

Probiotics as a possible treatment of obesity

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Introduction

Obesity and its associated disorders are one of the major health problems in the developed world. Obesity has been mainly related with an energy imbalance when energy intake exceeds energy expenditure, however other factors must also be considered.

Recent insight suggests that an altered composition and diversity of gut microbiota could play a critical role in energy balance and metabolism, implicating it as a major factor in the development of obesity [1].

Targeting microbiota in order to modulate the microbiota composition with probiotics is considered as a promising strategy for the development of new solutions for its treatment [2].

Aims

The **objectives** of this project are:

- ❖ To understand the symbiotic relationship between the intestinal flora and the human organism underlying the microbiota functions.
- ❖ To determine the mechanism of the intestinal microbiota in the development of obesity.
- ❖ To determine the effectiveness of the action of probiotics as a possible therapeutic strategy.

Materials and Methods

Literatures research on Pubmed and Google Scholar database using terms such as "**obesity**", "**probiotics**", "**gut microbiota**" or a combination of them. Selected papers, including reviews, were published between 2005 and 2016 and chosen on the basis of their content.

The association between microbiota composition and obesity

Microbiota functions

❖ The human gut is home to 10^{14} **bacteria**, located mainly in the colon.

❖ The functions of the microbiota can be broadly categorized into three groups: **metabolic**, **protective** and **structural**.

❖ The host's intrinsic characteristics, such as **genetic factors**, the state of the **immune system** and **nutrition** influence the composition and metabolic activity of the gut microbiota.

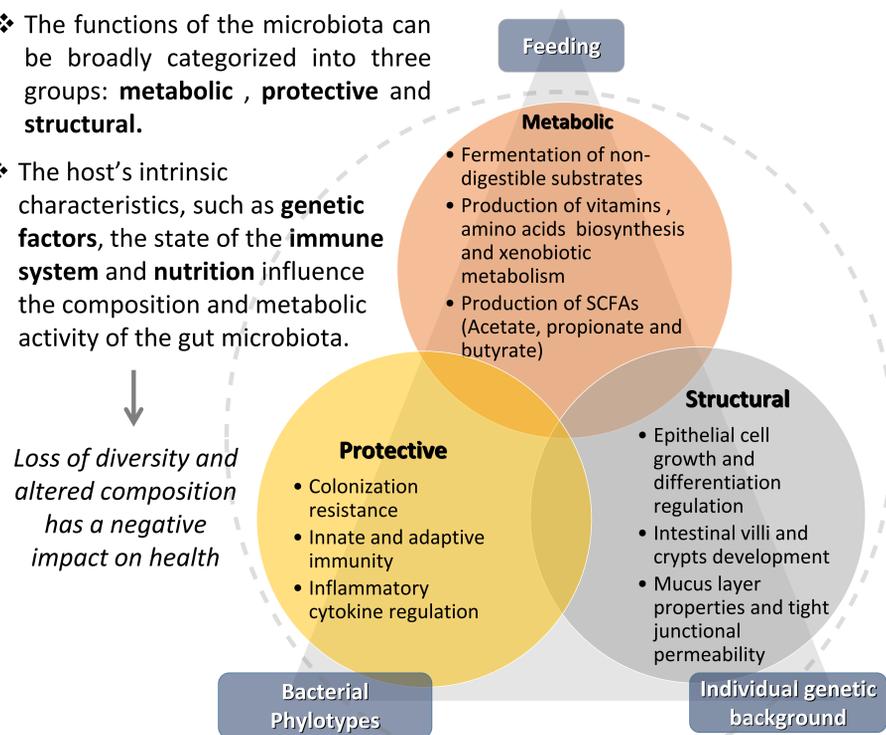
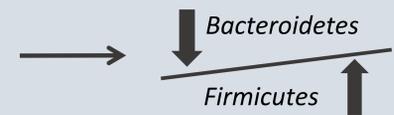


Fig.1: The human gut microbiota has many positive benefits within the human body, which include maintaining immune, energy, and metabolic homeostasis.

Dysbiosis microbiota

• Obesity has been correlated with the altered ratio of the two dominant phylum groups (>90%)



• Suggested mechanisms that link the changes observed in gut microbiota composition with the obesity and associated disorders :

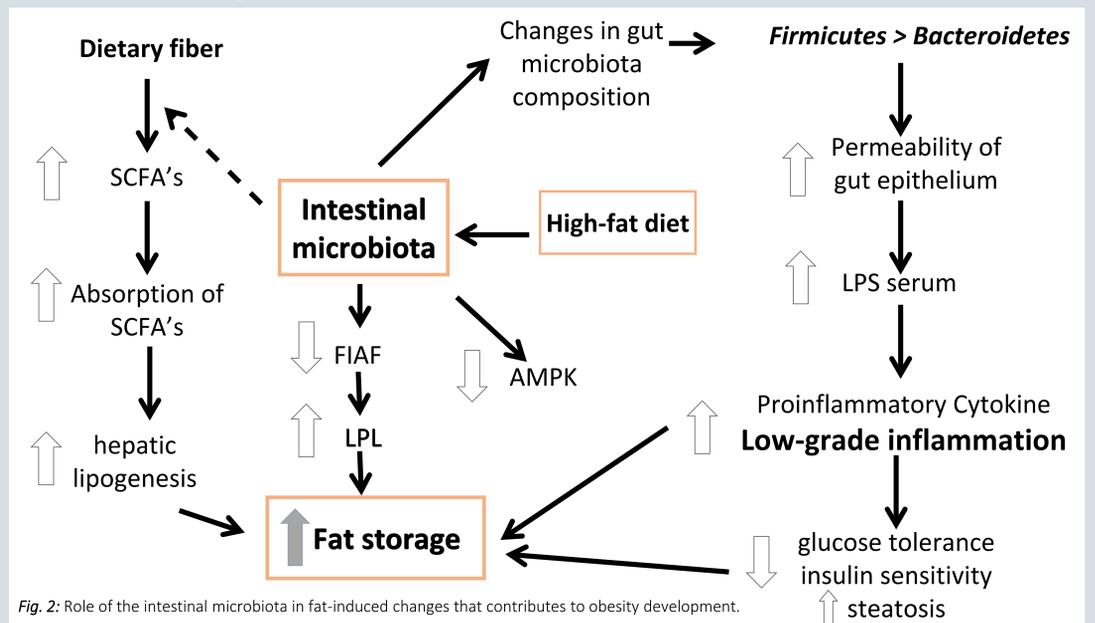


Fig. 2: Role of the intestinal microbiota in fat-induced changes that contributes to obesity development.

Treatment approach

PROBIOTICS

Live microorganisms that when administrated in adequate amounts have been shown to confer health benefits to the host.

Lactobacillus and *Bifidobacterium* are the probiotic strains typically consumed by humans.

Lactobacillus gasseri appears to be the probiotic strain that can best assist weight loss in humans.

Probiotics mechanisms of actions:

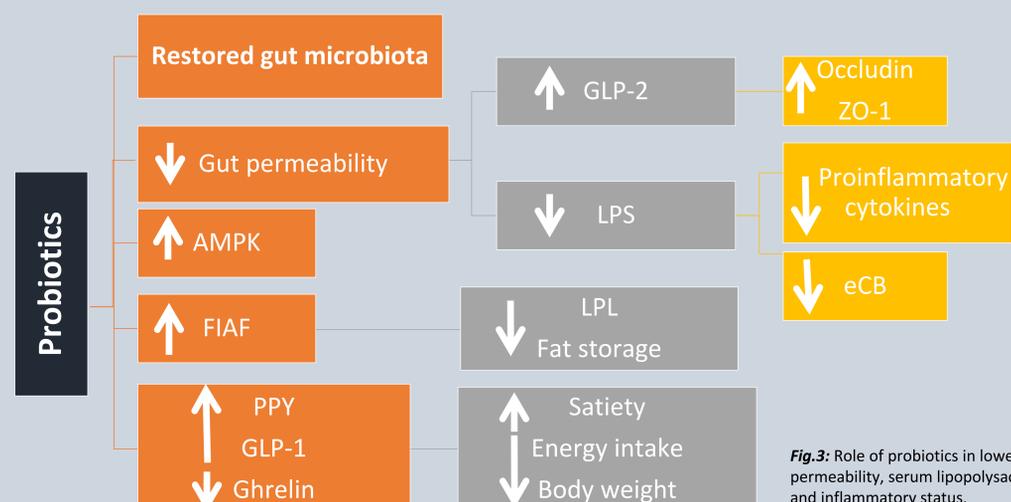


Fig.3: Role of probiotics in lowering gut permeability, serum lipopolysaccharide and inflammatory status.

Conclusions

- ❖ There is clear evidence that the gut microbiome has a profound effect on the balance between health and disease.
- ❖ Obesity is associated with the abundance of *Firmicutes* and a decrease of *Bacteroidetes*. These alterations are linked with adiposity, inflammation and energy homeostasis of the individual.
- ❖ Evidence suggests that probiotics offer a promise for the treatment of obesity. They have shown efficacy reducing fat accumulation through their effects on controlling food intake, body weight and gut microbiota.
- ❖ In order to improve intervention strategies to manage obesity and obesity-related diseases, further studies are required. It is needed to better understanding of the interactions between the host and the gut microbes in individuals with obesity.

References

1. Cani, P. D., & Delzenne, N. M. (2011). Pharmacology & Therapeutics The gut microbiome as therapeutic target. *Pharmacology and Therapeutics*, 130(2), 202–212.
2. Delzenne, N. M., Neyrinck, A. M., Bäckhed, F., & Cani, P. D. (2011). Targeting gut microbiota in obesity : effects of prebiotics and probiotics. *Nature Publishing Group*, 7(11), 639–646.