STEPHY Publishers

Trends in Nursing and Health Care Research

Perspective

ISSN: 2771-2842

Gut Microbiome to Health and its Relationship with Chronic Diseases

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Abstract

In recent years, gut microbiome is thought also important to one's nutrition and health, same as any organ in human body. How and why the gut microbiome comes and is beneficial to human body, are results of living rules of the nature. Only a microorganism that is beneficial to the human body can grow better since it allows the body to live better and be healthier, and the human body must promote its growth to benefit itself; therefore, there is an advantage for a beneficial microorganism compared with a harmful microorganism to grow in the gut, and a beneficial microorganism can sterilize a harmful one by contending for resources to live and reproduce in the gut and form a barrier that can prevent other microorganism to live by itself. Gut microbiome mainly distributes in colon and cecum, and can produce a lot of nutritional materials by fermenting the indigestible dietary residues from prior digestive organs which are important to human health, and can also help one to be immune to other harmful microorganism's invasion due to its effects which make it win harmful microorganism to live and reproduce in the gut.

Keywords: Gut microbiome, Symbiosis, Contending, Barrier effect, Fermentation

Introduction

Recent years, gut microbiome is considered as playing an important role same as any other organ in human body in human's digestive system. The lack of a healthy microbiome would cause enteric disease and malnutrition, and such malnutrition is also related to many diseases that we don't know the cause, such as Parkinson's disease, Alzheimer's disease, autism and amyotrophy. It is noticeable that these diseases highly occur in the developed countries, related to abuse of antibiotics, which may hurt the gut microbiome. In developing countries, the case is unknown, but the increased incidence of the so-called diseases of the wealthy and powerful may also be related to the lesion in gut microbiome.

Digestive system is where human body absorbs energy and materials from the foods one ingested to maintain life and keep healthy, it is to eat minus entropy to charge one's life, and one also needs to contact with microorganisms from outside world in this process, and finally, some of them can live together with the gut and form a microbiome that has a symbiotic relationship with the human body. Human's body has immunity by itself, so there should only be the microorganisms that are symbiotic with the human body can coexist with the digestive system, and such beneficial microorganism can suppress the growth of other harmful microorganisms, similar to fermentation, it should be the growth of the yeast that suppressed the growth of other harmful microorgan-

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Quick Response Code:

Received: 30 September, 2023 **Published:** 09 October, 2023

Citation: Zhang J. Gut Microbiome to Health and its Relationship with Chronic Diseases. *Trends Nur Health Care Res.* 2023;3(3):1–3. DOI: 10.53902/TNHCR.2023.03.000529

isms; therefore, the growth of beneficial microorganisms can also suppress the growth of harmful microorganisms; moreover, the body's immunity must combat with those harmful microorganisms and adjust the body more suitable to live and keep healthy, while it needs those beneficial microorganisms to grow better to benefit its own health; thence, only a beneficial microbiome can coexist with human body, and a microbiome that is symbiotic with the human body would form finally.

Similar to fermentation, that the growth of beneficial yeast can provide more nutritional materials than the original product, e.g., many amino acids would be produced when the flour was fermented, the growth of the beneficial microorganism in the gut microbiome can also produce many kinds of materials that are beneficial to health. And it seems that these extra products from the symbiosis of gut microbiome and the human body had become essential to human health. Some materials we ingested from food, which we thought useless because our gut can't digest them by itself, are possible to be useful to human health when the gut microbiome took part in the digestion, e.g., such as the fiber from vegetables and fruits, gut microbiome can ferment them and produce many beneficial materials.

Gut Microbiome, Digestion, and Immunity

Gut microbiome functions both in digestion and immunity

The gut microbiome distribution gradually increases from prior digesting organs to the subsequent ones. In stomach, it is a place where the stomach cells secret gastric acid to dissolve the foods that are ingested and such acid is even unbearable by the stomach itself, here the starch, fat and protein would be hydrolyzed; therefore, there is little microorganism living here. The gastric acid is also a part of immunity in gut, majority of microorganisms ingested would be killed here as long as the gastric acid was not diluted by plenty of water, even vibrio cholerae can be killed by this. It is when the acid was diluted that the vibrio cholerae may sneak into the subsequent digestive organs and lead to cholera. In the subsequent digestive organs, it is when the acid becomes weaker and weaker, the digestive juice is consumed up, that microorganisms can begin to stay.

The gut microbiome begins to form after one was born, from his ingestion the microorganisms and the materials which can develop into the gut microbiome would also be ingested. Human body has immunity by itself, one would adjust his body to be more suitable for life and health.[1]

If the microorganism is harmful to the human body to live, one's body would strive to live and keep healthy, and the microorganism can't live well if the human body wants to live well. On the opposite, if the microorganism is beneficial to the human body to live and it lives better when the human body became healthier, since one's body would always try to live better and be healthier, the microorganism can live well when the body is striving to be healthier. As a result, the harmful microorganisms must be suppressed by the human body to live, because human body must want to live better and be healthier. However, the beneficial ones would be benefited by the human body to live when it benefited the human body to be healthier, the body must promote its growth to benefit itself.

The advantage of a beneficial microorganism to live in the gut would help the gut to sterilize the harmful microorganism, and such sterilization is similar to how the yeast can make no other microorganisms to reproduce during a fermentation, all the resources for the growth of microorganism would be used up by it, and yeast can't be decomposed by other kinds of microorganisms when it was alive, this leaves no chance for other kinds of microorganisms to grow, and should be reason why the food fermented won't be decomposed by other microorganisms during the fermentation; therefore, since a beneficial microorganism must have advantage to live in the gut than the harmful ones, the beneficial microorganisms would sterilize the harmful ones by contending with them for the resources to live and reproduce in the gut, a beneficial one must defeat the harmful one because it can get support from the human body to which it is beneficial, and they also form barriers that prevent other kind of microorganism from growing there by themselves; therefore, there would only be a microbiome that have symbiotic relationship with human body can survive finally, and it will become a part of the human body, such microbiome can help the body's immunity against pathogenetic microorganisms one may ingest from food by same effects. It is both a beneficial microorganisms have advantage to contend with the harmful ones and the barrier formed by itself that prevented other harmful microorganism to grow or to reproduce in the gut, and this can remarkably modify the immunity of the human body against the pathogenetic microorganisms invading from the gut, it is similar to how yeast can make there no any other microorganism to live during a fermentation and prevent the decomposition of the food during the fermentation.[2]

After the gut microbiome formed, it would be stable and tend to be more beneficial to the human body due to the reasons above, and it can help the body to be immune to another harmful microorganism one may ingest. It mainly distributes in the cecum and colon where the digestive juice was used up, and can provide many nutritious materials that are beneficial to the body's health by fermenting the remained materials that can't be digested by prior digestive organs. Fibers, some other indigestible polysaccharide, and some endogenous mucus, which can't be digested by the digestive organs inside the body, can all be fermented to be nutritious materials that

are useful to the body health by the microbiome here, this includes many kinds of short-chain fatty acids, B vitamins and vitamin K, minerals, amino acids, and cholesterol etc., fiber has become useful nutrient in this respect. Acetate, propionate, and butyrate are three major kinds of short-chain fatty acids produced by the fermentation of gut microbiome. Butyrate can directly provide energy for the gut to worm, and this possibly is the reason why fibers can promote worming of the gut. Acetate and propionate are both good to glucose regulation, they can reduce the glucose fluctuation after meal, and increase the one's sensitivity to insulin, therefore they can help to prevent diabetes type II. Vitamin K and cholesterol are also necessary nutrients to human body, and too much cholesterol can be balanced by phytosterol in vegetables and fruits.

And gut microbiome possibly is also infectious, it should be such infectivity that enabled us to inherit those beneficial microbiomes from our parents and other people who we were living with, and this makes it much easier for us to form a beneficial gut microbiome that can be symbiotic with human body and help the body to be immune to other harmful microorganisms in the gut. Some infectious diseases in gut, such as Helicobacter Pylori infection, possibly are just caused by disorder of the gut microbiome, the beneficial microorganisms failed to defeat the harmful ones as they should. However, it may be harmful to human body if only to kill those harmful microorganisms for curation, instead the body should be allowed to combat the diseases and recover health by itself. In this way, prebiotics may be better than any nucleic acid test, can help the gut microbiome to recover its healthy state, which is beneficial and a part of human body, then one can recover health when his gut microbiome recovered health, and would also have no infectivity anymore once he could keep his health and totally had no symptom of the pathogenetic infection.[3]

Conclusion

Human's gut adapted to live in environments that are full of microorganisms, it needs strong immunity to combat with the microorganisms which may invade or be harmful to the human body. However, there are also beneficial microorganisms, since the human body has immunity and always wants to be healthier, the body would cooperate with the beneficial microorganism to live and be heathier therefore a beneficial microorganism has advantage to live in the gut compared with a harmful one, having a symbiotic relationship with the human body. The body would promote the growth of a beneficial microorganism while restrain a harmful one because it wants to live better and be healthier, this can be done by the immunity, self-adjustment, and anything the body can do for its living and health. Similar to how yeast can make no other microorganism to live in the food which is being fermented, a beneficial microorganism can also restrain the growth of harmful microorganism by contending for the resources in the gut as well as forming a barrier for other microorganism's living by itself, the beneficial one must defeat the harmful one due to its advantage to live in the gut, from the symbiotic relationship with the human body. Finally, one must have a gut microbiome that is beneficial and therefore can have symbiosis with him as a result of struggles for living and being healthy, and one may inherit the gut microbiome from our ancestors and other healthy people who he lives with.

Such a healthy microbiome plays an important role in human's nutrition and health, it can produce many nutrients and other nutritious materials which the human body needs, including some short-chain fatty acids, B vitamins, vitamin K, minerals, amino acids, and cholesterol. The short-chain fatty acids are mainly acetate, butyrate, and propionate. Butyrate can motivate the colon to worm; thereby, one may have lower risk of colon cancer. Acetate and propionate can benefit glucose regulation and insulin sensitivity in one's body, so that they can help to prevent diabetes type II.

A healthy microbiome is also important to one's immunity, it can restrain harmful microorganism to grow in the gut, as it is beneficial to human body and can live better when the body is healthier, having a symbiosis with the human body, it actually has become a part of human body and the body's immunity against pathogenetic microorganism one might ingest from food. It is because the gut microbiome wasn't healthy enough that leads to the enteric infection, a healthy gut microbiome can help one to be immune to the invasion of harmful microorganism in gut, and prebiotics is a good medicine that can help one to recover a healthy gut microbiome, Helicobacter Pylori may be cured healthily just by proper dose of prebiotics ingestion.

Acknowledgments

None.

Funding

None.

Conflicts of Interest

Author declares that there is no conflict of interest.

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