

Doordarshan Bangla covers National Institute of Biomedical Genomics' research

By Sunderarajan Padmanabhan

New Delhi, February 04: Healthy pregnancies leading to healthy birth of children has immense importance. Babies who are born preterm i.e. less than 37 weeks of pregnancy, have poor development early on in life and have elevated risk of late onset diseases. Both preterm birth and neonatal infections are associated with high neonatal mortality.

National Institute of Biomedical Genomics, Kalyani, West Bengal, is conducting large scale genomic and epigenomic research studies to identify the biological underpinnings of preterm birth and neonatal respiratory tract infections in babies. DD Bangla recently covered on television its ongoing research work on the genomics of maternal and neonatal health.

Dr. Arindam Maitra, Associate Professor of NIBMG, described the institute's ongoing research in the largest pregnancy cohort in the country, the Garb-Ini study, in collaboration with two other institutes, Translational Health Science and Technology Institute (THSTI), and Regional Centre of Biotechnology (RCB), and Gurugram Civil Hospital and Safdurjang Hospital.

He informed that NIBMG is analyzing variations in the DNA sequence as well as in the DNA methylation of mothers who are delivering preterm and those delivering at term. He also described a sub-study in which they are measuring mother's stress during pregnancy by clinical, biochemical and genomic tools to understand its association with premature birth outcomes.

Dr. Bornali Bhattacharjee, Ramanujam Fellow at NIBMG, described her ongoing research work on preterm newborns. They often suffer from difficulty in breathing due to incomplete lung development and are admitted to the hospital neonatal care units for oxygen therapy or ventilator support. Hospitals deal with the most debilitating infections and the use of antibiotics is the highest in healthcare facilities. However, with overuse of antibiotics there has been a rise in antibiotic resistant bacteria which cannot be killed using the commonly prescribed antibiotics and the most antibiotic resistant bacteria can be found in hospitals. Dr. Bhattacharjee and her team has been asking the following questions:

What pathogens do the preterm neonates admitted to the SNCU with respiratory distress carry in their nostrils? What are their antibiotic resistance profiles? How much of antibiotic resistance is found in bacteria isolated from hospital sewage? Can these multidrug resistant (MDR) bacteria be killed?

They had found the presence of meropenem (a last line antibiotic) non-susceptible, multi-drug resistant *Klebsiella pneumoniae*, a bug enlisted in the WHO critical pathogens chart in the nostrils of newborn babies admitted to the SNCU with respiratory distress and were able to map the resistomes of these pathogens using next generation sequencing. This finding was published last year (*Bhattacharjee et al. 2019, Int J Antimicrob Agents*).

Such multi-drug resistant bugs can be hospital acquired and often form robust biofilms on hospital equipment and spread from patient to patient and have the ability to cause deaths in severe infections. The team was able to use lactic acid, a common organic acid in killing these bacteria in liquid cultures as well as after formation of robust biofilms in our laboratory. These findings have also been published recently (Bardhan et al., 2019, *Antibiotics (Basel)*).

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