DBT-NIBMG scientists working to tackle the problem of preterm deliveries

New Delhi, Oct 15: Children born before 37 weeks of gestation have higher risk of delayed cognitive and motor skills, sensory deficits, cerebral palsy, respiratory illness and immunodeficiency. Individuals born preterm are at risk of late onset diseases in adult life. Mothers delivering preterm experience increased risk of developing cardiovascular disease, type II diabetes, and breast cancer in later life. Preterm birth (PTB) is also the leading cause of infant mortality and morbidity worldwide. In India, 3.6 million out of 27 million babies are born preterm per annum and India has the highest PTB cases.

Feto-maternal health during pregnancy and PTB outcome is modulated by a range of external factors. DNA methylation (DNAm) affects the molecular adaptability of both the mother and fetus during pregnancy by modulating gene expression. It is therefore necessary to study maternal genome-wide DNAm landscape during gestation and evaluate significant differences associated with PTB outcomes compared to term delivery.

The pathophysiology of spontaneous PTB is still unclear, which makes identification of reliable and accurate predictors difficult. Studying temporal patterns of varying DNAm marks in maternal peripheral blood throughout gestation will help identify genes whose expressions may be altered during pregnancy in order for the mother and fetus to adapt and evaluate the importance of specific genes in the context of premature delivery of the fetus.
Using bioinformatic and statistical models, researchers at DBT- National Institute of Biomedical Genomics (DBT-NIBMG), Kalyani have identified genes showing differential DNAm patterns during pregnancy in mothers delivering preterm compared to those delivering at term in the prospective cohort of Interdisciplinary Group for Advanced Research on Birth Outcomes—DBT India Initiative (Garbh-ini). These findings are an important step towards associating the functional impact of specific genes and their suggestive role on driving adverse birth outcomes.

The study suggests the pivotal role of placenta, a feto-maternal organ, which allows nutrient uptake, thermo-regulation, waste elimination, and gas exchange via the mother's blood supply; to fight against internal infection; and to produce hormones supporting pregnancy.

Deriving conclusive functional relevance of variation of DNAm marks from maternal peripheral blood early in pregnancy, will help to develop strategies for successful clinical intervention and prevent deaths of newborns and children under 5 years age, as well as improve maternal health, and curb global health burden associated with babies born too early.

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