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Umbilical cord gene expression signals premature babies' lung disease risk

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Diagnosing a risk of fatal lung disorders may be possible by analysing the umbilical cords of premature babies, according to research published in the online open access journal Genome Biology. Until now, paediatricians have not been able to predict the development of bronchopulmonary dysplasia (BPD) because of the difficulties with obtaining lung samples.

Isaac Kohane and his team at the Children's Hospital, Boston, US, collected umbilical cord tissue samples from 54 premature infants born at less than 28 weeks of gestation, including 20 samples from infants who later developed BPD.

When DNA expression profiles were compared, the researchers found that infants who subsequently developed BPD had distinct gene expression signatures that differed from the ones who did not develop the disease, although the maternal characteristics (for example, the cause of delivery, race, or inflammation of the uterus) were similar. The genes that differed between the two groups involved chromatin remodelling and histone acetylation pathways.

"This has provided a rare opportunity to examine the influence of foetal physiology on postnatal health and development using the multiple tissues in umbilical cords as a proxy for a wide variety of tissues in the maternal-foetal unit," says Kohane.

BPD occurs in 20-40% of infants born below 1000 grams and before 28

weeks of gestation, and means babies still need supplemental oxygen at 36 weeks postmenstrual age. It is the second leading cause of death among infants born within this gestational age and is characterised by inflammation and scarring in the lungs.

The study by Kohane and colleagues will contribute towards generating prognostic markers for disease from umbilical cord profiles.

Source: BioMed Central