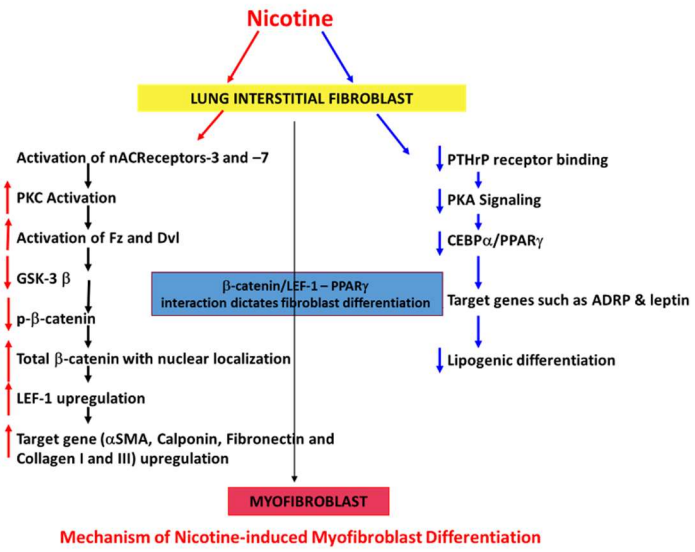
Aerosolized Peroxisome Proliferator-Activated Receptor Gamma (PPARγ) Agonists for Treating Neonatal Lung Injury [LAB0043, LAB0138]

Background

- Approximately 10% of women smoke during pregnancy.
- Although there are many agents in smoke that are detrimental to the developing lung, nicotine directly affects fetal lung development.
- Maternal smoking during pregnancy adversely affects fetal lung growth and causes smoke-induced pulmonary alveolar trans-differentiation of lipofibroblast to myofibroblast *in utero.*
- Such patients are typically treated with steroids and β agonists, which alleviate the symptoms caused by smoking but do not address the actual etiology of the smoke-induced effects on the fetus.
- Currently there are no specific treatment for neonatal lung injury caused by smoking.

Innovation

- Dr. Virender Rehan has developed a therapy that uses Peroxisome Proliferator-Activated Receptor gamma (PPARγ) agonists to treat nicotine-induced lung damage on a molecular level.
- Dr. Rehan found that the administration of PPARγ agonists reversed the nicotine-induced trans-differentiation of lipofibroblast to myofibroblast and thereby not only blocked but also reversed nicotine-induced lung injury.
- To effectively prevent the maternal nicotine exposure-induced effects on the lungs of the neonate, PPARγ agonist intervention is needed during gestation and lactation periods.



Mechanism of Nicotine-induced Myofibroblast Differentiation

Advantage

- PPARγ agonist treatment reverses nicotine-induced cell damage in neonates.
- Aerosolized PPARγ can be administered via nasal spray or oral inhaler.

Applications

- Treatment for nicotine-induced lung disease

Lead Inventor: Virender Rehan, MD

IP Status

- US Patent No. 9,173,875 titled "Treatment for Nicotine-Induced Lung Disease Using Peroxisome Proliferator-Activated Receptor Gamma Agonist" issued November 3, 2015.

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Related Publications

- Kuniyoshi KM, Rehan VK. The impact of perinatal nicotine exposure on fetal lung development and subsequent respiratory morbidity. Birth Defects Res. 2019;111(17):1270-1283.
- Lee C, Sakurai R, Shin E, Wang Y, Liu J, Rehan VK. Antenatal PPARγ Agonist Pioglitazone Stimulates Fetal Lung Maturation Equally in Males and Females. Am J Physiol Lung Cell Mol Physiol. 2020;

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