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Attention: Health/Lifestyle/Science/Public Editors

Major Breakthrough in Peanut Allergy Genetics

Canadian and International Researchers uncover causes of peanut allergy

Hamilton, ON (11 March 2011) – Canadian researchers at the McGill University Health Centre (MUHC) and the University of Saskatchewan, in partnership with collaborators in Scotland, Ireland, England, and the Netherlands, have made a significant breakthrough in understanding the causes of peanut allergy.

Peanut allergy affects up to 2% of children in Canada and may result in a severe or life-threatening allergic reaction. The number of people affected by peanut allergy appears to have increased dramatically over the past 20-30 years, but the causes of the disease are unknown.

A team of Canadian researchers led by Dr. Ann Clarke in collaboration with Dr. Reza Alizadehfar, have contributed to identifying a gene that doubles or triples the risk of a child developing peanut allergy. The gene of interest is filaggrin, which is responsible for a skin barrier protein of the same name that prevents foreign substances, such as irritants and allergens, from entering the body. Changes in the gene decrease the effectiveness of this barrier, allowing substances to enter, which presumably leads to a range of allergic conditions. Filaggrin has previously been shown to be a significant factor in causing eczema and asthma.

“We know that there is an inherited tendency towards allergies,” said Dr. Ann Clarke, one of the MUHC researchers and an AllerGen NCE (AllerGen)-funded investigator. “We wanted to see if a gene involved in eczema was also involved in peanut allergy.“

“Allergic conditions such as asthma, eczema, rhinitis and food allergies tend to occur together in families and individuals. Since we did not know the eczema status of our sample of the Canadian general population, it was difficult to assess if the contribution of the gene to peanut allergy was independent of eczema,” said Dr. Yuka Asai, co-principal author of the study and a CIHR and AllerGen-supported research fellow at McGill University.

“Fortunately, our collaborators had this information on their populations,“ added Dr. Moshe Ben Shoshan, a pediatric allergist and immunologist at the MUHC who worked on the study. “They found the odds of having a mutation were higher in people with peanut allergy than the general population, regardless of whether or not they have eczema.”

The findings are published today in the *Journal of Allergy and Clinical Immunology*. In the paper, researchers acknowledge the difficulties of studying a complex disease such as peanut allergy, which has genetic and environmental components.

The collaboration looked at four different population groups from Canada, England, Ireland and the Netherlands. This is the first time that any genetic association with peanut allergy has been demonstrated in more than one population, making it more likely to be a genuine risk factor.

Professor Irwin McLean, a co-investigator of the study, is one of the world's leading authorities on filaggrin. He said the findings suggest that peanut allergy may be caused by substances entering the body through the skin, or could also have an effect in the gastro-intestinal area.

Considering that peanut allergy is a complex disease with many components, this is not the final answer to the question of what causes peanut allergy. However, it is an important step forward in understanding the genetic risk factors for this disease.

Dr. Alizadehfar one of the authors in this study and a researcher at MUHC stressed that this newly discovered association between a defect in the filaggrin gene and peanut allergy might not be restricted to only peanut. "This is probably not a direct genetic cause of peanut allergy per se; it may possibly be a risk factor for food allergy in general". He suggests that similar studies should be conducted in the future looking at this genetic defect in other types of patients suffering from food allergy.

The Canadian portion of this study was funded by CIHR, AllerGen Network of Centres of Excellence, the Canadian Dermatology Foundation, Fonds de la recherche en santé du Québec, the Canadian Allergy, Asthma, and Immunology Foundation, the Foundations of the McGill University Health Centre and the Montreal Children's Hospital, and the University of Saskatchewan Department of Medicine Research Fund.

AllerGen NCE Inc. invests in research undertaken by leading Canadian investigators aimed at the generation of new knowledge about the causes, treatment and prevention of allergic disease, asthma and anaphylaxis. AllerGen is a national research network dedicated to improving the quality of life for people suffering from allergic and related immune diseases. AllerGen is funded by Industry Canada through the federal Networks of Centres of Excellence (NCE) Program. The Network is hosted at McMaster University in Hamilton, Ontario.

Reference

Brown SJ, Asai Y, Cordell HJ, Campbell LE, Zhao Y, Liao H, et al. Loss-of-function variants in the filaggrin gene are a significant risk factor for peanut allergy.
J Allergy Clin Immunol 2011;127(3): 661-667.

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