

A Novel Genetic Marker for Food Allergy

TECHNICAL FIELD

Diagnostic: Food Allergy (2003-0715)

BACKGROUND

Food allergies affect nearly 10% of all individuals. These allergies can be life-threatening, and the primary therapy is avoidance of the allergenic food. Although the factors important in the pathogenesis of food allergies are not known, there is clearly a genetic predisposition. IL4RA, IL13, and CD14 genetic polymorphisms have been implicated as atopy susceptibility genes by multiple investigators. Still, little has been done in the area of food allergies.

Thus, the ability to accurately predict susceptibility to food allergy would serve as a beneficial diagnostic tool.



TECHNOLOGY

The present invention by Dr. Gurjit Hershey of the Cincinnati Children's Research Foundation identifies a novel genetic marker for food allergy. The V75 IL-4Ra / Q130 IL-13 / T-159C→T CD14 allele combination is strongly associated with food allergy and is an important genetic marker to identify at-risk infants. In addition, the genetic markers may be useful in predicting the natural history of food allergy and aiding the management of this common condition. Dr. Hershey has determined that with each locus analyzed at the level of genotypes, the TT (CD14 -159 C→T) genotype was significantly associated with food allergy. However, no significant allele frequency difference between food allergy patients and normal controls was observed at any of the six polymorphic sites when analyzed individually. Sequential multi-locus analyses revealed significant excess of 2-locus VV (I75V IL-4Ra) – QR (R130Q IL-13), and QR (R130Q IL-13) – TT (159 C→T CD14) in food allergy patients compared to controls ($p = 0.029$ and 0.011 , respectively). This was caused by a dramatic increase of individuals carrying the allele combination of V75 IL-4Ra / Q130 IL-13 / T-159C→T CD14 in patients with food allergy, compared to controls ($p = 0.008$). Furthermore, this allele combination was associated with the phenotype of eczema among food allergy patients ($p=0.02$). Peanuts ($n = 63$), milk ($n = 41$), and egg ($n = 39$) were the major foods causing food allergy in this study.

Peanuts, milk, and egg each had specific genetic fingerprints, and therefore this technology may be applicable in diagnosing food allergies in the future.

APPLICATIONS

1. Gene-based test for diagnosis of food allergies
2. Research tool

ADVANTAGES

- Standardized diagnostic tool
- Better manage and treat disease state

INVESTIGATOR

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STATUS

Patent applications pending.

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A Novel Genetic Marker for Food Allergy

THE INVENTOR

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BACKGROUND

Dr. Khurana Hershey is the Director of the Translational Research Program in Allergy and Asthma and Professor of Pediatrics at Cincinnati Children's Hospital Medical Center and the University of Cincinnati College of Medicine.



As part of her role as Director of Center for Translational Research in Asthma and Allergy, Dr. Hershey has developed a comprehensive database of allergic children seen in allergy and asthma clinics at CCHMC. Extensive phenotypic information including clinical, demographic, and quality of life data is available for nearly 2000 children and has been entered into a comprehensive database. DNA samples are available on over 98% of these children. This registry serves as a basis for multiple projects and grants.

Dr. Hershey is an elected member of the Society for Pediatric Research and a Diplomat of the American Academy of Allergy, Asthma and Immunology. She is a recognized leader in the allergy field and serves on the Editorial Board of the Journal of Allergy and Clinical Immunology and has been asked to serve on several NIH study sections and focus groups. She is the Principal Investigator of an NIH Asthma and Allergic Diseases Cooperative Research Center. She was recently named one of the Five Leading Women in Healthcare in the Greater Cincinnati Metropolitan Area by Women's Business Cincinnati Magazine, and nominated Outstanding Woman at Cincinnati Children's Hospital Medical Center. Her other honors include being awarded the Basil O'Connor Starter Scholar Award and the Asthma and Allergy Foundation of American Investigator Award. Her research has been supported by numerous sources including the National Institutes of Health, March of Dimes and the American Heart Association.