Medical Xpress

Scientists identify possible target for prevention and treatment of pneumonia

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Researchers at Children's Hospital of Pittsburgh of UPMC have identified a key protein target that may be a crucial factor in the development of a vaccine to prevent and new therapies to treat pneumonia, the leading killer of children worldwide.

Research led by Jay K. Kolls, MD, chief of the Division of Pediatric Pulmonary Medicine, Allergy and Immunology at Children's, identified for the first time the importance of a protein known as interleukin 22 (IL-22) in the immune response to a strain of bacterial pneumonia. In the laboratory, the researchers were able to effectively treat mice with pneumonia by using purified IL-22.

Results of the study are published in the February online issue of *Nature Medicine*.

"Currently there is no vaccine that covers all kinds of pneumonia and antibiotic treatment is sometimes limited by antibiotic resistance. As acute respiratory infections are the no. 1 killer of children in the world, progress in the development of novel vaccines or new, more effective treatments is critical," said Dr. Kolls, the Neils K. Jerne Professor of Pediatrics and Immunology at the University of Pittsburgh School of Medicine. "Our results raise the possibility of developing new protein-based therapies using IL-22 to limit or prevent pneumonia."

Pneumonia causes almost one in five deaths in children under age 5 worldwide – more than 2 million children each year, according to the

World Health Organization. It kills more children than any other disease – more than AIDS and malaria combined.

IL-22 and interleukin 17A (IL-17A) are produced by a recently discovered lineage of cells known as T Helper Type 17 (Th17). Children's researchers found evidence that the Th17 cell lineage and its cytokines IL-22 and IL-17A have evolved to promote host defense against certain infections in the lung caused by extracellular pathogens.

This is an important discovery because the Children's research team proposes that by stimulating the Th17 arm of the immune system, they can more efficiently treat bacterial pneumonia. Furthermore, the researchers propose that Th17 is a less critical pathway for intracellular bacteria such as those that cause listeria and tuberculosis – thus raising the potential to target this pathway in diseases of chronic inflammation such as rheumatoid arthritis or inflammatory bowel disease without increasing susceptibility to these intracellaulr pathogens.

Dr. Kolls' laboratory investigates mechanisms of lung host defenses in normal and immunocompromised hosts as well as lung immunology in disease such as cystic fibrosis and asthma. Additional research interests of Dr. Kolls include gene therapy, lung immunology, lung host defenses, tumor necrosis factor, pneumocytis carinii pneumonia, ethanol, gene expression, polymerase chain reaction and molecular biology.

Source: Children's Hospital of Pittsburgh