Commentary

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Overview of Interdigitating Dendritic Cell

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Description

Functional food/feed is not experiencing the breakthrough that was expected 10 years ago. The kind of mucosal immune status that is needed for optimal production protection or performance is not known. It is true that these goals are quite often contradictory goals: indeed an alerted immune status, even at mucosal surfaces, is often not beneficial for production or performance. Induction and maintenance (continuous alertness) of protective immune mechanisms will always be at the cost of energy which will consequently be lost for productive or other purposes. Nonetheless, a certain degree of mucosal immune alertness is needed to protect against chronic and acute infectious diseases that can cause major losses in production. Conversely overacting immune responses can be immune pathological and detrimental for the host. Therefore we will discuss factors that can direct immune responses towards the mucosae can improve a general mucosal alertness or can reduce excess inflammation. A fundamental knowledge on the different nature of the immune competent cells, their intricate communication, their induction sites and communication signals is required for understanding the immune orchestra and its music and for dietary modulation of the tone of immune music.

Immune orchestra is an immune response, produced by an orchestra under the guidance of a conductor the professional antigen-presenting cell such as the Interdigitating Dendritic Cell (IDC) who interprets the score (antigen). The immune responses can be divided in innate immunity, responsible for the first line of defense and induction of immune responses, and acquired immunity, responsible for antigen-specific memory. Innate immunity is mediated by the 'so-called' antigen a specific immune cells such as the Dendritic Cell (DC), macrophages and neutrophils (microphages). However, their important immune role is not restricted to a first-line defense but lays also in the triggering of alarm signals (interpretation of the score and direction of the music) which are crucial for initiating and directing subsequent antigen a-specific and specific defense reactions. Moreover, recent data have shown that these 'so-called' a-specific cells, as well as other cells, are not as a-specific: indeed they can recognize and differentiate specific Pathogen Associated Molecular Patterns (PAMPs) with Pathogen Recognition Receptors (PRRs) (see next chapter). Depending on the Pathogen Associated Molecular Patterns (PAMP) recognized, the 1 Dendritic Cells (DC), as well as other Pathogen Associated Molecular Patterns (PAMP) activated cells, can direct the immune response into opposite ways with important implications on the inflammatory response, production, protection and performance. The antigen specific cells (members of the orchestra) which have an immunological memory and secrete immune active molecules are divided in two main populations, the B and T cells. Their antigen specificity is mediated by cell surface receptors (their instruments), the B Cell Receptor (BCR) and the T Cell Receptor (TCR), respectively. B cells recognize with their BCR directly a specific epitope of an unprocessed antigen. T cells on the other hand, recognize with their T Cell Receptor (TCR), epitopes of a processed. The induction of an immune response in secondary lymphoid organs

The induction of an antigen-specific immune response happens in the secondary lymphoid organs such as the tissue-draining lymph nodes and the blood-filtering spleen. It is here that Interdigitating Dendritic Cell (IDC) is key players in the activation of naive T cells and the modulation of the response. Depending on their state and type of activation, they will induce naive T cells into different effector T cells such as Th1, Th2 or regulatory T cells (Tolerance). These effector T cells will then activate specifically those B cells and macrophages presenting the same epitopes as did their inducing Interdigitating Dendritic Cell (IDC) before. One could say that B cells and macrophages present antigen to T cells for their own benefit because they need cytokines and other stimulatory molecules from the T cell to be activated for production of antibodies and enzymes.