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EXPLORING the EPIGENETICS of LUNG DISEASE

A recent study by **Jesse Roman, MD**, Ludwig Kind Professor of Medicine, found that a mother's diet can prompt changes in how her offspring's cells function. It offers clear and specific evidence that maternal experience can affect the health of following generations: in this case, that insufficient maternal nutrition during pregnancy can change the functioning of genes that affect lung health.

In the study, researchers examined lung-related genes in offspring of mice whose diet was limited during the second and third trimesters of gestation. They found that a handful of genes had a different level of expression in those progeny than did the genes in offspring of mice who ate normally. Two of those genes had particularly increased expression; both help keep intact the lining of blood vessels surrounding the lung's alveoli and promote their normal function. In addition, there was also increased expression of a gene that may predispose blood vessels to inflammation and clotting. Finally, the researchers also found higher levels of fibronectin—a connective tissue molecule that normally helps cells organize into tissues, but that sometimes attracts immune cells that prompt excessive inflammatory reactions, like asthma.

This research represents a **step forward** in understanding how follow-on generations' gene function can be affected by maternal or paternal experience.

Genetic mutations acquired by a mother during her lifetime are not themselves passed to subsequent generations. But changes in epigenetics—cellular activities driven by molecular processes not coded for in genes—can be passed from parent to child. This research represents a step forward in understanding how follow-on generations' gene function can be affected by maternal or paternal experience.

A next step for Dr. Roman and his colleagues is to explore in greater detail how altered gene expression affects lung function. It is possible that epigenetic changes in lung-specific genes—such as Dr. Roman found in his groundbreaking study—could be associated with the long-observed phenomenon of higher rates of lung disease in children born to undernourished mothers. ■