A categorically novel finding: Fighting against severe and progressive pulmonary hypertension

2 September 2013, by Frances Dumenci

(Medical Xpress)—Pulmonary hypertension (PH) is a condition characterized by increased blood pressure in the lungs. It frequently leads to early death in patients. Numerous macrophages, which are cells that mainly engulf and digest cellular debris and pathogens, are found around the lung vessels of patients with PH. These perivascular macrophages express high levels of the enzyme required for the production of leukotriene B^4 (LTB4), which induces inflammation and directly promotes death of the cells lining the pulmonary vessels from the inside.

Researchers from Virginia Commonwealth University, Stanford University, the University of Colorado and the University of Michigan recently reported results from a study that uncovers this new and potentially pivotal role for macrophage-derived LTB4 in PH. The results were published in the journal *Science Translational Medicine*.

"This is a categorically novel finding that LTB4 causes apoptosis, or cell death," said Norbert Voelkel, M.D., professor of pulmonary research in the VCU School of Medicine and the director of the Victoria Johnson Center for Obstructive Lung Diseases. "This was not known previously. Immune-disease associated with pulmonary vascular disease, as observed in patients with AIDS, scleroderma and lupus, is mechanistically driven by macrophage-derived LTB4 as shown in animal models. Therefore, therapeutic inhibition of the synthesis of LTB4 becomes a novel strategy in the fight against severe and progressive pulmonary hypertension."

Voelkel has studied the role of leukotrienes in PH since 1982. His colleague, Mark Nicolls, M.D., associate professor of medicine at Stanford University, is the senior author on the paper. Nicolls and Voelkel collaborated in research projects of PH in immunocompromised animal models that develop severe pulmonary vascular disease.

An earlier paper authored by Voelkel and another colleague, Frank Fitzpatrick, Ph.D., professor of oncological sciences at the University of Utah, reported that bestatin, a drug now also used in clinical cancer trials, affects the production of lung LTB4. The study showed that bestatin prevented the development of severe PH in preclinical trials, and it also reverses established PH.

"Based on these preclinical studies, the next step is to design and perform clinical trials to investigate the safety and effectiveness of treating severe PH patients with inhaled bestatin, or one of its derivatives," Voelkel said. "The hope is that these trials lead to treatment strategies that help prolong the life of patients with PH and to reduce the burden of the disease on these patients by reducing hospitalization and increasing the overall quality of life."

More information:
stm.sciencemag.org/content/5/200/200ra117

Provided by Virginia Commonwealth University