

OFFICE OF TECHNOLOGY TRANSFER

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TECHNOLOGY OPPORTUNITY

Modulator of Lung Branching Morphogenesis and Alveolarization

McGill University is seeking a company with the capacity to develop a pharmacologically active derivative of LGL1(late gestation lung 1) for the treatment of lung disorders. Defects in alveolarization, whether they are related to a primary failure of alveolar formation or to inadequate tissue repair from disease, account for a number of serious pulmonary conditions including: Chronic Obstructive Pulmonary Disease (COPD), Bronchopulmonary Dysplasia (BPD) and New BPD. Each year, these conditions account for significant morbidity and mortality worldwide.

Applications

LGL1 or a pharmacologically active derivative thereof, may have therapeutic benefit for both early or late onset lung disorders.

Advantages

•LGL1 plays a role in branching morphogenesis in early development and may also play a role in the regulation of alveolarization in the post natal lung and as such may have therapeutic benefit for both infant and adult-onset respiratory diseases.

•Current therapies for COPD such as bronchodilators, anticholinergics, steroids, oxygen therapy or aerosolized surfactants merely address secondary manifestations of disease. Therapies targeting LGL1 may directly address the inadequacy of alveoli in the lung.

•BPD is a life-threatening disease and constitutes an unmet clinic need. The induction of alveolar formation is a promising therapeutic avenue and if successful can make a clinically-significant difference in patients.

Technology

The inventors have discovered a novel glucocorticoid-responsive gene (LGL1) expressed in the developing fetal lung. Both LGL1 mRNA and protein are detected from the earliest stages of lung development and throughout the period of lung branching morphogenesis with the maximal LGL1 protein expression occurring at the time of alveolar formation. Using antisense technology in explant lung cultures, the inventors have establishes that a reduction of the normal levels of the LGL1 gene product is associated with a significant reduction in lung formation; while airway growth continues, there is a marked reduction or even cessation in the formation of new airway branches. This suggests that the LGL1 protein plays a role in airway branching morphogenesis as well as in the regulation of alveolarization.

The Inventors

Dr. Feige Kaplan is currently Professor in the Departments of Human Genetics and Pediatrics in the Faculty of Medicine at McGill University. Prior to obtaining her PhD from McGill, Dr. Kaplan completed her studies at Columbia and MIT. Dr. Kaplan also pursued post-doctoral training at the Hebrew University in Jerusalem. Her major research focus is to understand the role of steroid-responsive genes in lung development and in both early and late onset respiratory diseases.

Dr. Neil Sweezey, in addition to being a Staff Respirologist and a Senior Scientist at the Hospital for Sick Kids, is an Associate Professor in the Department of pediatrics at the University of Toronto. Dr. Sweezey's research focuses on both hormonal regulation of lung development and on the role of CFTR in lung development.

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