

Comparison of the microbiota of human gut with other animals

Shillpa Nair

The animal kingdom is extremely vast and diverse, yet they have many common features with regards to their microbiota. The gastrointestinal tract of humans has trillions of bacteria, which are of vital importance to the proper functioning of the body. They are not only essential for the digestion and absorption of nutrients but even play a part in the immune system. Even very simple organisms such as nematodes have gut microbiota; therefore, restricting comparisons only to those species which are closely related to humans would be limiting. Despite this fact, most studies on the gut microbiome have been conducted on mammals. In a study, the human gut microbiome was compared with the animals from the phyla, such as Nematoda, Arthropoda, Mollusca and Vertebrata. Among vertebrates, further comparisons have been made between humans and other mammals, along with birds, fishes, amphibians and reptiles. The microbiota of organisms that have been compared to humans include *C. elegans*, bees, snails, cows, horses, dogs, cats, wood mice, macaques, chimpanzees, cottonmouth snakes, Burmese pythons, freshwater fish, northern leopard frogs, and chickens, along with other bird, insect and reptile species. Many factors such as the genetic components of the host immune system and external factors like the host's diet and geography inform the similarities and differences between the microbiota of humans and other organisms.

The human gut microbiome has a great deal in common with other mammalian microbiomes. This may be due to the similar structure of the organs of the digestive system, thereby having similar pH and other properties that allow the same species of bacteria to flourish. Additionally, as animals may be classified into herbivores, carnivores, and omnivores, the composition of food that is digested varies. Hence, the bacteria which secrete enzymes and perform metabolic functions to digest and absorb the broken-down food particles will also vary, depending on the proportion of fats, proteins, and carbohydrates taken in the diet. After studying the different kinds of microbes present in various types of phyla, it was found that the gut microbiomes of various animal phyla are all mainly composed of three major bacterial phyla, namely Bacteroidetes, Firmicutes and Proteobacteria. However, the specific species of bacteria vary across the animal kingdom, across individuals of the same species as well as even the same individual through the passage of time. The causes of these changes are often, but not limited to seasonal variation, disease, change in diet, temperature, antibiotics and so on. By comparing the variations among different microbiomes, it could be possible to understand the causes of diseases, create medicines and treatments against diabetes, cancers and gastrointestinal disorders such as colitis and learn how to develop a favourable environment for the growth of beneficial bacteria so that human health and longevity can be improved.

Keywords: Gut, Microbiota, Human health, Vertebrates, Bacteria, Mammals, Nematodes

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