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EDITORIAL

Balancing immune tolerance and immune responses

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Regulation is crucial for streamline function of immunity during infection, controlling growth of transformed cells, tolerance to commensal microbes, and tolerance at immune privilege sites. It is a complex process and takes place at signaling levels as well as the cellular level. The regulation at signaling level is mediated through molecular interactions of various transducer molecules and at the cellular level it is mediated through cell to cell interaction via cytokines or chemokines secreted by them. The breakdown of molecular regulatory circuit results in either low response to invading microbes or unwanted heightened responses or autoimmune diseases. This issue of *International Reviews of Immunology* describes, how physical workout, lowers inflammatory responses through pattern-recognition receptors of natural immunity and how regulatory B lymphocytes maintain low immune responses during pregnancy and its link with the hormones predominantly secreted during pregnancy. The issue also discusses the link among B cells, antibodies and neurological diseases in the central nervous system (Figure 1).

Sensing signature molecules of pathogens, also known as pathogen-associated molecular patterns (PAMPs) by innate immune sensors, induces cytokines and chemokines to develop an antimicrobial state. On another hand, sensing of host molecules, known as damage or danger-associated molecular pattern by innate sensors, result in autoimmune inflammatory diseases. In recent years, the crosstalk among metabolic products produced during different physical states and associated metabolic diseases and innate immunity have been investigated to greater extant. The first review article of this issue by Collaoa et al. discusses how physical or metabolic state is linked with innate immunity, particularly Toll-like receptor-mediated immune responses. The authors also discuss the beneficial aspects of physical activities in light of

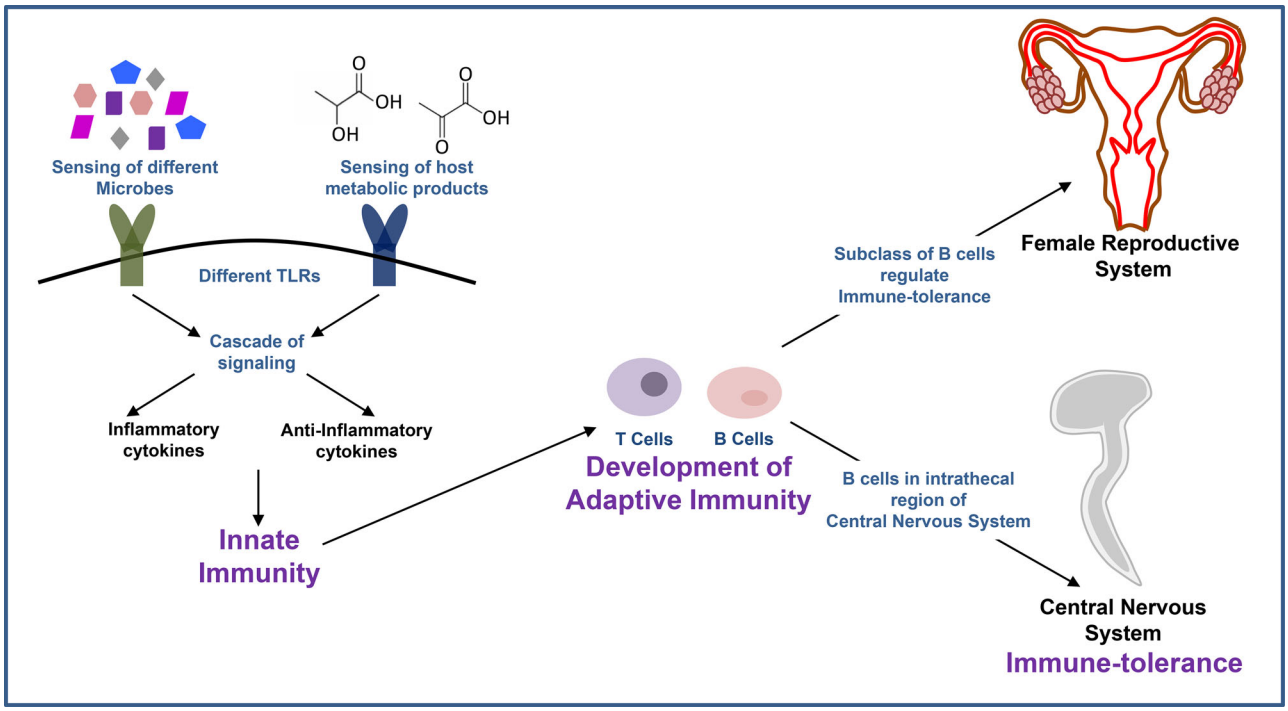

Figure 1. Balancing tolerance and inflammation.

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innate immunity.[1] The article is not only interesting to the immunologist, but it is also interesting to researchers working in sports medicine, translational immunology, and human physiology (Figure 1).

Several anatomical sites in the human body are challenged by biotic and abiotic entities. However, it does not induce immune responses in terms of inflammation and is called immune privilege sites. Among these sites, the female reproductive tract is one of the unique immune privilege sites because invasion of disease-causing microbes promptly induces inflammation/immune responses to overcome the infection, although sperm antigens do not cause any inflammatory responses. Additionally, during pregnancy the substantial changes in physiology and immunity are taking place in the body of the female to support fetal growth. The second review of this issue by Dutta et al. discusses the immune factors involved in redefining and reshaping the immunity of a pregnant female. The article particularly focuses on regulatory B cells that play a pivotal role in pregnancy for creating a tolerant environment to invading microbes.[2] The article will be interesting to broad readers of immunology and gynecology or scientists working on reproductive immunology to learn the levels of immune regulation (Figure 1).

The central nervous system (CNS) was considered as immunologically less active or an inactive region of the human body. However, recently it has been shown that neuronal cells express various cell surface and intracellular sensors and induces responses upon stimulation with PAMPs. Moreover, it is evident that CNS has subtypes of B and T lymphocytes, which is crucial in immunity, immunopathology during microbial infection, autoimmune diseases, and in noninfectious diseases such as Parkinson's disease and Alzheimer's disease. The last article of this issue by Negia et al. discusses the juxtaposition of immunity and the nervous system and its role in diseases.[3] This article discusses the B lymphocytes and immunoglobulin biology in the intrathecal region of CNS. This article will be useful to broad readers of neuroimmunology and researchers of fundamentals aspects of infectious, noninfectious neurological diseases or neurological injuries (Figure 1).

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