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Original Research Paper

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ROLE OF MICROBIOTA IN GOOD HEALTH & DISEASE- A LITERATURE REVIEW

Dr.Shrikhande Suchita	P.G. Scholar, SharirKriya Department, B.M.A.M.,Nagpur
Dr.Marghade Nirmala*	Professor & HOD, SharirKriya Department, B.M.A.M.,Nagpur*Corresponding Author
Dr.KararePrerana	Associate Professor, SharirKriya Department, B.M.A.M.,Nagpur
Dr.Bedre Rupali	Associate Professor, SharirKriya Department, B.M.A.M.,Nagpur

ABSTRACT The collection of microorganisms that live in peaceful coexistence with their hosts has been referred to as the microbiota, microflora or normal flora. The human microbiota diverse roles in regulating gut motility, inflammation, glucose homeostasis, and energy harvesting.The human microbiota in health- the human microbiota affects host physiology to a great extent. The human microbiota in disease -Infection is one of the most common diseases caused by dysbiosis of the microbiota.It can be concluded that the human microbiota plays an important role in the wellbeing of the human host, and participates actively in the development of a wide variety of diseases.

KEYWORDS : Microbiota, Health, Disease.

Introduction:

The collection of microorganisms that live in peaceful coexistence with their hosts has been referred to as the microbiota, microflora, or normal flora.Trillions of microbes have evolved with and continue to live on and within human beings. A variety of environmental factors can affect intestinal microbial imbalance, which has a close relationship with human health and disease.Environmental factors related to diet, drugs, and anthropometric measures are larger determinants of microbiotacomposition.Microbiotic composition and function differ according to different locations, ages, sexes, races, and diets of the host.

Microbiota: The majority of the gut microbiota is composed of strict anaerobes, which dominate the facultative anaerobes and aerobes by two to three orders of magnitude. Although there have been over 50 bacterial phyla described to date, the human gut microbiota is dominated by only 2 of them: the Bacteroidetes and the Firmicutes, whereas Proteobacteria, Verrucomicrobia, Actinobacteria, Fusobacteria, and Cyanobacteria are present in minor proportions.

Virtually all multicellular organisms live in close association with surrounding microbes, and humans are no exception. The human body is inhabited by a vast number of bacteria, archaea, viruses, and unicellular eukaryotes. The collection of microorganisms that live in peaceful coexistence with their hosts has been referred to as the microbiota, microflora, or normal flora. The composition and roles of the bacteria that are part of this community have been intensely studied in the past few years. However, the roles of viruses, archaea, and unicellular eukaryotes that inhabit the mammalian body are less well known. It is estimated that the human microbiota contains as many as 1014 bacterial cells, a number that is 10 times greater than the number of human cells present in our bodies. The microbiota colonizes virtually every surface of the human body that is exposed to the external environment. Microbes flourish on our skin and in the genitourinary, gastrointestinal, and respiratory tracts. By far the most heavily colonized organ is the gastrointestinal tract (GIT); the colon alone is estimated to contain over 70% of all the microbes in the human body.

Normal Microbiota:

These microorganisms are not harmful to humans; in fact, some are even beneficial and all help maintain our health. Our normal microbiota consists of various bacteria, fungi, and archaea. Other forms of bacteria present in the human gut are necessary for proper digestion of carbohydrates.

Place of microbiota:

The human microbiome is the aggregate of all microbiota that resides on or within any of a number of human tissues and biofluids, including the skin, mammary glands, placenta, seminal fluid, uterus, ovarian follicles, lung, saliva, oral mucosa, conjunctiva, biliary and gastrointestinal tracts.

Difference between microbe &microbiota:

The microbiome, as said, refers to the collection of genomes from all the microorganisms in the environment. Microbiota, on the other hand, usually refers to specific microorganisms that are found within a specific environment The human microbiota in health The human microbiota affects host physiology to a great extent.

The normal gut microbiome produces 50–100 mmol L-1 per day of short-chain fatty acids (SCFAs), such as acetic, propionic, and butyric acids, and serves as an energy source to the host intestinal epithelium .

These SCFAs can be quickly absorbed in the colon and serve many diverse roles in regulating gut motility, inflammation, glucose homeostasis, and energy harvesting.

Accumulating evidence suggests that gut bacteria play critical roles in maintaining human health in many aspects. For example, gut bacteria could train the immune system, prevent the growth of pathogenic bacteria, regulate the gut development, maintain epithelial integrity, and shape the neuronal development. It is known that colonising gut bacteria are critical to the normal development of host defense. It has been proposed that gut bacteria are required to maintain epithelial integrity by regulating tight junction permeability. Gut bacteria benefit the host in a number of other ways, including regulating gut motility, producing vitamins and controlling the maturation and function of the microglia in the central nervous system.

The human microbiota in disease:

Increasing evidence suggests that gut microbiotadysbiosis would lead to a number of diseases, including gastrointestinal disorders, obesity, cardiovascular diseases, allergy and CNS-

related diseases, which affect a large population in the world. Besides, mood and behaviour are also susceptible to alterations in the gut microbiota.

Infection is one of the most common diseases caused by dysbiosis of the microbiota. Importantly, infectious disease and its treatment have a profound impact on the human microbiota, which in turn determines the outcome of the infectious disease in the human host Offending pathogens colonize the intestinal mucosa, thus resulting in the induction of a strong inflammatory response, followed by the translocation of the intestinal bacteria. Numerous studies have demonstrated the intimate relationship between infection and dysbiosis of the microbiota, and have shown that infection is associated not only with the microbiome, but also with viruses.Disturbance of the microbiota is also associated with the progression of human immunodeficiency virus (HIV) hepatitis B virus (HBV), and other diseases.

Application:

The human microbiome can be considered as an important origin of resources for genetic diversity, a modifier of disease, an essential component of immunity, and a functional entity that influences metabolism and modulates drug interactions. As the gut microbiota appears to contribute to nearly every aspect of the host's growth and development, it is not surprising that a tremendous array of diseases and dysfunctions have been associated with an imbalance in either composition, numbers, or habitat of the gut microbiota. For many other conditions, such as atopy or mood disorders, the possibility of microbial contribution is less apparent. Research looking into the involvement of the gut microbiota in these conditions is in its infancy, requiring further substantiation and elaboration.

The human gut microbiota may be viewed upon as an organ [70], and contributes to the digestion of food and the breakdown of toxins and drugs, regulates lipid and glucose metabolism, plays a fundamental role in the induction, training and function of the host immune system, modulates gene expression, and reduces inflammation.

Conclusion

The human microbiota plays an important role in the wellbeing of the human host, and participates actively in the development of a wide variety of diseases.From the structure to the function of the microbiota, future research should move microbiome investigations toward providing explanations of causality.The crucial roles of the human microbiota should be investigated at a much deeper level, and microbiome-based diagnosis and treatment strategies will be used for future personalized medicine work.

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