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## The role of LRP5 in lung angiogenesis and regeneration

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Chronic lung diseases including chronic obstructive pulmonary disease, pulmonary fibrosis and asthma are the third leading cause of death in the United States. To date, lung transplantation is the only way to save patients with end-stage chronic lung diseases. However, because of the shortage of transplant donors, high cost and serious complications, lung transplantation is not an optimal approach. It has been recognized that adult human lungs may have the potential to regenerate after pneumonectomy (PNX). Thus, stimulating regeneration of adult lungs could be a good therapeutic strategy for chronic lung diseases. Angiogenesis, the growth of new blood vessels plays a key role in organ development, homeostasis and regeneration. We have reported that the Wnt co-receptor, low-density lipoprotein receptor-related protein 5 (LRP5) controls neonatal lung vascular and alveolar development. Here we demonstrate that LRP5 also controls adult lung regeneration through angiopoietin-Tie2 signaling. Compensatory lung growth after PNX is inhibited in *Lrp5* knockout mice. We have also developed a unique method to implant hydrogel on the mouse lung which enables us to clearly visualize lung-specific angiogenesis in mice. Using this method, we found that host lung-derived angiogenesis and alveolar cell recruitment are inhibited in hydrogels implanted on the lungs of *Lrp5* knockout mice or mice treated with Tie2 inhibitor. Modulation of LRP5 signaling may therefore lead to the development of novel therapeutic interventions for various lung diseases and the improvement of lung organ engineering.

### Biography

Akiko Mammoto has received her PhD from Osaka University in Japan and completed her Postdoctoral studies at Boston Children's Hospital/Harvard Medical School. She is currently an Instructor in the Vascular Biology Program at Boston Children's Hospital and has published more than 65 papers in high impact journals and serves as an Editorial Board Member of Scientific Reports.

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