DANONE NUTRICIA ACADEMY

Gut Microbiota
The Nutritional Connection

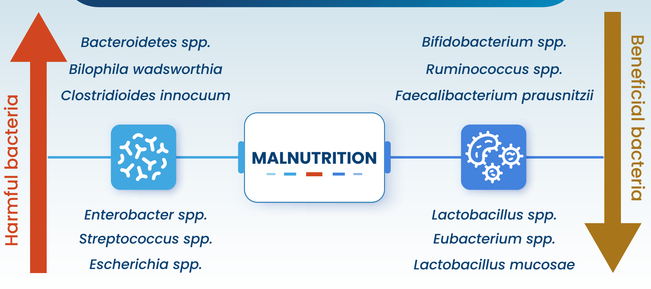
Role of nutrients in gut health

Dietary elements influencing gut health and microbiota are:

Dietary elements with positive influence	Role
Dietary fiber	▷ A key nutrient for maintaining the diversity of gut microbiota[1] ▷ Maintains the integrity of the mucus barrier[1]
Dietary proteins and amino acids	▷ Regulate the amounts and profile of bacterial metabolites[1] ▷ Important for intestinal mucosal homeostasis[1]
Retinoids	▷ Crucial for mucin production, cell growth, and differentiation[2] ▷ Affect the gut microbiome by impacting the intestinal mucosal barrier[2]
Vitamin D	▷ Critical role in the regulation of gut microbiota[1] ▷ Provides protection against IBD[1]
Vitamin E	▷ Promotes plasma membrane repair[2] ▷ Reduces the pathogenicity of Citrobacter[2]
Vitamin C	▷ *In vitro* antimicrobial effects against bacteria, fungi, and viruses[2] ▷ Modulates intestinal microbial communities[2]
Vitamin B2	▷ Reduces luminal ROS[2] ▷ Creates an environment that positively affects the gut microbiome composition[2]
Polyphenols	▷ Increase intestinal barrier protectors (*Bifidobacterium spp.* and *Lactobacillus*)[3] ▷ Increase butyrate-producing bacteria (*Faecalibacterium prausnitzii* and *Roseburia*)[3] ▷ Decrease lipopolysaccharide producers (*Escherichia coli* and *Enterobacter cloacae*)[3]
Selenium	Promotes the growth of beneficial bacteria[2]

Dietary elements with negative influence	Role
High-fat diet	Reduces diversity of the gut microbiota[1]
Artificial sweeteners	▷ Overgrowth of Proteobacteria and *Escherichia coli*[3] ▷ Significantly lower *Bacteroides, Clostridia,* and total aerobic bacteria[3]
Emulsifiers	▷ Reduce microbial diversity (*Bacteroidales* and *Verrucomicrobia*)[3] ▷ Increase inflammation-promoting Proteobacteria[3]

How does malnutrition alter gut microbiota?[2]



Key takeaways

- Food components and endogenous metabolites directly impact the gut microbiota and gut epithelial barrier, thus playing a pivotal role in gut health.
- Childhood malnutrition is reported to alter the gut microbiota significantly.

Abbreviations
IBD: Inflammatory bowel disease; **ROS:** Reactive oxygen species

References
1. Zhang P. Int J Mol Sci. 2022 Aug 24;23(17):9588.
2. Iddrisu I et al., Nutrients. 2021 Aug 8;13(8):2727.
3. Valdes AM et al., BMJ. 2018 Jun 13;361:k2179.