

Commensal microbiota: realities and vaccine making potential

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Intestinal microbiota in terms of diversity and quantitative content of microorganisms (bacteria, fungi, protozoa and viruses) significantly exceeds all other loci of microbial localization in the human body. This is due both to the peculiarities of the intestinal tube and to the special role of the intestinal microbiota in the functioning of human organs and systems. It is no coincidence that the intestinal microbiota is actively involved in the metabolic function of the intestine, determines the functioning of endocrine organs, displaces exogenous pathogens, and regulates the immune functions of the body.

Under the conditions of a healthy organism, microbiota components provide the right balance of response to exogenous pro- and anti-inflammatory stimuli by regulating the production of cytokines and secretory immunoglobulins (mainly IgA). Components of the microbiota are capable of stimulating the immunological apparatus of the intestine, in particular, a complex of specific cells of the small intestine, mainly located in Peyer's patches.

A feature of the immune response to bacterial stimuli in reality triggers a response not only in the intestine itself, but also on other mucous membranes of the body: the nasopharynx, oral cavity, and urogenital system. This feature of mucosal immunity opens up opportunities for the formation of specific immune responses to an orally administered antigen not only in the intestine, but also in other parts of the body, which are most often the “gates” of infection caused by pathogenic viruses and bacteria.

In this respect, commensal intestinal microorganisms may function as vectors for presenting vaccine antigens to the immune system, and there is a real opportunity to create new vaccine preparations based on bacteria. It is known that probiotic strains are able to successfully maintain viability, passing through the gastric barrier and colonizing the small and large intestine for a long time. IEM has developed an approach that allows, by introducing the genes of pathogenic bacteria and viruses into the genome of lactic acid bacteria, to form a specific immune response against various pathogens. Features of the construction and functioning of mucosal vaccines against various pathogens, including the SARS-Cov-2 virus, discussed.

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