PREBIOTICS
ITS EFFECT ON GASTROINTESTINAL MICROBIOTA AND HEALTH

Marta Hernández Requejo

UAB Universitat Autònoma de Barcelona

INTRODUCTION

There is good knowledge of the direct effect of food on human health. Also, long ago, microbiologists defined the existence of microorganisms that inhabit the human body. Both findings lead scientists to develop approaches to relate both subjects, searching for microbial patterns and improvements in health leaded by food changes.

OBJECTIVES

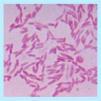
The aim of this review is to describe the relationship between **gut** microbiota and **food.** Therefore understanding how it affects human **health** by analysing metagenomic insights.

METHODOLOGY

PubMed · ELSEVIER · Servei de Biblioteques UAB · NIH National Institutes of Health

HUMAN GASTROINTESTINAL MICROBIOTA

400–1500 species in the gut, most of them **OTU**, not characterized yet.
Present domains are Bacteria, Archaea and Eukarya and the most dominant bacteria are from phylums **Bacteroidetes** , **Firmicutes**, Proteobacteria, Actinobacteria, Fusobacteria and Verrucomicrobia

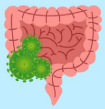

Bacteroidetes


Firmicutes

What does the gut microbiota do?

Regulation of population
Carbohydrate degradation →
- Vitamin B and K production
- **SCFA** production, butyrate, acetate, and propionate

How does illness affect?



Gut illnesses such as Crohn disease, ulcerative colitis or irritable bowel syndrome suffer **dysbiosis**: variations in the microbe comunities

METAGENOMICS

Whole genome study without relying on culture methods. Provides information about the genome, taxonomy, diversity, and abundance of a sample.

Sample preparation
↓
DNA extraction
↓
(DNA amplification)
↓
DNA library
↓
Sequencing
↓
Data analysis

DNA **base pair** order

✓ Amplicon Sequencing
Amplification and sequencing of a common gene. RNA 16s

✓ Shotgun metagenomics
Sequencing of the whole genome

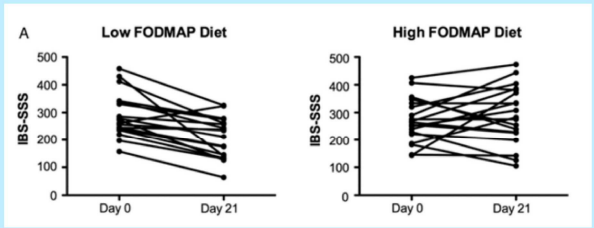
PREBIOTICS

Non-digestive ingredients that alter microbial composition and activity by its fermentation, leading to improvements in health

- Inulin
- Oligosaccharides
- Beta-glucans
- Fructans

REVIEW OF TRIALS

Low FODMAP in IBS and IDB

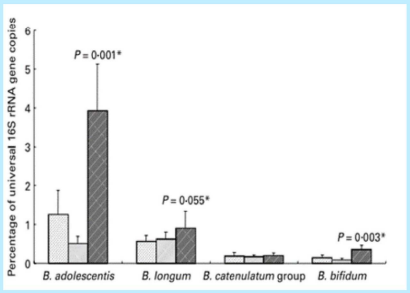


Irritable bowel disease symptom severity scoring IBS patients following Low and High FODMAP diets

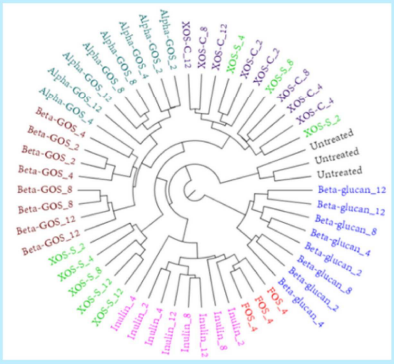
Symptoms relief by the reduction of gas formation.
Reduction in beneficial microbiota, SCFA producers.
Increase of the risk of pathogen implantation.

Prebiotics in healthy adults

Increase in abundance and gas producers, but also increase in SCFA, with antiinflammatory properties.



Genera Bifidobacterium in feces after inulin suplementation



Microbial tree after suplementation with different prebiotics

CONCLUSIONS

There is an association between food ingestion and the modulation of microbiota. Although, current studies do not provide enough evidence to relate its effects to health or disease. Further investigation is necessary.

Fehlbaum, S., Prudence, K., Kieboom, J., Heerikhuisen, M., van den Broek, T., Schuren, F.H.J., Steinert, R.E., Raederstorff, D., 2018. In Vitro Fermentation of Selected Prebiotics and Their Effects on the Composition and Activity of the Adult Gut Microbiota.
Ramirez-Farias, C., Slezak, K., Fuller, Z., Duncan, A., Holtrop, G., Louis, P., 2009. Effect of inulin on the human gut microbiota: stimulation of Bifidobacterium adolescentis and Faecalibacterium prausnitzii.
McIntosh, K., Reed, D.E., Schneider, T., Dang, F., Keshteli, A.H., De Palma, G., Madsen, K., Bercik, P., Vanner, S., 2017. FODMAPs alter symptoms and the metabolome of patients with IBS: a randomised controlled trial.