Medical Xpress

Researchers find new molecule to treat asthma

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A new study carried out by researchers at Sanford-Burnham Medical Research Institute (Sanford-Burnham), the Max Planck Institute for Colloids and Interfaces (Germany), the Free University of Berlin (Germany), UC San Diego, and Shinshu University (Japan) has identified a novel molecule that prevents T-cells from orchestrating asthma brought on by allergens. The findings, published on May 12 in *Proceedings of the National Academy of Sciences* (*PNAS*), show promise for a new potent therapeutic agent to treat asthma, a chronic disease affecting more than 25 million Americans.

"We have identified a synthetic molecule, a sulfate monosaccharide, that inhibits the signal that recruits T-cells to the lungs to start an asthma attack," said Minoru Fukuda, Ph.D., adjunct professor in the Tumor Microenvironment and Metastasis Program at Sanford-Burnham. "The molecule substantially lessened asthma symptoms such as inflammation, mucus production, and airway constriction."

The study, performed in mouse models for asthma research, showed that the synthetic sulfate monosaccharide blocks the interaction between chemokine CCL20—a T-cell signaling protein—and heparin sulfate, a molecule that protects and immobilizes CCL20 on epithelial cells in the lung. Blocking this interaction stalled the recruitment of the T-cells that trigger inflammation. The favorable results were achieved when the novel molecule was administered intravenously as well as by inhalation.

Although billions of dollars are spent every year on asthma medication,

asthma still accounts for one quarter of all emergency room visits in the U.S. each year (~1.75 million ER visits). And, asthma is on the rise. Since 1980, asthma death rates overall have increased more than 50 percent among all genders, age groups, and ethnic groups. The death rate for children under 19 years old has increased by nearly 80 percent since 1980.

"There is currently no cure for asthma, and asthma control remains elusive for many patients, so there is still a need for research to find new therapies," says Mike Tringale, senior vice president at the Asthma and Allergy Foundation of America (AAFA), a national asthma patient organization that has declared May National Asthma Awareness Month.

"Pulmonary inhalation of this new molecule may help reduce asthma symptoms by suppressing chemokine-mediated inflammatory responses," said Fukuda. We look forward to the further development of the molecule to treat the millions of people who suffer from this chronic disease."

Asthma

Asthma is a chronic (long-term) lung disease that inflames and narrows the airways. Asthma causes recurring periods of wheezing (a whistling sound when you breathe), chest tightness, shortness of breath, and coughing. The effects are usually temporary, but if the episode is severe, a person may need emergency treatment to restore normal breathing.

Asthma affects people of all ages, but it most often starts during childhood. In the United States, more than 25 million people are known to have asthma, and 60 percent of cases are allergic asthma. About 5 million of these people are children. Despite the availability of treatments, asthma remains poorly controlled among many patients. People with asthma can be of any race, age, or sex, and treatment costs

billions of dollars each year.

More information: Novel di-sulfated iduronic acid attenuates asthmatic response by blocking chemokine–heparan sulfate-mediated T-cell recruitment, www.pnas.org/cgi/doi/10.1073/pnas.1319870111

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