

Novel Peptide for the Treatment of Pulmonary Diseases

Each year millions of people are diagnosed with various pulmonary disorders that result in loss of quality of life, damage to organ function and some even result in death. These disorders are mostly caused by exposure to a range of harmful agents such as chemical compounds, drugs or biological infections. Idiopathic Pulmonary fibrosis (IPF) is one of the most common lung diseases and is characterized by respiratory discomfort and increase in lung elastance. IPF accounts for 20% to half of all cases of interstitial lung disease (ILD) and recently, there has been an increase in its incidence. The respiratory disease COVID-19 caused by infection with the new coronavirus, SARS-CoV-2, has currently caused a global pandemic and resulted in over one hundred thousand deaths in the US alone. Respiratory failure has been reported in people suffering from COVID-19 and scientific studies have implicated it as a major cause of death in 53% of patients. It has been established that the pathogenic SARS-CoV-2 binds to the angiotensin converting enzyme 2 (ACE2) leading to inactivation of ACE2 and inhibition of certain pathways that protect lung tissues.

Considering these factors, a peptide generated in the ACE2 axis and know to provide protective action in a range of tissues can be an ideal candidate for attenuating pulmonary fibrosis and can possibly have therapeutic role against COVID-19.

Technology

The technology described here is a biologic therapeutic method that implements the use of a peptide which binds to the ACE2 receptor and offers a novel therapeutic modality for pulmonary fibrosis and potentially other disorders involving pulmonary damage such as COVID-19.

The inventors of this therapeutic technology identified a peptide that plays a significant role in antagonizing the actions of AngII/AT1 axis. This peptide has also been shown to reduce cardiac fibrosis via the MrgD receptor. These findings strongly indicate that this peptide might be involved in pulmonary fibrosis and modulation of the autonomic nervous system.

The initial studies conducted by the inventors, involving patients with Idiopathic Pulmonary Fibrosis (IPF) have indicated that this peptide is significantly decreased in patients suffering from IPF. Studies by other scientists have also established its antifibrotic effects on the liver, kidneys and cardiovascular system. In an *in vivo* study by the inventors on a rodent model the peptide demonstrated protective efficacy when it was administered to rats with bleomycin induced pulmonary fibrosis.

Considering these findings, it is evident that this peptide has the potential to be a novel biologic therapeutic candidate for the treatment of various pulmonary diseases and has the potential to attenuate lung tissue damages suffered by COVID-19 patients.

Application

- This novel technology can be used to treat idiopathic pulmonary fibrosis (IPF), asthma, chronic bronchitis, chronic obstructive pulmonary disorder (COPD) and other pulmonary disorders.
- The application of this peptide-based therapy has the potential for attenuating pathological effects of COVID-19 in pulmonary tissues

Advantages/Benefits

- The efficacy of this therapy is not limited to one specific disease. This peptide will have beneficial effects on patients suffering from a wide range of pulmonary disorders that involve pulmonary fibrosis or pulmonary scar tissue formation in the lungs or autonomic nervous system impairment.

Status of Development

- In an *in vivo* study, administration of the therapeutic peptide protected Wistar rats against bleomycin induced pulmonary fibrosis.
- The peptide succeeded in attenuating pulmonary fibrosis and preserving the respiratory mechanic in a BLM-induced pulmonary fibrosis rodent model study.
- Human study - Evaluation of patients with idiopathic pulmonary fibrosis (IPF) indicated that the peptide was significantly (365%) lower in IPF patients relative to healthy individuals. This further demonstrated its protective role and hence therapeutic potential.

Intellectual Property Status: Provisional patent application filed on April 28th, 2020

Information on Inventors



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