subclinically mastitic, and clinically mastitic cases. The quarters were divided into healthy (< 2 lakh cells/ml), subclinical mastitis (2–4 lakh cells/ml), and clinical mastitis group (> 4 lakh cells/ml), based on SCC. The clinically mastitic quarters (> 4 lakh cells/ml) exhibited higher contralateral thermal asymmetry (1.04 ± 0.15 °C vs 0.72 ± 0.19 °C) and a narrower teat-to-udder thermal gradient (-2.03 ± 0.17 °C vs -2.27 ± 0.24 °C) compared to the healthy group. Regression model predicted somatic cell counts with a median absolute error of approximately 300,000 cells/ml, achieving a 77% sensitivity in identifying clinical mastitis (> 4 lakh cells/ml) and flagging 73% of subclinical quarters (2–4 lakh cells/ml) as elevated above baseline in five-fold cross-validation.

Conclusions: The infrared thermography can be used to correlate with somatic cell count categories for mastitis detection, shown potential as an auxiliary, non-invasive tool to assist early mastitis screening, though its use under variable farm field conditions must be further evaluated.

Keywords: Bovine mastitis, Somatic cell count, Teat skin surface temperature, Non-invasive screening, Infrared thermography, CV-models

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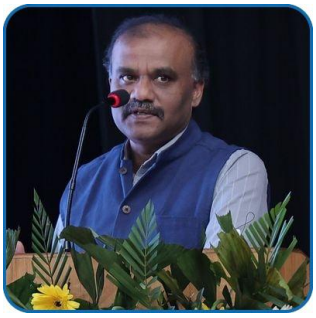


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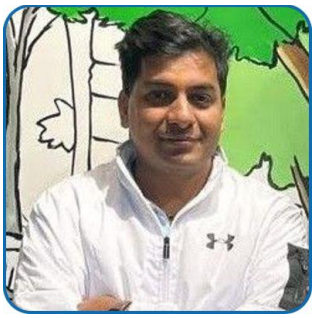
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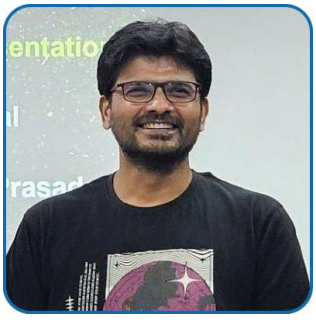


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Welcome to Hyderabad: A Curated City Guide for FiAB Delegates

Welcome to Hyderabad for the FiAB (Frontiers in Animal Biotechnology) Conference at the National Institute of Animal Biotechnology (NIAB). Located near the bustling IT hub of Gachibowli and Financial District, NIAB places you within reach of both modern entertainment and centuries-old heritage.

Whether you have an evening free after sessions or an extended stay, here are the top places to explore during your time in the "City of Pearls."

Modern Attractions Near NIAB (Within 10–20 Minutes)

Since conference schedules can be tight, these nearby spots in Financial District, Gachibowli, and Madhapur offer quick, relaxing outings:

- **Durgam Cheruvu & Cable Bridge:** Often called the "Secret Lake," this spot features a scenic cable-stayed bridge, waterfront promenades, and pedal boating. It is especially picturesque in the evening when illuminated.
- **Shilparamam Arts & Crafts Village:** An open-air crafts village showcasing traditional Indian handicrafts, woodwork, textiles, and cultural dance performances. It is ideal for delegates looking to buy authentic souvenirs.
- **Gachibowli & Financial District Culinary Scene:** The area surrounding NIAB is packed with upscale lounges, microbreweries, and specialty restaurants serving both global cuisine and local Hyderabadi dishes.

Historic Landmarks & Old City Heritage (45–60 Minutes Away)

If you have a half-day or a full evening free, head to the heart of historic Hyderabad to experience the royal legacy of the Qutb Shahi and Nizam dynasties:

- **Charminar & Laad Bazaar:** Built in 1591, this four-towered square monument is the central icon of Hyderabad. Surrounding it is Laad Bazaar, famous for lacquer bangles, pearls, and street food.
- **Golconda Fort:** A magnificent 16th-century fortress known for its acoustic engineering, hilltop views, and history as the center of the diamond trade (where the Koh-i-Noor originated). Stay for the evening Light & Sound show.
- **Qutb Shahi Tombs:** Located close to Golconda Fort, this necropolis features beautiful domed mausoleums set in landscaped gardens.
- **Salar Jung Museum:** One of the world's largest one-man art collections, holding over 38,000 artifacts across several galleries, including European, Asian, and Middle Eastern treasures.

Iconic City Landmarks & Evening Views (60-90 Minutes Away)

- **Birla Mandir:** Perched on a hilltop (Naubat Pahad), this temple constructed entirely of white marble offers clear panoramic views of the city skyline and Hussain Sagar Lake.
- **Hussain Sagar Lake & Necklace Road:** A large heart-shaped lake featuring a massive 18-meter monolithic Buddha statue in the center. Boat transfers to the statue and evening walks along Tank Bund / Necklace Road make for a pleasant break.

Must-Try Hyderabadi Culinary Experiences

No visit to Hyderabad is complete without exploring its distinct culinary heritage:

- **Hyderabadi Dum Biryani:** Rich, slow-cooked rice layered with marinated meat and spices. Famous local spots include *Bawarchi*, *Pista House*, *Paradise*, and *Shah Ghouse*.
- **Irani Chai & Osmania Biscuits:** Stop by classic cafes like *Nimrah Cafe* (near Charminar) or *Café Niloufer* for a traditional cup of spiced tea and buttery biscuits.
- **Haleem & Kebabs:** If you enjoy rich, slow-cooked savory dishes, try local kebab specialties and mutton delicacies in Old City, Hitech City or Banjara Hills.

Practical Travel Tips for Delegates

- **Local Transport:** Cabs and rideshares (Uber, Ola) are easily available throughout Gachibowli, NIAB, and HITEC City. The Hyderabad Metro connects key parts of the city efficiently.

Sponsors

Successful organization of FiAB 2026 is being made possible through generous support from sponsors and companies that believe in animal health, diagnostics and biotechnology for animal health and human welfare. We extend our deepest appreciation to all our sponsors for helping make this event a reality.

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