Vitamin D may treat and prevent allergic reaction to mold in cystic fibrosis patients

August 25 2010

Vitamin D may be an effective therapy to treat and even prevent allergy to a common mold that can cause severe complications for patients with cystic fibrosis and asthma, according to researchers from Children's Hospital of Pittsburgh of UPMC, the University of Pittsburgh School of Medicine and Louisiana State University School of Medicine.

Results of the study, led by Jay Kolls, M.D., Ph.D., a lung disease researcher at Children's Hospital and professor of pediatrics at the University of Pittsburgh School of Medicine, are published in the September 2010 issue of the Journal of Clinical Investigation.

Aspergillus fumigatus, is one of the most common airborne molds and while it does not cause illness in the vast majority of those who inhale it, it can cause life threatening allergic symptoms in patients with cystic fibrosis. As many as 15 percent of patients with cystic fibrosis will develop a severe allergic response, known as Allergic Bronchopulmonary Aspergillosis (ABPA). Some patients with asthma also can develop ABPA.

The research team led by Dr. Kolls studied cystic fibrosis patients from the Antonio J. and Janet Palumbo Cystic Fibrosis Center at Children's Hospital who had A. fumigatus infections. One group had developed ABPA, while the other hadn't. The researchers found that the ABPA patients had a heightened response by immune cells known as type 2 T helper (Th2) cells, and that a protein known as OX40L was critical to this heightened response. The heightened Th2 response correlated with

lower levels of vitamin D as compared with the non-ABPA patients. Adding vitamin D to these cells in the laboratory substantially reduced the expression of OX40L and increased the expression of other proteins critical to the development of allergen tolerance.

"We found that adding vitamin D substantially reduced the production of the protein driving the allergic response and also increased production of the protein that promotes tolerance," said Dr. Kolls, who also is professor and chair of genetics at LSU Health Sciences Center New Orleans. "Based on our results, we have strong rationale for a clinical trial of vitamin D to determine whether it can prevent or treat ABPA in patients with cystic fibrosis."

Cystic fibrosis is an inherited chronic disease that affects the lungs and digestive system of about 30,000 children and adults in the United States (70,000 worldwide), according to the Cystic Fibrosis Foundation. A defective gene and its protein product cause the body to produce unusually thick, sticky mucus that clogs the lungs and leads to life-threatening lung infections and obstructs the pancreas and stops natural enzymes from helping the body break down and absorb food.

"These important findings by Dr. Kolls' team add to the growing body of evidence showing that vitamin D may play a critical role on immune responses and allergic diseases," said Juan Celedón, M.D., Dr.P.H., chief of the Division of Pulmonary Medicine, Allergy and Immunology at Children's Hospital.

Provided by University of Pittsburgh Schools of the Health Sciences