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Commentary

Importance and Functions of Gut Microbiota

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DESCRIPTION

Bacteria, *archaea*, fungi, and viruses that inhabit an animal's digestive system are known as the gut microbiota. The collection of all gut microbiota genomes is known as the gastrointestinal metgenome, sometimes known as the microbiome. The human gut is the place where majority of the microbiota is located. The gut microbiota has a wide range of functions, including factors like colonization, pathogen resistance, maintaining the intestinal epithelium, metabolizing nutritional and medicinal substances, regulating immunological function, and even behaviour through the gut-brain axis. In different regions of the digestive tract, the gut microbiota's microbial composition varies.

The colon has the highest density of microbes of any environment found on earth, with between 300 and 1000 distinct species present. The majority and most investigated component up to this point is bacteria, which make up roughly 30 or 40 species and represent for 99% of gut bacteria. Bacteria can make up to 60% of the dry mass of faeces. Although anaerobes make up more than 99% of the bacteria in the gut, large densities of aerobic bacteria can be found in the cecum.

Human genome is thought to be present in the human gut microbiota. In relative to other parts of the body, the gut microbiota of humans contains the most bacteria and species. In humans, the intestinal epithelium and the intestinal mucosal barrier that it secretes developed which is tolerant and even supportive of the gut flora acts as a barrier to pathogenic organisms, by the time the gut flora has been developed one to two years after birth.

Importance of gut microbiota

Some gut flora and humans have a mutualistic interaction rather than a commensal one (harmless coexistence). By converting dietary fibre into Short-Chain Fatty Acids (SCFAs), such acetic acid and butyric acid, which are eventually absorbed by the host, certain human gut microbes help the host. Additionally, intestinal bacteria are involved in the synthesis of vitamins B and K as well as the metabolism of bile acids, sterols, and xenobiotic. The SCFAs and other substances make similar systemic importance to hormones, and the gut flora itself seems to operate like an endocrine organ. Dysregulation of the gut flora has also been linked to a variety of inflammatory and autoimmune disorders. Human gut microbiota composition varies throughout time, depending on dietary changes and alterations in general health. The probiotic bacteria strains that were the most likely to be effective for treating certain central nervous system illnesses had undergone preclinical and small human trials. In the human gut, *Bacillota* (Firmicutes), *Bacteroidota, Actinomycetota,* and *Pseudomonadota* are the four most prevalent bacterial phyla. *Bacteroides*, *Clostridium*, *Faecalibacterium*, *Eubacterium*, *Ruminococcus*, *Peptococcus*, *Peptostreptococcus*, *and Bifidobacterium* are the most common bacterial genera. There are also lower amounts of other genera including *Lactobacillus* and *Escherichia coli*.

Functions

Bacteroides species individually try to compensate around 30% of all the bacteria in the gut, indicating that this genus is particularly crucial to the host's health. Candida, Saccharomyces, *Aspergillus, Penicillium*, Rhodotorula, Trametes, Pleospora, Sclerotinia, Bullera, and other fungal genera have all been found in the gut.

Candida is most frequently found in people with cirrhosis from hepatitis B and chronic hepatitis B, while rhodotorula is most frequently found in individuals suffering from inflammatory bowel disease. Another substantial group of gut flora known as archaea. *Archaea* plays a crucial role in the metabolism of the bacterial by-products of fermentation. Industrialization is linked to changes in the microbiota, and a lack of diversity may result in the extinction of some species.

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