

Modulate the Gut Microbiota by Mediterranean Diet is a Good Strategy to Combat the Overweight and Obesity

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Obesity has reached epidemic proportions globally and it is prevalent in low- and middle- incomes countries. It is a major public health concern, caused by a combination of environment and genetic factors.

Scientists and consumers know that to maintain a good weight control there is no choice but to create a negative energy balance. This seems simple, but it is not. The figures speak for themselves and the social and health impact is very serious. How to stop the progress of obesity?

In recent years, the gut microbiota has also been found to be implicated in obesity and recent studies have suggested that gut microbiota is an important environmental factor that affects energy harvest from the diet and energy storage in the host, through a multiple-faceted mechanism involved in the control of body weight and energy homeostasis. Currently there is no doubt about the relationship between dietary factors, microbiota and obesity [1]. The central element of this relationship is the microbiota which in turn can be modulated by the diet.

The human gastrointestinal tract harbors an extremely complex and dynamic microbial community that plays an important role in protecting the host against pathogenic microbes, modulating immunity, regulating metabolic processes, and is regarded as an endocrine organ [2]. The information obtained recently from the sequence-based and functional metagenomics enables a more understanding of the structure and function of microbial communities.

Changes in dietary pattern may affect the microbiota in a substantial manner. This issue may have major relevance for human health because microbiota is an efficient physical barrier and has features to regulate many immune and metabolic functions [3].

Gut microbiota promotes fat storage by suppression of the intestinal expression of an inhibitor of lipoprotein lipase which is considered to be a mediator of microbial regulation of energy storage [4].

Moreover, gut microbiota affects energy extraction by colonic fermentation from undigested food components. The short chain fatty acids produced representing an important energy source for the symbiotic association host-gut microbiota. In addition to these effects bacterial microbiota may modulate gut motility, alter secretion of gut hormones and modify both gut permeability and immune function. Therefore, dysbiosis also may influence the host metabolism and proinflammatory state being present in obesity [5].

On the other hand, there is a wide evidence on the relationship between the two dominant bacterial phyla, Bacteroidetes and Firmicutes, and the status of overweight and obesity. Firmicutes dominant, "obese microbiomes", were found to contain more genes associated with lipid and carbohydrate metabolism and the breakdown of otherwise indigestible food compounds than Bacteroidetes dominant, "lean microbiome".

The consumption of diets higher in fruit, vegetables and fiber is linked to increased microbial richness, at either the taxonomic level or the gene level [6].

The diet provides the necessary nutrients for the symbiotic association between the complex bacterial population and the host. Both are very sensitive to the type and amount of substrates that reach the large intestine of the host. If the microbiota can be modulated through diet and is also directly related to the use of dietary energy and its storage as adipose tissue, it is evident that with a varied diet rich in nondigestible compounds (dietary fiber and associated bioactive compound), the microbiota could be modulated by the diet to achieve a healthy intestinal ecosystem capable of controlling the body fat storage.

Ongoing research on the human intestinal microbiota appears to allow its positive manipulation by diet to prevent and/or treat overweight and obesity. The composition of the diet can modify the bacterial population in a short time, although the changes produced can be reversible, which implies the need to create healthy dietary habits to maintain throughout life. Therefore, from a nutritional point of view, I would like to highlight the role of diet and more specifically the role of the eating pattern in obesity through modulation of the intestinal microbiota. In this line, the Mediterranean dietary pattern was declared an intangible cultural heritage of humanity by UNESCO. This consumption may help in maintaining the gut microbiota homeostasis and it should be the eating pattern for teaching in education programs because it is a good option to combat the growing problem of obesity and metabolic syndrome [7].

The notion that the "obese microbiota" could harvest more energy from the diet, and that the intestinal microbiota could at the same time direct the response of host to energy intake, could offer new approaches to combat obesity. Efforts to modulate the intestinal microbiota would be a high priority for public health and to date a healthy diet rich in plant foods containing a high variety of healthy substrates for the intestinal microbiota appears to be an effective personalized strategy for controlling the content of body fat.

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