



CCMB LV Prasad Eye Institute

Study urges for microbiology-guided diagnosis and treatments and genomic surveillance in hospitals

Hyderabad, 7th Apr, 2026: Researchers from the CSIR-Centre for Cellular and Molecular Biology (CCMB) and the LV Prasad Eye Institute (LVPEI) came together in a unique collaborative study that uncovered alarming levels of antimicrobial resistance (AMR) in bacteria causing eye infections. The study, published in [Communications Biology](#), represents one of the most comprehensive genomic analyses of eye pathogens from India to date. Drs Karthik Bharadwaj and Divya Tej Sowpati from CSIR-CCMB and Dr Joveeta Joseph from LVPEI led the study.

CSIR-CCMB researchers led the genomic and bioinformatics analyses, and LVPEI researchers contributed in clinical expertise, patient samples, and microbiological characterization – bringing together cutting-edge genomics with real-world clinical insights. “To understand and solve a problem like AMR, it is essential for clinicians and scientists come together and contribute through their expertise. This is not a problem to be solved with model organisms but rather with real patient samples,” said Dr Vinay K Nandicoori, Director, CSIR-CCMB.

The team isolated bacteria from the patient samples and tested them with known antibiotics. They found more than 45% of isolates were multidrug-resistant, and included both Gram-positive and Gram-negative bacterial pathogens. “We found samples with vancomycin-resistant *Staphylococcus aureus* and extensively-drug resistant (XDR)-*Klebsiella pneumoniae* strains involved in eye infections. These findings are worrying because they can spread their AMR genes to other bacteria too. Also, these pathogens can infect other parts of our bodies,” said Dr Bharadwaj, clinician-scientist at CSIR-CCMB. Through whole genome sequencing, they have also identified new AMR-associated bacterial mechanisms and mutations in this study.



Eye infection, PC: LVPEI

From a clinical standpoint, the study underscores the urgent need to re-evaluate current treatment practices. It is common that a clinician starts treatment based on their best judgements before laboratory results are available. Since identifying the exact organism can take a few days, treatment is initiated with antibiotics that are most likely to be effective, and later adjusted once the test results are known. This is called empirical therapy.

The high prevalence of AMR challenges the continued reliance on empirical antibiotic therapy.

Fluroquinolones are a frequently used class of antibiotics, and this study reported resistance against these antibiotics in all eye pathogens. This highlights the importance of microbiology-guided diagnosis and treatment approaches, particularly in severe infections such as microbial keratitis and endophthalmitis. “While genomic tools are not yet part of routine clinical workflows, the insights generated through this study provide a critical foundation for developing region-specific treatment guidelines and strengthening antimicrobial stewardship efforts in ophthalmology,” said Dr Joseph, Head of Microbiology at LVPEI.

Eye infections are not isolated events - they are caused by microbes on our skin as well as in the environment. Thus, these results reflect the larger AMR landscape in our surroundings, and not just pertinent to the eye care sector. “This study positions eye as a valuable site for AMR surveillance in the environment around us,” said Dr Prashant Garg, Executive Chair, LVPEI.