



Bioinformatics approaches to assess safety of novel proteins in relation to food hypersensitivity

Hosted by the HESI Protein Allergens, Toxins, and Bioinformatics Committee



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Workshop Abstract: In the growing field of allergy research, scientists can approach protein characterization and allergy hazard assessment in diverse ways. The Health and Environmental Sciences Institute (HESI) Protein Allergens, Toxins, and Bioinformatics (PATB) committee supports original basic research that seeks to uncover the interplay between protein allergenicity and the physicochemical properties of allergenic proteins. The PATB also oversees the creation, maintenance and distribution of the Comprehensive Protein Allergen Resource (COMPARE) Database whose use in conjunction bioinformatic tools, offers an effective means for assessing allergenic potential of novel food proteins. PATB's focus on basic allergy research, coupled with bioinformatic methods for allergenic hazard assessment is unique within the scientific community as it supports an ever-increasing awareness of allergenicity among consumers and regulators. Topics to be covered in this workshop will include historic aspects of food allergy assessment, the evolution of bioinformatics as it relates to allergy assessment, and recent changes in regulations regarding novel food proteins.

This educational workshop will cover advances in protein allergy research and inform the use of novel approaches for the identification of potential food allergens. This event will be of interest to government regulators, those involved in food allergy and celiac disease research, and scientists involved in food safety and risk assessment.

Goals & Objectives:

- Evaluate bioinformatics approaches to characterize the allergenicity potential of novel proteins and inform allergy safety assessment.
- Discuss real-world examples of: 1) a product development case-study describing the utility of bioinformatics in protein characterization, and 2) practical applications of the EFSA 2017 Guidance.
- Provide insights from new research, ranging from modifications of allergen epitopes at the single amino-acid level, to using protein structural modeling for allergenicity prediction, to the relation between enzymes and allergenic activity.

Preliminary Agenda

Wednesday, October 17th

- 8:00 – 8:30 AM Continental Breakfast
- Welcome remarks and introduction – Lars Poulsen, University of Copenhagen
- 8:30 – 9:00 AM Overview of contributions and research of the HESI PATB – Greg Ladics, Dupont

Session I: Bioinformatics Approaches to Protein Characterization and Allergy Safety Assessment

- 9:00 – 9:30 AM History of bioinformatics: development of bioinformatics approaches to evaluate novel proteins – Andre Silvanovich, Monsanto
- 9:30 – 10:00 AM Case Study: Use of bioinformatics to inform protein characterization – Kitty Verhoeckx, TNO
- 10:00 – 10:30 AM Break
- 10:30 – 11:00 AM COMPARE Allergen Database: development and use in allergen safety assessment – Lars Poulsen, University of Copenhagen
- 11:00 – 11:30 AM Novel methods to identify allergenicity potential of proteins – Sebastian Maurer-Stroh, A*STAR Bioinformatics Institute (BII), Singapore
- 11:30 – 12:00 PM Using protein domain data resources to define and predict allergenic potential of proteins – Rob Finn, EBI
- 12:00 – 12:45 PM Panel Discussion
- 12:45 – 1:30 PM Lunch

Session II: Other Considerations for Allergen Safety Assessment

- 1:30 – 2:00 PM “Allergen Rebuild” project – Ronald van Ree, AMC
- 2:30 – 3:00 PM Protein structural modeling to predict allergenicity – Tanja Krone, TNO
- 3:00 – 3:30 PM Break
- 3:30 – 4:00 PM Industrial enzymes and allergenic activity: occupational exposure and lessons learned – TBD
- 4:00 – 4:30 PM Cross-reactive carbohydrate determinants – Edzard Spillner, Aarhus University
- 4:30 – 5:15 PM Panel Discussion – Additional experimental assays for consideration

Thursday, October 18th

8:00 – 8:30 AM Continental Breakfast

Session III - Non-IgE Mediated Allergy

8:30 – 9:15 AM Overview of 9 non-IgE mediated diseases and progress in immunology of non-IgE diseases – Antonella Cianferoni, Children’s Hospital of Philadelphia

9:15 – 10:00 AM Examples of peptides of “non-celiac related proteins” that cause disease – Frits Koning, Leiden University

10:00 – 10:30 AM Bioinformatics applications to non-IgE mediated allergies: examples of the application of the EFSA 2017 Guidance – Andre Silvanovich, Monsanto

10:30 – 10:45 AM Break

10:45 – 11:30 AM Panel Discussion – Role of bioinformatics in advancing the knowledge of other, less characterized non-IgE diseases

Session IV – Closing Session

11:30 – 12:00 PM Workshop Wrap-Up

About the Protein Allergens, Toxins, and Bioinformatics (PATB) Committee:

Website: <http://hesiglobal.org/protein-allergens-toxins-and-bioinformatics-committee-patb/> The website contains the PATB fact sheet that describes committee activities, committee publications, information on past workshops, and information on other committee achievements.

About HESI:

HESI is an independent non-profit dedicated to bringing together global teams of scientists from academia, government, industry, and NGOs to solve the most pressing risk and safety challenges facing humans and the environment today.

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