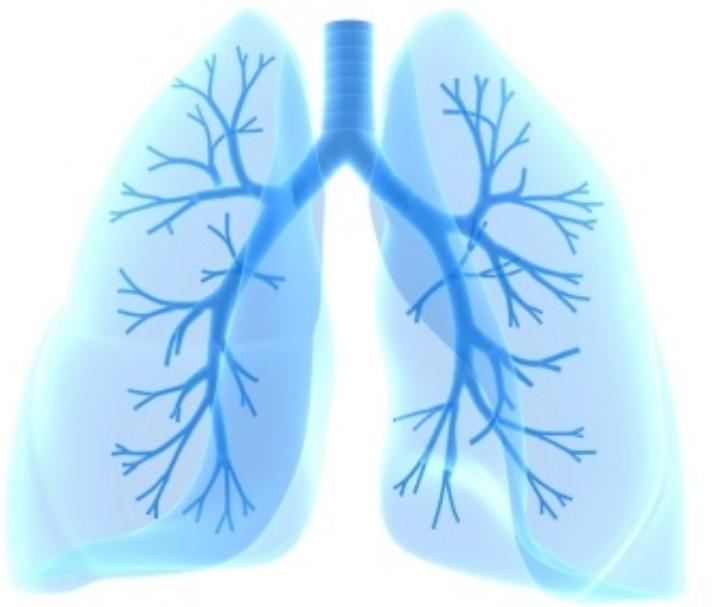
Finding cellular causes of lung-hardening disease

September 17 2013, by Tracey Peake



(Medical Xpress)—Idiopathic Pulmonary Fibrosis, or IPF, is an incurable lung disease that, over time, turns healthy lung tissue into inflexible scar tissue – hardening the lungs and eventually causing respiratory distress and death. Currently, there is no cure.

Phil Sannes, a professor of cell biology, studies IPF on the cellular level. In his most recent research, he's found that in the case of IPF patients, three growth factors within different types of cells in the lung may be

working together to cause the disease.

Previous research, including earlier studies from Sannes' lab, established two signaling molecules that seemed to be involved in the development of IPF: Wnt7B and TGF-?. In normal lungs, Wnt7B regulates the epithelial cells on the surface of the lung, and TGF-? plays a role in the development of fibroblasts in the layers underneath the epithelium. When the lung is damaged, Wnt7B and TGF-? help cells in the lung work together to make sure that the injured area is sealed off and the epithelium can repair itself. If the epithelium can't recover within roughly 48 hours after the injury, then fibroblast production accelerates and the quick growing fibroblasts create a scar. When the epithelium recovers, fibroblast production gets turned off and the scar eventually resolves itself.

In IPF, fibroblast production is stuck in overdrive. Somehow, the fibroblasts don't get the message to stop producing. Sannes' latest work, supported by the NIH, identifies a third possible player in the mix, a signaling molecule known as fibroblast growth factor nine (FGF9). In a paper in the *Journal of Histochemistry and Cytochemistry*, Sannes shows that FGF9, which is normally found only in the smooth muscle tissue in the lungs, also appears in epithelial cells of IPF patients.

"FGF9 is important to lung development, but in normal lungs it's only found in small amounts in smooth muscle tissue," Sannes says. "In fact, none of the three molecules are expressed a lot in normal lung – just when they're needed in the healing process.

"Finding FGF9 out of place like this is unusual. We don't know why it's there or what its role is, but our operating hypothesis is that in an IPF lung FGF9, Wnt7B and TGF-? are acting together in a coordinated way. Our next steps will be to find out how this combination may lead to development of IPF."

More information: jhc.sagepub.com/content/61/9/671.full