

Editorial



Know and Care Life Friends -Microbiota

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The almost all parts of human body inhabit trillions of different microorganisms with harmony-surprisingly out number human cells by 10 to 1. As their small size, however, microorganisms make up only about 1 to 3 percent of the body's mass (in a 200-pound adult, that's 2 to 6 pounds of bacteria), but perform vital functions including digestion of essential nutrients, maturation of intestinal physiology, development and stimulation of immune system, systemic effects on blood lipids and the inhibition of harmful bacteria essential for survival of human being.^{1,2}

So much human coexisting microorganisms are known as microbiota or normal flora which is a highly complex community of microbe including bacteria, viruses, fungi, protozoa and archaea. Scientifically they are of two types, one is responsible for ailment minor group (3-5%) and another is functioning friendly helpful activities major group (95-97%). Their composition and action vary according to their site of locations, ages, sexes, races, diets and geographic habitation of the hosts.³

Currently the friendly microbiota has been all but ignored as determinants of health and disease due to lack of proper current knowledge. This article on above mentioned topic is a sincere attempt to focus friendly microbiota on the basis of scientific evidence for greater interest to obtain maximum benefit out of them.^{4,5}

Knowledge about microorganism was quite different 150 years ago when it was discovery in 1673. Then it was hard to believe that microbe could cause human ailment before discovery of germ theory of disease, proving that specific diseases were caused by specific pathogenic micro organisms by Louis Pasteur and Robert Koch in the late 1870s.⁵ The first scientific evidence of microorganisms in normal human system was observed by Austrian pediatrician Theodor Escherichin the intestinal flora of healthy children and later named *Escherichia coli*.⁶ The idea of microorganisms' disease producing frightening ability was changed on observing the unbelievable helping functions in 1900 through research on intestinal microbe by Dr. Metchnikoff,⁷ in 2001 the Nobel laureate-microbiologist Joshua Lederberg termed microbiome to those microorganisms found in normal human body.⁸

Humans are born sterile and microbial colonization begins immediately at birth. It is estimated that 10 times of human cells i.e. 100 trillion microbiota occupies some specific sites of the body. But they are found in significant number in five major organs like oral cavity, oropharynx, nostrils, gastrointestinal tract, vagina and on skin. It is estimated that the most heavily colonized organ is the gastrointestinal tract containing over 70% of all the microbes in the human body.^{1,2}

The human gut has a calculated surface area of a tennis court (200 m²),⁹ and, as such a large organ, represents a major surface for highest microbial colonization. Additionally, the gut is rich in nutrients that are used by microbes, making it a preferred organ for their habitation. As much of this is in our gastrointestinal tract, which represents ~10% of our mass, which hosts up to 1000 bacterial species that encode about 5 million genes. Surprisingly they perform many of the functions required for our physiology and survival. Consequently, it is also established to some scientist as "forgotten organ,"¹⁰ observed as a "virtual endocrine organ" and considered to be an "essential organ."¹¹

Significant inter-individual variability in the gut microbiota composition found to healthy adults which suggest physiological role in the maintenance of health status. Now it is proved that human don't have all enzymes to digest all diet, microbe break down many of the proteins, lipids and carbohydrates in our diet into nutrients for absorption. Moreover, gut microbiota produces beneficial compounds, like vitamins, anti-inflammatories and perform fat storage, angiogenesis regulation, control mood etc. These functions are not performed by our own genome.^{12,13}

Interestingly, genes encoded by the human gut microbiota encode proteins required for host survival, but not present in the human genome. This finding has led to the definition of the gut microbe as "our forgotten organ".¹⁴

Microbiologist has led exciting discoveries on microbial direct action on the gut mucosa and the enteric nervous system (ENS). The metabolic output of the gut microbiota gives it a reach well beyond the local intestinal compartment. Thus, considering the ability to influence the function of distal organs and systems, in many respects, the gut microbiota resembles an endocrine organ which produce numerous chemicals of a hormonal nature like gamma-aminobutyric acid (GABA), noradrenaline, dopamine, and serotonin, released into the bloodstream and act at distal sites. The targets for these substances are not just the local ENS but many other organs including the brain. It releases its hormonal products into interstitial tissue to be picked up by blood and lymph capillaries, and these secretions are usually effective in low concentrations on target organs or tissues remote from the enteric microbiota. Moreover, specific members of the overall microbial community can respond to hormones secreted by the host.^{15,16} Brain like function of gut microbiota in humans is the most compelling evidence of a gut microbe-brain interaction came to light more than 26 years ago from the finding of a dramatic improvement in patients with hepatic encephalopathy, after the administration of oral Rifaximin antibiotics.¹⁷

suggested a crucial role of the human microbiota on human health and disease^{18,19} via several mechanisms. First, the microbiota has the potential to increase energy extraction from food,²⁰ increase nutrient harvest,^{19,20} and alter appetite signaling²¹. The microbiota contains approximately 150 times more²⁰ genes than are found in the entire human genome²² and provides humans with specific enzymes and biochemical pathways.¹⁹ For these reasons gut microbiota, has even been considered to be an "essential organ".²³

To take care of human microbiota known as forgotten/ endocrine/ essential organ utmost importance to be given in the following actions²⁴

encourage normal vaginal delivery for microbial colonization from mother Promote breast-feeding for establishment of microbiota during infancy, advice minimal use of antibiotics for minor infections in kids as it disrupts normal flora and predispose to disease of opportunistic infection and childhood obesity. avoid unnecessary use of chemical disinfectants which can make bacteria resistant to treatment, and promote of outdoor play that allows exposure to microbe through dirt which help to develop immunity against cancer/leukemia in children.

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Dr. Abdullah Akhtar Ahmed
Professor of Microbiology
Khwaja Yunus Ali Medical College