Scientists find the cellular on and off switch for allergies and asthma

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If you're one of the millions who dread the spring allergy season, things are looking up. A research study appearing in the May 2009 issue of the *Journal of Leukocyte Biology* shows how a team of American scientists have identified a previously unknown cellular switch that turns allergies and asthma both on and off. Equally important, this study also suggests that at least for some people with asthma and allergies, their problems might be caused by genes that prevent this switch from working properly. Taken together, this information is an important first step toward new medications that address the root causes of allergies, asthma and other similar diseases.

"This study uncovers some of the basic mechanisms that control whether or not people have asthma and allergies and the severity of the symptoms," said John Ryan, Ph.D., Professor of Biology at Virginia Commonwealth University, and a senior scientist involved in the research. "This understanding opens new avenues for treating these and other related diseases."

Ryan and colleagues made this discovery in mouse experiments that examined cells from bone marrow and umbilical cord blood that ultimately help create a type of immune cell (mast cells). Too many mast cells lead to an over-aggressive immune response, which causes allergies and asthma. The scientists found that when chemicals (cytokines IL-4 and IL-10) used to initiate an immune response (the "on switch") are added to developing mast cells, the developing cells die. Because bone marrow makes both mast cells and these cytokines, the researchers conclude that just as the cytokines serve as the "on switch" for the immune system, bone marrow cells also use them as the "off switch" to stop mast cells from getting out of hand. Further supporting their discovery was the finding that strains of mice prone to allergies and asthma had genes which affected the production of this chemical "off switch" in their bone marrow.

"The immune system has an incredible capacity for balance and counterbalance to maintain optimal and properly tuned immune responses," said John Wherry, Ph.D., Deputy Editor of the *Journal of Leukocyte Biology*, "The studies by Ryan and colleagues are an excellent example of this inherent self-regulation of the immune system and how an imbalance in mast cell regulation could contribute to allergy and disease."

Source: Federation of American Societies for Experimental Biology (news : web)