A HIGH FAT DIET MAY HAVE A NEGATIVE IMPACT ON THE GUT MICROBIOTA AND THE BRAIN.

MyNewGut partners have found that the interaction between diet and gut microbiota modulates the gut-brain axis in mice led a “high-fat diet”. This negatively influences brain function and induces depressive-like behaviour. High-fat diets rich in omega 3 or omega 6 polyunsaturated fatty acids do not appear to negatively affect the microbiota, whereas the effects of monounsaturated fatty acids are inconsistent. In mice, MyNewGut partners also showed that a bacterial strain (Enterococcus faecium 417/16) reduces depressive-like behavior associated with obesity, acting through the gut-brain axis. The MyNewGut partners have also evaluated the role of another bacterial strain (Bifidobacterium longum 77/16) on stress resilience and cognitive performance in humans. Further results have shown that following a healthy diet (e.g., the so-called Mediterranean diet) alleviates depression symptoms, supporting observational human studies.

Animal models have some similarity to humans and can provide useful knowledge about the gut microbiota. However, results from animal models are not always translatable to humans and conclusions should be made with caution.

THE GUT MICROBIOTA INFLUENCES METABOLIC HEALTH.

Studies in animal models have revealed new mechanisms whereby the microbiota could impact metabolic health. MyNewGut partners have discovered that peptide activity (GIP/PPY) responsible for the breakdown of hormones produced in the gut, which regulate appetite and blood sugar levels (such as glucagon-like peptide 1 (GLP-1)), are of bacterial origin. Therefore, the presence of specific bacteria producing these two hormones heathfully influences appetite, food intake and body weight gain. MyNewGut partners also showed that a specific microbiota configuration, characterized by low species diversity, linked to unhealthy dietary habits (high intake of total carbohydrates and fat) is associated with the subsequent development of overweight and metabolic inflammation in childhood, and could have predictive value. By contrast, intake of fermented milk, seeds, whole-grain products, among others, was linked to increased microbiota diversity and maintenance of normal weight during childhood.

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The Microbiome’s Influence on Energy balance, Brain Development, Diet-related Diseases and Behaviour

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ABOUT MyNewGut

The MyNewGut Project is a five-year project which has received funding from the European Union’s Seventh Framework Programme. 30 partners from 15 countries have researched how the human gut microbiota and its genome (microbiome) influence energy balance and brain development and function and, thereby, impact the development of obesity and behavioural disorders related to our lifestyle.

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WHAT IS THE GUT MICROBIOME’S ROLE IN HUMAN HEALTH?

Gut microbiota is the name given to the population of microbes living in our intestine. A large body of evidence supports the notion that the gut microbiota and its genome (microbiome) play a role in human development and physiology. Microbiome-related functions, which depend on factors like diet, method of delivery, and lifestyle (e.g., exercise), influence the communication and functioning of the gut, brain, and geno-phenotypic factors. The gut microbiota, as a commensal associate, is a major player in the health and well-being of the host. Thus, understanding the gut microbiome is critical to addressing the social and economic burden of diet- and microbiota-related diseases in Europe, particularly obesity and diabetes, and behavioral disorders.

THE PROJECT’S OBJECTIVES

The EU-funded project MyNewGut has delved into the gut microbiota universe in order to achieve these aims:

- Investigate the role of the gut microbiota and its components in metabolism and energy balance.
- Identify specific gut microbiota and metabolic functions that help to predict obesity, and behavioral changes.
- Develop new food ingredients and food products, by identifying new gut microbiota that target the gut ecosystem and contribute to reducing the risk of developing metabolic and microbiota-related disorders.

RESEARCH FINDINGS

- BACTERIAL STRAINS IN OUR GUT COULD BE THE NEXT GENERATION OF PROBIOTICS

The MyNewGut project has discovered new bacterial strains in healthy people that seem to be effective against obesity and metabolic disorders by influencing the endocrine and immune pathways. One of these bacterial strains is known as Enterococcus hirae (EHEC). It has shown preclinical efficacy in metabo- and immune dysfunctions in obesity, reducing serum triglyceride levels, increasing glucose tolerance, body weight gain and insulin sensitivity.

- DIETS RICH IN FIBRES ARE ASSOCIATED WITH FEWER SYMPTOMS OF DEPRESSION, HELP TO MAINTAIN BODY WEIGHT, REDUCE THE RISK OF DEVELOPING CHRONIC METABOLIC DISEASES

Dietary fibres are the main fuel for our gut microbiota. These carbohydrates are not digested by our digestive enzymes, and thus reach our large intestine almost intact. They are fermented by gut bacteria, which yield short-chain fatty acids (SCFA), which regulate satiety and glucose metabolism, reduce body inflammation, stress, and depressive behaviors.