Allergy: the latest technology in vitro in the service of an appropriate diagnosis

The countless and various allergen sources from both the plant kingdom is to the animal kingdom constantly stimulate our immune system.So the allergy diagnostics laboratory is evolving using new technologies such as molecular biology, nanotechnology to highlight the "cross-reactivity" and "polisensibility ".

The cross-reactivity between allergens is a detectable phenomenon in vitro that allows to highlight the presence of antibodies formed after the sensitization to common molecules present in different substances, whether these pollens or foods, for example, reactivity between birch and apple or those that can be found between different shellfish or between different fish . Therefore the association between pollen allergy and food allergy can manifest clinically both locally, involving the respiratory (rhinitis), skin (conjunctivitis, urticaria), digestive (colic, diarrhea, itching of the pharynx and edema labile), both at the systemic level (angioedema).In patients with food allergy the polisensibility is almost always constantly present and we recommend a thorough diagnostic investigation in order to identify, exclude and remove all sources allergenic.Often the results obtained with the in vitro diagnostic allergologic traditional highlight multiple positive, but only with the use of "molecular diagnostics " you can get and show whether we are facing a "true allergy" or if the patient has many positivity caused structural homology between different proteins.These molecular allergens are grouped into different families according to their molecular conformation and also perform different activities : enzymatic, metabolic, structural or storage causing clinical reactions of varying severity. One of the first cross reactivity highlighted is that between the “birch pollen” and some fruits and vegetables.

In fact the most studied and most common allergenic molecules in the plant world are those of the birch and those present in pollens of plants in the family including fagacee (hazel, alder, hornbeam) and in plant foods such as apple, carrot, celery, cherry, pear. Allergic patients have clinical manifestations frequently report mild local and a good tolerance for cooked food and commercial fruit juice. The food allergy is an allergic disease immune-mediated in different ways: it can be IgE-mediated, non-IgE mediated, mixed IgE and non IgE mediated, cell- mediated. The food intolerance is non immune-mediated: the cause is enzymatic, such as lactose intolerance, or drug such as biogenic amines, or toxic such as sgombridis and idiopathic. Each food originating from plants contains allergenic proteins stable and heat-labile, easily degradable to heat and digestion while each food originating from animals is mostly characterized by allergenic proteins with stability to heat and digestion.

Among the most common food allergies of animal origin is that the egg, especially the albumen sensitivity in pediatric patients showing clinical dermatological conditions like widespread eczema skin.

Human milk, with more than 40 proteins, can also cause moderate allergic reaction and these proteins are heat sensitive and normally the individual develops tolerance within four years. The milk of various ruminants buffalo, cow, sheep, goat is the same or very similar proteins to those of human milk, sharingfeatures structural, functional and biological properties.

The major allergen of shrimp, positive in 80 % of those allergic to shellfish, it is present in the muscle tissue of all living beings that explains the cross-reactivity between the different species: shrimp, prawns, lobster, crab, oysters, snails, squid. The same molecule has a high structural identity even to other invertebrates, such as dust mites and cockroaches. For patients allergic to mites and cockroaches are responsive to the same molecule without coming into contact with fish, so the patient vaccinated for mites likely to become sensitive to shellfish.

One of the most important vegetables that cause allergy is soybeans. Used as nourishment or as flour, flakes, soy milk or squeezed to get the oil, for purposes pharmaceutical, cosmetics and industrial and is also an allergen that causes occupational asthma. The main difficulty in making the diagnosis of true allergy to soya is in being able to distinguish the real positive from the cross reactivity with birch and cross reactivity with peanuts.

Reactions to wheat are connected to a storage protein responsible of severe immediate reactions or phenomena of anaphylaxis induced by exercise, within 4 hours after ingestion and when the body temperature has risen significantly; in winter such episodes occur less easily.

The clinical utility of the assay of this protein is to be able to identify both patients at risk of anaphylaxis to wheat in relation to physical exercise both patients (adolescents) at risk of developing severe and immediate reactions to wheat.

So when you suspect that a food borne allergen is causing allergic reactions, more or less strict, we must remember the different allergenic components, the cross reactions associated with food / pollen and cross reactions between foods.

Dr F. Barocci, Dr M. De Amici, Dr S. Caimmi, Prof. G. L. Marseglia

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