

# **The hologenome concept: role of microbiota in the fitness and evolution of humans, animals and plants**

All plants, animals and humans are holobionts, consisting of the host and diverse symbiotic microbiota (the microbiome), including bacteria, viruses, and eukaryotic microorganisms. After discussing the composition of microbiomes, the numerous roles of microbiotas in the fitness of holobionts will be presented. We will then discuss the modes of transmission of microbiota between generations and the role of microbiota in genetic variation and evolution.

Modification of microbiomes by probiotics, prebiotics, microbial transplantation and phage therapy can prevent and cure certain diseases. The following is a list of the course lectures:

1. Introduction: Symbioses and the Hologenome Concept
2. Abundance and Diversity of Microbiota
3. Microbiotas are Part of Holobiont Fitness
4. Microbiotas are Transmitted between Holobiont Generations
5. Variation in Holobionts
6. Viruses are part of Holobionts
7. Origin of Prokaryotes and Eukaryotes
8. Evolution of Holobionts and Speciation
9. Pathogens as Symbionts
10. Prebiotics, Probiotics, Synbiotics and Phage Therapy
11. Unresolved Questions and Future Research