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Comparative Structural Proteomics of Possibly Allergenic New Seed Proteins

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DESCRIPTION

Although food is necessary for life, it can occasionally become a hazard and cause illnesses that can be fatal, such as food allergies, intolerances, and toxicities because of its diverse ingredients. Despite the fact that the processes underlying food toxicity and intolerance are well recognized, the molecular basis of food allergy is poorly understood due to the complex interactions between the host immune system and dietary antigens. Most commonly, food allergies involve an unfavorable immunological (hypersensitivity) reaction to dietary proteins. As a result, food allergy is neither a single disease nor is it caused by a single pathophysiological condition; rather, it comprises a wide spectrum of disorders, ranging from chronic conditions that affect skin, and the gastro-intestinal tract, to sudden, potentially deadly symptoms.

The epidemiological, clinical, and immunological components of the illness have been the focus of the majority of research conducted to far. The basic understanding of the structural contributions of the macromolecular allergens in the formation of allergic reaction is quite basic, although being thoroughly addressed in case of tiny molecule weight xenobiotics-like medicines.

It is well known that not all proteins cause allergic reactions. Only a few distinct protein families contain the proteins linked to allergies. Therefore, it is quite likely that factors specific to a protein's structure affect how allergic it is. Finding the common structural characteristics that might be connected to protein allergenicity is the key challenge. To accomplish this, we used comparative structural proteomics, which involved analyzing proteins that are connected to allergies.

It's interesting to note that the bulk of plant food allergies fall under a small number of protein families. They are often the proteins that protect the species' survival by acting as either seed storage proteins or proteins actively participating in the body's defence. The protein members of the seed storage family can be roughly divided into 2S albumins, 7S vicilins, and 11 S globulins. The storage proteins have a wide range of functions and are very polymorphic. In addition to testing the seed proteins for allergenicity, they offer a wide range of unique protein folds, the study of which will advance our fundamental comprehension of these proteins in the context of physiology and evolution.

Legume seeds and tree nuts are the primary causes of food allergies among the eight main sources. Plant sources are high in a range of allergy-related proteins when compared to animal sources. The importance of proteins from seeds in food, whether it is their nutritional value for cattle or their practical features for food processing, is a major factor in the interest in these proteins. Tree nuts and legume seeds are excellent sources for testing because they are highly rich sources of proteins. Understanding the structure of seed proteins with allergy potential is the goal of the current investigation. The thesis aims to develop a structure-based knowledge of the fundamental physiological processes and evolutionary implications of seed proteins, as well as a correlation between structure and factors influencing protein allergenicity.

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