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**Connecting mechanical and molecular regulators of lung development**

Abstract:

Development of the lung is is highly regulated and stereotyped, leading to an architecture that is conserved within a given species and optimized for gas exchange. Using novel microfluidic platforms for the culture of embryonic mouse lung explants, we demonstrate a novel physical mechanism that times and coordinates the formation of new airways in normal lung development. Furthermore, we have identified mechanically responsive signaling molecules for several key reciprocal molecular signaling pathways between the epithelium and mesenchyme that are responsible for regulation of airway branching morphogenesis. Our ongoing studies seek to define the mechanotransduction pathways that underpin this novel regulatory system to increase understanding of the linkages between between molecular, genetic, and physical mechanisms in lung development and disease.