

Microbiome

What is a microbiome?

A microbiome is the microbial community associated with an animal, plant or other host or with a terrestrial, aquatic or other ecosystem. Microbiomes include a variety of microscopic life: bacteria, archaea, fungi, protists (protozoa and algae), and viruses.

Microbiomes perform life-sustaining functions at staggering scales on a daily basis. While the human microbiome is attracting much attention, it is only one of many such microbial ecosystems, including those in all the different environments around us.

Why is it important?

Microbiome research is expanding exponentially and is poised to revolutionize our understanding of organism and environmental interactions. The expansion of microbiome research is largely founded on genomic technologies and has the potential for major advances across many economic sectors including human health, forestry, fisheries and aquaculture, agrifoods, mining, energy and environment. These advances in our understanding of microbiomes in, and between, these sectors have great potential to yield important social, environmental, and economic benefits.

An improved understanding of the roles of populations of microbes, and their interactions, will improve our understanding of how diseases develop, progress and are overcome (or not) by the hosts' immune systems.

What does the microbiome have to do with health?

The microbiome is essential for human development, immunity and nutrition. The

bacteria living in and on us are not invaders, but beneficial colonizers. Autoimmune diseases such as diabetes, rheumatoid arthritis, muscular dystrophy, multiple sclerosis, and fibromyalgia are associated with dysfunction in the microbiome.

Initiatives like the Human Microbiome Project in the US and others are exploring the role of the human microbiome and its impact on human health and disease.

Challenges

Some questions surrounding the microbiome are similar to other areas which involve the collection and storage of biological samples. While it is important to share data so that we can understand, for example, what is a healthy microbiome, we also need to protect individual privacy and appropriately consent individuals involved.

Another challenge is to verify and regulate products claiming to evaluate and/or improve your microbiome as they emerge, identifying those with actual evidence of health benefits.

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Resources

<https://www.hmpdacc.org/health/ethical.php>

https://depts.washington.edu/ceeh/downloads/FF_Microbiome.pdf

<https://www.nature.com/news/microbiomes-raise-privacy-concerns-1.17527>

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