Enzyme could prove effective in treating tumors and inflammatory diseases in lung: study

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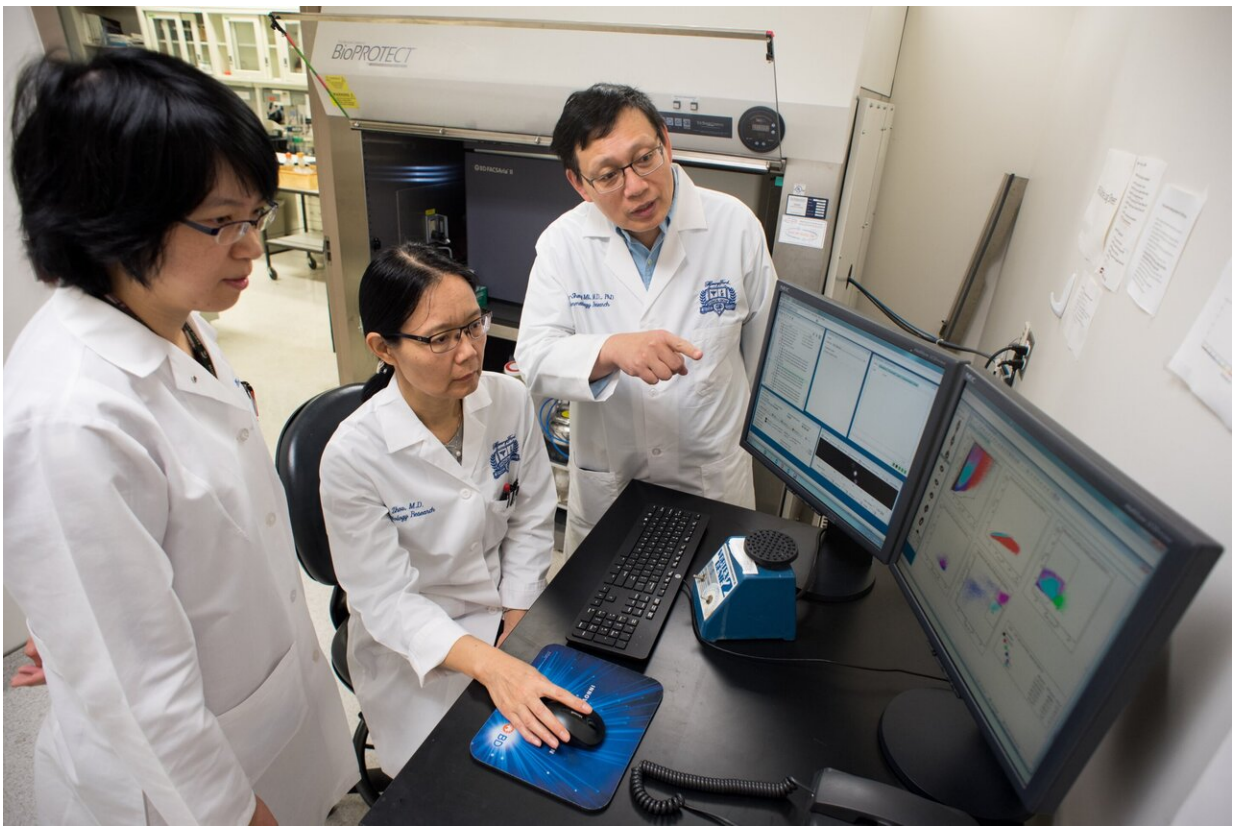

From left to right: Yi Yao, Ph.D., Li Zhou, M.D.; and Qing-Sheng Mi, M.D., Ph.D. Credit: Henry Ford Health System

Findings from a research study, led by scientists at Henry Ford,

published in the latest issue of *Nature Communications* suggest an enzyme could play an important role in the treatment of cancer and autoimmune diseases in the airway.

Histone deacetylases (HDACs) are enzymes that help modulate gene expression by removing acetyl groups from histone or non-histone proteins. Inhibition of HDACs is emerging as a promising approach to treat various types of malignant diseases and inflammatory disorders.

"The findings from this study show the key role HDAC3, one in the large HDAC family, plays in regulating lung macrophage development and homeostasis," said Qing-Sheng Mi, M.D., Ph.D., senior author of the study, senior scientist/professor, director of the Center for Cutaneous Biology and Immunology, Department of Dermatology, and director of Immunology Program of Henry Ford Cancer Institute. "Four pan-HDAC inhibitors have been approved by the FDA for anti-tumor therapy. However, due to common severe side effects of these pan-HDAC inhibitors, developing drugs with high selectivity for individual HDACs has become a priority for researchers."

"This study sheds light on HDAC3 as a potential therapeutic target for intervention in cancer and autoimmune diseases in the airway," said Li Zhou, M.D., co-senior author, associate scientist in the Center for Cutaneous Biology and Immunology at Henry Ford.

Lung alveolar macrophages are the innate immune cells residing in lung alveoli. They are important for the maintenance of homeostasis in the airways and are involved in the development of a variety of pulmonary diseases, including asthma and lung cancer.

"According to the findings of this study, the deletion of HDAC3 in mouse alveolar macrophages leads to significant impairment of alveolar macrophage development, maintenance, maturation and regeneration,"

said Yi Yao, Ph.D., the first author in the paper and a research instructor from Dr. Mi's laboratory.

More research is needed to better understand the underlying mechanism by which individual HDACs regulate immune cell development, maintenance and function. This knowledge will help with identifying potential therapeutic treatments.

"Our study may help bring HDAC3-inhibitor into clinical trial for lung cancer and inflammatory diseases," said Dr. Qing-Sheng Mi.

More information: Yi Yao et al, Histone deacetylase 3 controls lung alveolar macrophage development and homeostasis, *Nature Communications* (2020). DOI: 10.1038/s41467-020-17630-6

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