Probiotics and Obesity: Benefit or Harm?
Beatriz Gómez Solsana, Autonomous University of Barcelona. Biomedical Sciences Degree.

Introduction

The human being is a super-organism composed of both human and microbial cells (microbiota). In fact, the genes encoded in our microbiome exceed human genes (99% of our genes have a microbial origin). Microbial cells play an important role in our organism; their functions include: the digestion and processing of otherwise indigestible components from our diet for posterior absorption, vitamin synthesis (vitamin K and B12), immune system stimulation, formation of a barrier-like structure, which prevents the adhesion and colonization of pathogens, etc. They determine the health, physiology and development of the host.

Both human and microbial cells must live in symbiosis; any dysregulation (dysbiosis) will mean a risk for the host’s health. For example, obesity – a worldwide epidemic – can be caused by a disruption in the gastrointestinal tract (GIT) microbiota by or the increment of specific bacterial species in the GIT.

Currently, new treatments for diseases with a dysbiosis etiology are being developed. One of the therapies that is being considered and evaluated are probiotics; due to their capacity of modifying host microbiota, they could efficiently supplant those microbes causing the disease.

Objectives

The final objectives of this project were:

- To create an informative leaflet with the aim of transmitting scientific knowledge to the general population.
- To simplify the scientific information found in reviews and papers to a broadly understandable language without technical terminology.
- To clearly define the microbiota, probiotics and show their possible impact on obesity.

Results

There are numerous hypotheses that support the role of microbiota in the development of obesity. The establishment of microbiota in the gut would:

- Promote the formation of new capillaries in the GIT, allowing a major absorption of nutrients.
- Inhibit AMPK-dependent fatty acid oxidation.
- Increase the formation of short chain fatty acids (SCFAs), which would reduce Fiaf levels. This would stimulate the increase of lipoprotein lipase (LPL), that boosts fat accumulation in adipose tissue.
- Promote the transformation of indigestible carbohydrates to SCFAs, which stimulate liver lipogenesis and increase fat storage and adipogenesis through GPR41/43 receptors.

However, other investigations have demonstrated that SCFA produced by the microbiota also promote the secretion of intestinal peptides such as peptide YY and GLP-1, which generate satiety.

Conclusions

- It is clear that microbiota plays a role in the development of obesity. One of the main causes of gaining weight more easily could be the inter-individual differences in microbiota. Although obesity has been related to the increased presence of specific bacterial species, this is still widely discussed.
- Studies with much larger cohorts should be conducted, to accurately establish the specific microbial profile of individuals with different physical characteristics.
- It would be crucial to standardize the methods that should be used in microbiota and probiotic studies. As a result, a clear understanding and general acceptance of their implications could be achieved.
- To make people more aware of the dangers of suffering from obesity, the health system should promote consciousness-raising programmes.
- Finally, since the microbiota mainly develops during the first years of life, it would be essential to assess if probiotic treatment would be more effective if administered at an earlier stage in life.

Materials and Methods

- Scientific literature search on PubMed database: keywords used: “microbiota” (or specific bacterial species), “obesity”, “probiotics” or a combination of them. The scientific articles were selected depending on their quality and publication date. Sensationalist articles were also revised.
- Development of a Survey: the objective was to know the general understanding of the population about the subject. The survey was uploaded to a social network and was answered by 115 people. Subsequently, the results were analysed.

Treatment approach

Currently, the effect of probiotics on weight loss is being tested, because some sensationalist articles claim that this products are also used in animal fattening.

In theory, the bacteria in these products would be able to displace pathogenic microbes and specific microbes with an increased capacity on calorie extraction, returning the normal balance to the gut microbiota.

Major objective: promote a change in the microbiota in order to favour the presence of microbial strains that are normally found in non-obese individuals, thus facilitating weight loss.

Promising results seen with: Lactobacillus gasseri.

References