Columbia Technology Ventures

Direct reduction of pulmonary inflammation using Liver X receptor agonists

Technology #cu13211

Chronic obstructive pulmonary disease (COPD), emphysema and other related lung diseases are characterized by increased inflammation in the lungs and affect nearly 5 million people in the United States. Current technologies to address these chronic and deadly diseases are targeted at relieving the symptoms, mainly by opening the passages to allow more air to enter the lungs. These approaches, however, fail to treat the inflammation itself. The technology described here demonstrates that Liver X receptor (LXR) agonists, as well as several antagonists of the miR33 and TLR4/Myd88 pathways, are capable of directly decreasing inflammation, providing promising avenues for the treatment and potential reversal of these devastating diseases.

Reduction of MMPs demonstrates significant improvement in smoke-induced emphysema and COPD

In response to inhaled cigarette smoke and other noxious particles, immune cells in the lungs begin to secrete cytokines and matrix metalloproteinases (MMPs), resulting in progressive lung destruction and reduced airflow. LXR agonists have recently been shown to reduce the immune response and prevent atherosclerosis. This technology has established that LXR agonists are also capable of decreasing the inflammatory response from macrophages in response to cigarette smoke, in turn reducing the secretion of MMPs in lung tissue. The technology also identifies miR33 and TLR4/Myd88 antagonists as potential targets to reduce pulmonary inflammation and promises to address the root cause of disease.

This technology has been tested utilizing both in vitro culture techniques and an in vivo mouse model of emphysema.

Lead Inventor:
Jeanine D'Armiento, M.D., Ph.D.

Applications:
• Treatment of COPD, smoking-related emphysema, and other inflammation-related pulmonary diseases
• Prophylactic treatment of lung disease
• Combination therapy with existing COPD and emphysema therapies
• Method for determining whether a therapy is efficacious from serum or bronchoalveolar lavage fluid

**Advantages:**

• Addresses root cause of disease rather than symptomatic treatment
• May be combined with existing therapies
• Reduces pulmonary inflammation, mucus hypersecretion, obstructive bronchiolitis, and alveolar/bronchial infiltration
• Multiple modalities including LXR agonist, RNAi, Ribozymes, DNA/RNA Aptamer, and small peptides

**Patent Information:**

Patent Pending [WO2015095386](https://www.wipo.int/pctdb/en/)

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**Related Publications:**


**Inventors**

Jeanine D'Armiento