PISA abstract

Sex-Dependent Differences in Lung Vascular Regeneration

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Introduction/Background- Chronic lung diseases, including chronic obstructive pulmonary disease (COPD) contribute to global morbidity and mortality. Lung transplantation remains one of the options for patients with end-stage lung diseases, but it is not optimal. The human lungs possess an ability for regeneration and repair following injury or partial resection. Impaired lung regeneration and repair are implicated in the pathogenesis of lung diseases. Stimulating the regenerative ability of the lungs would be a promising strategy for chronic lung diseases. There are sex-related differences in lung diseases. Females with COPD have a higher risk of hospitalizations with greater morbidity compared to males. Development of the sex-dependent treatment may lead to more efficient strategy for lung diseases, and we need to understand the mechanism. Angiogenesis - formation of new capillary blood vessels- plays key roles in organ regeneration. We have reported that endothelial signaling is necessary for regenerative lung growth after unilateral pneumonectomy (PNX). There are sex-dependent differences in transcriptomics of endothelial cells (ECs) and angiogenic activity.

Methods- We perform left unilateral PNX on male vs. female C57BL6 mice, measure the remaining lung weight, and analyze vascular and alveolar regeneration and endothelial signaling using immunohistochemical and molecular biological analysis.

Results- Post-PNX increases in the remaining lung weight are lower in the female mice compared to males. Alveolar numbers and blood vessel formation are significantly lower in females compared to males. Post-PNX increases in the expression of angiogenic genes, VEGFR-2, Tie2, and PDGFB are higher in male mice.

Conclusion- Post-PNX vascular and alveolar regeneration is less stimulated in females compared to males. Understanding the sex-dependent mechanism would lead to the development of more specific strategies for lung diseases.