ISSN: 2155-9597
Journal of Bacteriology & Parasitology

OPEN ACCESS Freely available online

Opinion Article

Symbiotic Interaction between Gut Microflora and Immune System

Xinwang Li*

Department of Microbiology, The Second Affiliated Hospital of Nanchang University, Nanchang, China

DESCRIPTION

Millions of microorganisms reside in the digestive system, which is the main and most crucial area for bacterial colonisation. On one hand, the large bacterial population in gut tissues could potentially cause opportunistic invasions that result in sepsis and other health problems like inflammation. In order to sustain the symbiotic interaction between the host and the microbiota, the immune system has evolved and made adjustments. On the other hand, it is important to remember that the gut microbiota also plays an immunoregulatory role in preserving host immunological homeostasis. In addition, there is a lot of interest in the relationship between the immune system and either the microbiota or probiotics as it relates to therapeutic applications.

The intestine is a special organ that frequently interacts with microbes. The corrosive gastric acid environment kills and destroys the majority of microorganisms, although some can still pass through the gut. The fundamental purpose of the many microvilli (also known as brush border), which cover the gut surface, is the absorption of nutrients. Glycocalyx is a molecule that covers the brush boundary. Microvilli could stop the entry of pathogenic bacteria because glycocalyx is a negatively charged, mucoid glycoprotein complex. Additionally, apical tight junctions of intestinal epithelial cells make sure that infections cannot enter through the intestine.

Vast populations of immune cells reside within these and the underlying structures as Peyer's patches, the most important intestinal sentinels are made up of macrophages, dendritic cells, interfollicular areas, and B-cell follicles.

A significant function of Peyer's patch is sampling of particulate antigens, mostly bacteria and food through a specialized phagocytic cells termed as M cells, which can transport material from lumen to subepithelial dome. Dendritic cells in the area can then collect antigens and deliver them to immune effector cells. However, in the setting of ingesting dietary antigens, CD4+ T cells play a major role in mediating intestinal tolerance. These Treg cells release TGF-and IL-10, both of which have an anti-inflammatory effect on immune cells in lamina propria. Food allergies and inflammatory bowel disease are examples of gut pathologies that result from a breakdown in the immunological hemostasis pathway. Mucin, antimicrobial peptides, and secretory IgA are examples of intestinal barriers that keep microbes and the gut from coming into direct contact.

Damage to the barrier can result in bacterial invasion, epithelial activation, and inflammatory reactions. Inflammatory cytokines like IL-6, IL-12, and IL-23 are released when proinflammatory antigen presenting macrophages and dendritic cells are activated. Effector T-cell subsets known as Th1 and Th17 are polarised and release pro-inflammatory cytokines like: TNF-, IFN-, and IL-17. Additionally, neutrophils are drawn in and go through a dramatic process of cell death known as NETosis, which results in tissue damage and the formation of Neutrophil Extracellular Traps (NETs).

Intestine comprises of large number of microorganisms, which are primarily spread in the colon. In Adults colons are estimated to contain around 40 trillion bacteria, including archaebacteria, along with some fungi and protozoa. An average of 600,000 gut microbial genes is carried by each person. Individuals differ significantly in terms of bacterial strain diversity.

Each person has a distinct intestinal microflora that is influenced by dietary preferences, host genotype, and initial colonisation by vertical transmission at birth. In healthy people, the bacterial flora in faeces remains constant over time. Over 90% of all microorganisms in human gut ecology belong to two major bacterial groups called Bacteroidetes and Firmicutes. The residues are of Actinobacteria, Proteobacteria, Verrucomicrobia, and Fusobacteria. When taken in sufficient quantities, probiotics are microorganisms that are good for health. The probiotics that are most frequently used in clinical practise are Lactobacillus and Bifidobacteria. Additionally, frequently utilised are yeasts like *Saccharomyces boulardii* and Bacilli species. The types of bacteria that colonise the intestine are directly related to the function of probiotics work.

An important element that affects the host's health is interaction of probiotics with host cells and gut flora. Probiotics have an effect on the intestinal environment by controlling gut mucosal

Correspondence to: Xinwang Li, Department of Microbiology, The Second Affiliated Hospital of Nanchang University, Nanchang, China, E-mail: lixinwang@gmail.com

Received: 29-Aug-2022, Manuscript No. JBP-22-18130; **Editor assigned:** 01-Sep-2022, Pre QC No. JBP-22-18130 (PQ); **Reviewed:** 15-Sep-2022, QC No. JBP-22-18130; **Revised:** 22-Sep-2022, Manuscript No. JBP-22-18130 (R); **Published:** 29-Sep-2022, DOI: 10.35248/2155-9597.22.13.431.

Citation: Li X (2022) Symbiotic Interaction between Gut Microflora and Immune System. J Bacteriol Parasitol. 13:431.

immunity, by interacting with commensal bacteria or potentially dangerous pathogens, by generating metabolites (such as short-chain fatty acids and bile acids), and by acting on host cells through signalling pathways. These mechanisms can assist in: the reduction and eradication of potential pathogens; the increase of antigen-specific immune response; the improvement of intestinal milieu; the strengthening of intestinal barrier; and the reduction of inflammation.

The digestive disorders, Inflammatory Bowel Disease (IBD), functional dyspepsia, gastroesophageal reflux disease, and nonalcoholic fatty liver disease are all influenced by a disturbed intestinal immune function. IBD patients have a decline in regulatory species and an increase in potentially aggressive gut microbial strains.

CONCLUSION

Despite the wide variety and broad therapeutic use of probiotics, the immunoregulatory mechanism is still not well understood. The *in-vivo* processes of probiotics administered orally or by enema therapy, including residence time, colonisation, and reproduction, impact on the body's natural gut flora and microbial interactions, need further research. Furthermore, in order to develop new therapeutic applications, it is beneficial to concentrate on how the immune system interacts with the microbiota or probiotics. In addition to immune-modulators and anti-TNF medications, probiotics, prebiotics, and faecal microbial transplantation have all been tried out on patients with IBD.