

Therapeutic Antioxidant Peptides

Category

Therapeutic – New Use or Method of Treatment

Problem

Currently no cure for pulmonary hypertension and interest in better treatments

Solution

Peptides extracted from botanicals which act as SOD mimetics to treat PH

Intellectual Property

- ▶ Issued patent in the US

Value Proposition

- ▶ Novel method to treat pulmonary hypertension

Market Attractions

- ▶ Pulmonary Hypertension Therapeutics market valued at \$6.3B in 2019 with an expected CAGR of 5.6%.

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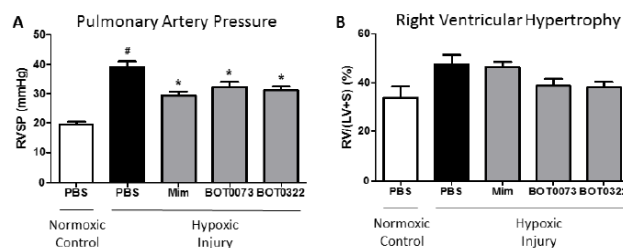
innovations.ucdenver.edu

Problem:

Pulmonary hypertension (PH) is a multifaceted disease characterized by high blood pressure in the lungs, a life-threatening complication with no cure but with ongoing research to develop better treatments. An important pathophysiological mechanism in PH is oxidative stress which promote abnormal vascular responses. Reactive oxygen species (ROS), such as superoxide (O_2^-) are potent activators of a variety of disease pathways. In blood vessels, changes in O_2^- levels have been shown to impact vascular tone, inflammation, cell growth and apoptosis. Importantly, studies have shown that elevated ROS in hypoxic pulmonary arteries can contribute to the development of PH. Superoxide dismutases (SOD1, SOD2 and SOD3) are the major antioxidant defense systems against O_2^- by catalyzing dimutations of O_2^- into hydrogen peroxide (H_2O_2) and molecular oxygen (O_2). There is substantial experimental evidence that show the promise of a variety of antioxidant therapies for different forms of PH. SOD mimetics (metalloporphyrins) are a class of catalytic antioxidants that scavenge a wide range of ROS. However, SOD/catalase enzymes have moderate efficacy due to average distribution to lungs and heart and short half-lives in living tissue. Because SODs have been well-characterized in numerous disease models, their dysregulation provide important insight of how ROS impacts the pulmonary vasculature, thus representing important targets for novel antioxidant strategies.

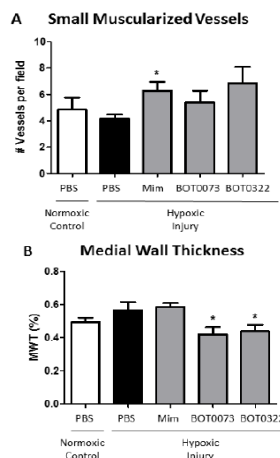
Technical Solution:

Researchers at the University of Colorado, led by Leah Villegas and Myphuong Le, have developed new antioxidant strategies to treatment of PH in the form of peptide therapeutics from botanical extracts. These bioactive peptides have shown promise for inhibiting and/or scavenging reactive oxygen species in subjects.



Above. Hypoxic mice treated with botanical peptide extracts (BOT0073/BOT0322) showed attenuation of right ventricular systolic pressure and right ventricular hypertrophy. Results are compared with a PBS negative control (PBS) and mimetic positive control (Mim).

Right. Hypoxic mice treated with botanical peptide extracts (BOT0073/BOT0322) showed increased number of small, distal muscularized vessels and attenuation of medial wall thickness.



Resources & Documents

US Patent No. 10,517,917:
“Compositions and Methods for Preventing or Treating Pulmonary Hypertension” issued December 31st, 2019.