Interactions Between the Microbiota and the Host - A Narrative Review

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The intestine is the most densely colonized region of the body, inhabited by a rich and diverse community of microbes. The functional significance of the intestinal microbiota is not yet fully understood, but it is known that the microbiota is implicated in numerous physiological processes of the host such as metabolism, nutrition, immune system development and regulation of behavior and mood. This article reviews recent findings on how individual bacteria of the intestinal microbiota affect health or disease in its hosts, including the molecular interactions, and potential therapeutic opportunities.
Microbiota-microbiota and microbiota-host interactions are mediated by direct cell contact and by metabolites either produced by bacteria; or produced by the host or the environment and metabolized by bacteria. Among them are short-chain fatty acid, the most common ones being butyrate, propionate, and acetate. Other examples include polyamines, linoleic acid metabolites, tryptophan metabolites, trimethylamin-N-oxide, vitamins, and secondary bile acids. These metabolites are involved in regulating the cell cycle, neurobiological signaling, cholesterol and bile acid metabolism, immune responses, and responses to antioxidants. Furthermore, bacterial compounds such as lipopolysaccharides, lipoteichoic acid, peptidoglycans, flagellin and toxins modulate the inflammatory response of the host in physiological and pathological processes.
Understanding the host-microbiota pathways and their modulation will allow identification of individualized therapeutic targets for many diseases. This overview helps to facilitate and promote further research in this field.

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