

## The Double Role of Nutrients in Immunity

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**Abstract:** *Background* Nutrients are the substances found in food which drive biological activity, and are essential for the human body. Dietary nutrients may be converted into metabolites by intestinal microbes that serve as biologically active molecules affecting regulatory functions in the host.

*Objectives* To demonstrate role of nutrients as functional foods in the management of immunity.

*Materials and methods* This includes the role of macronutrients, micronutrients, and the gut microbiome in mediating immunological effects. Nutritional modulation of the immune system has applications within the clinical setting, but can also have a role in healthy populations, acting to reduce or delay the onset of immune-mediated chronic diseases. Ongoing research in this field will ultimately lead to a better understanding of the role of diet and nutrients in immune function

*Results* Probiotics may restore the composition of the gut microbiome and introduce beneficial functions to gut microbial communities, resulting in amelioration or prevention of gut inflammation and other intestinal or systemic disease phenotypes. A well-functioning immune system is critical for survival. The immune system must be constantly alert, monitoring for signs of invasion or danger. Cells of the immune system must be able to distinguish self from non-self and furthermore discriminate between non-self molecules which are harmful (e.g., those from pathogens) and innocuous non-self molecules (e.g., from food).

*Conclusion* This presentation describes how diet and intestinal luminal conversion by gut microbes play a role in immune-mediated chronic diseases.

**Key words:** nutrients, gut microbiota, immunomodulation

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### Background

The immune system protects the host against infection from pathological microorganisms and provides constant surveillance for malignant cells that arise over a lifetime. The immune system is able to develop appropriate tolerance to self-proteins, circulating macromolecules, self-cells, and tissues, and to harmless environmental molecules

Nutrients are the substances found in food which drive biological activity, and are essential for the human body. Dietary nutrients may be converted into metabolites by intestinal microbes that serve as biologically active molecules affecting regulatory functions in the host (1).

Individual heterogeneity regarding the intensity of immunological responses exists, largely dependent on genetics, environment, lifestyle, nutrition, and the interaction of these factors. Nutritional immunology is a field of immunology that describes the influence of nutrition on the immune system, antiviral activity, and associated protective functions

Moreover, crosstalk between commensals and the immune system is now recognized because microorganisms can modulate both innate and adaptive immune responses. The microbiome is vital for immune system development and homeostasis. Gut microbiome and its metabolites might manipulate the local immune responses as well as those of the systemic immune system (2).

Metabolites produced by pathogenic microbes that cross the intestinal barrier trigger pathological conditions, while metabolites produced by saprophytic microbes cross the intestinal barrier and favor the body.

The immune system plays a vital role in keeping the body healthy by providing a fine balance between the elimination of invading pathogens and the maintenance of tolerance to healthy self-tissue. It is now evident that the gut microbiota has a profound effect on the host immune system and can induce autoimmune-related diseases (3). The interactions between the gut microbiota and host immunity are complex, dynamic and context-dependent (4). The gut microbiota and its metabolites have been shown to influence immune functions and immune homeostasis both locally and systemically. Antibiotic treatments, vaccinations and hygiene practices all can alter gut microbiota composition (5).

### **Objective**

The objective was to demonstrate role of nutrients as functional foods in the management of immunity, to demonstrate role of Imuniplant in the management of disfunctional immune responses. The direct modulation of gut microbiome that could diminish inflammatory responses and ameliorate adaptive immune responses.

### **Materials and methods**

This includes the role of macronutrients, micronutrients, and the gut microbiome in mediating immunological effects. Nutritional modulation of the immune system has applications within the clinical setting, but can also have a role in healthy populations, acting to reduce or delay the onset of immune-mediated chronic diseases. Ongoing research in this field will ultimately lead to a better understanding of the role of diet and nutrients in immune function. Deficiency in

macronutrients and/or micronutrients causes impairment of immune function, which usually can be reversed by nutrient repletion.



Fig. 1 Imuniplant tea is a natural immunomodulator of the human microbiome

Imuniplant tea for autoimmune and metabolic diseases, natural immunomodulator of the human microbiome. Imuniplant tea is a natural genetic immunomodulator of the human microbiome that contributes to the removal of microbiota dysbiosis and thus autoimmune and metabolic diseases can be prevented and removed. Imuniplant tea contains: cultivated medicinal plants=35%; plant from the spontaneous flora=25%; buds of fruit trees=15%; flowers of fruit trees=15%; berries=10%

Properties: natural genetic immunomodulator, it regulates cellular metabolism, it regulates the central nervous system; it modulates the activity of important neurotransmitters, physically and mentally energizing, remineralizing, it increases resistance to fatigue, natural modulator of the intestinal microbiome. Indicated in: autoimmune diseases, metabolic disorders, diseases of the internal organs (liver, kidneys, lungs, hyperacidity), metabolic acidosis, metabolic syndrome, microbiome dysbiosis.

Form of presentation: dry and ground powder packed in tea bags of 1 gram each. 30 envelopes/pack.

Administration: 740 ml of tea that is drunk daily

Duration of treatment: in relation to the evolution of the disease (2-6 months)

Contraindications there are not.

Side effects: they did not appear after long-term use.

Terms of validity: 2 years from the date on the prospectus; it is kept in the dark and at a constant temperature

Other specifications: it can be used in parallel with the allopathic medication established by the attending physician

## Results

Imuniplant modulation of the immune system has applications within the clinical setting, but can also have a role in the aging population, acting to reduce or delay the onset of immune-mediated chronic diseases. Ongoing research in this field will ultimately lead to a better understanding of the role of diet and Imuniplant in immune function and inflammation. A dysfunctional immune system can cause a whole range of pro-inflammatory conditions like impaired gut function, weakened responses to new infection (6).

Imuniplant may restore the composition of the gut microbiome and introduce beneficial functions to gut microbial communities, resulting in amelioration or prevention of gut inflammation and other systemic diseases (7).

An immune response is a reaction which occurs within an organism for the purpose of defending against foreign invaders.

There are two distinct aspects of the immune response, the innate and the adaptive, which work together to protect against pathogens. Alterations in the gut microbiome affect the immune system balance via the production of metabolites. Microbes coexist with humans and play an important role in regulating health and disease. Immune dysregulation is any proposed or confirmed breakdown or maladaptive change in molecular control of immune system processes (8).

Memory T and memory B cells are also produced in the case that the same pathogen enters the organism again. The innate immune response is an organism's first response to foreign invaders. The innate immune system consists of physical barriers such as skin and mucous membranes, various cell types like neutrophils, macrophages, and monocytes, and soluble factors including cytokines and complement. For example, dysregulation is a component in the pathogenesis of autoimmune diseases and some cancers. The microbiome is vital for immune system development and homeostasis. Immune deficiencies may be temporary or permanent (9).

Temporary immune deficiency can be caused by a variety of sources that weaken the immune system. Pregnancy also suppresses the maternal immune system, increasing susceptibility to infections by common microbes. Probiotics may restore the composition of the gut microbiome and introduce beneficial functions to gut microbial communities, resulting in amelioration or prevention of gut inflammation and other intestinal or systemic disease phenotypes.

A well-functioning immune system is critical for survival. The immune system must be constantly alert, monitoring for signs of invasion or danger. Cells of the immune system must be able to distinguish self from non-self and furthermore discriminate between non-self molecules which are harmful (e.g., those from pathogens) and innocuous non-self molecules (e.g., from food).

## Conclusions

This presentation describes how diet and intestinal luminal conversion by gut microbes play a role in immune-mediated chronic diseases. The gut microbiota is considered to be a master regulator of immune homeostasis. Besides modifying the gut microbiota, Imuniplant modulates the immune system in elderly people. Probiotics have been widely reported to act on the immune system. They are living microorganisms with immunomodulatory effects that stimulate Th1 cytokines and suppress the Th2 response, which are being researched for the treatment of several diseases. Probiotics most commonly used are part of the intestinal microbiota like lactobacilli, bifidobacteria, and enterococci.

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