

EDITORIAL



Faces of antibody in immunopathology and immunotherapy

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Pathogen-specific immunity in mammalian hosts is primarily mediated by specialized cell-types known as B and T lymphocytes. The subsets of T lymphocytes play a pivotal role against various pathogens such as intra- and inter-cellular bacteria, viruses, protozoa or worm infections. In contrast, some subsets of T lymphocytes are also involved in immunopathology during autoimmune diseases. One T lymphocyte subset is essential for the development of the B-lymphocyte-mediated antibody generation during pathogenic or antigenic (or foreign molecule) challenge. The antibodies against pathogens facilitate clearance through immunological processes such as opsonization, complement activation, and removal of microbes or antigens through immune complex formation without injuring the host. This issue of *International Reviews of Immunology* describes the allergic role of antibodies developed in a small percentage of the population against some food substances that may result from dysregulation of B lymphocytes due to host genetics, environmental factors, or other responses during the development of host immunity. This issue also describes the therapeutic potential of low molecular weight antibodies, known as nanobodies, derived from camelids (Figure 1).

An inappropriate deleterious immune response generated during the encounter of a foreign substance is known as an allergy. Allergic responses range from mild to severe health problems, or even death. Food allergies are prevalent in early age, but adults can also develop allergies to some food substances. The first review article on this issue by Hong Lim et al. [1] discusses the peanut allergy, which is triggered by Immunoglobulin E (IgE). The article extensively discusses the recent immunotherapy strategies and delivery routes for immunotherapy in individuals with a peanut allergy. The article aims not only to broaden the current understanding of peanut allergies, but also introduces new avenues of therapy to improve the quality of life for affected individuals. This article is useful to a broad readership working in basic immunology, particularly researchers working in allergy immunology and the clinicians treating patients with food allergies (Figure 1).

Gluten is a protein present in major food grains such as wheat, barley, and rye; many individuals develop a gluten intolerance or sensitivity. Individuals with a gluten intolerance or sensitivity start developing an antibody against gluten. Upon intake of gluten-containing food, the gluten-specific antibodies start damaging gut lining, which causes Coeliac disease. The action of gluten antibodies is not limited to gut pathology; it also affects other organ system and physiological function. The second review article in this issue, by Graziano and Rossi [2], focuses on gluten sensitivity. The authors describe two contrasting features associated with gluten sensitivity: the cutaneous manifestations with Coeliac disease, and cutaneous manifestations without Coeliac disease, also known as non-Coeliac gluten sensitivity. The review also discusses how the arms of immunity shape the disease, and various known and unknown immunological facets link to gluten sensitivity. This review may be useful to clinical researchers and fundamental researchers who are working in the fields of clinical immunology, allergy, and human physiology (Figure 1).

Basic understanding of cellular processes and revolution in molecular biology methods for gene cloning and manipulation enable the investigation of structural and functional aspects of the desired molecule, particularly proteins. These methods and tools are refined to the extent that it is easy to produce the protein with therapeutic potentials. Currently, several therapeutic proteins such as a hormones, clotting factors, and so on are used to treat patients. However, these therapeutic proteins have a limitation, as they may be recognized as foreign by the patient's immune system and trigger protein-specific immune responses, even though the protein is of human origin. The third review article in this issue by Faraji et al. [3] discusses the immune responses elicited against therapeutic proteins in recipient patients. The authors also discuss the host factors and the factors associated with therapeutic proteins, which influence the development of such immune responses in recipients. Based on current knowledge, the authors suggested

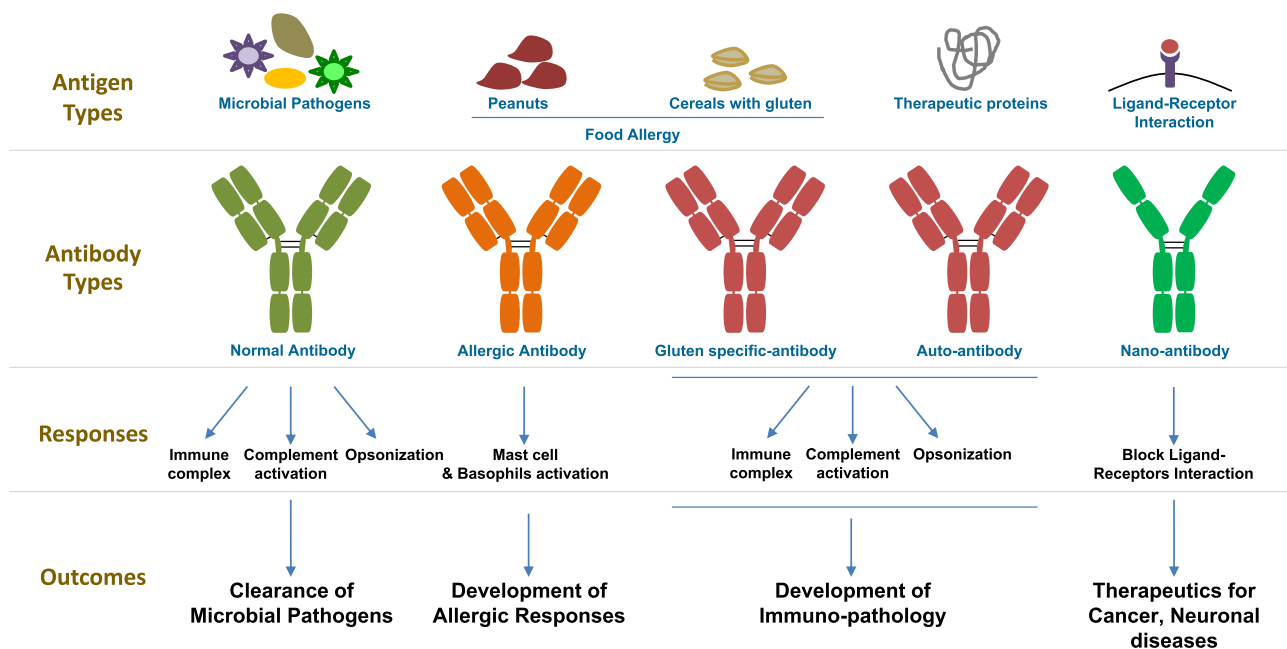


Figure 1. Antibodies in immunopathology and immunotherapy.

several requirements to overcome these problems associated with the therapeutic molecules (Figure 1).

The antibody has diverse applications in therapy and diagnosis for an array of infectious and noninfectious diseases. The generation of single epitope-specific antibody known as a monoclonal antibody (mAb) made a big leap in antibody-based immunotherapy for many complex diseases, including cancer and autoimmune diseases. However, it is associated with several immunological and non-immunological challenges because it is generated in mice. In the recent past, heavy-chain antibodies known as nanobodies have been discovered in camelids and suggest a promising role in therapeutics due to their small size and low molecular weight. The last review article of this issue by Kazemi-Lomedasht et al. [4] describes the properties and advantages of these nanobodies and ease in production for therapeutic applications. However, careful

and stringent evaluations are needed because these nanobodies are originated from the camelids (Figure 1).

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