Juvenalis
WELLNESS TESTING
BY EUROFINS BIOMNIS

Gut microbiota

For several years, various therapeutic areas have emerged in which gut microbiota tests can be applied as a diagnostic or monitoring tool.

In personalised medicine, microbiota are currently the subject of numerous studies to:

- evaluate the predisposition to develop certain pathologies;
- predict the course of a disease;
- predict a patient's response to a specific treatment;
- give guidance on the dosage and frequency of administration of a treatment;
- identify microorganisms to be reintroduced to reestablish a healthy state.

Juvenalis supports a preventive medical approach adapted to the individual patient, and now also offers tests to survey the gut microbiota.

Intestinal microbiota

The microbiota is a community of living microorganisms that evolve in a specific environment. In the body, there are various microbiota, in the intestine, skin, mammary glands, placenta, seminal fluid, saliva, oral mucous tissue, ...

Of the human microbiota, the gut microbiota has been best characterised to date. It is involved in many physiological processes such as:

- lipid metabolism or vitamin production,
- maintaining the digestive barrier,
- homeostasis of the immune system and also protection against pathogens due to barrier effect,
- efficacy and toxicity of drugs and xenobiotics.

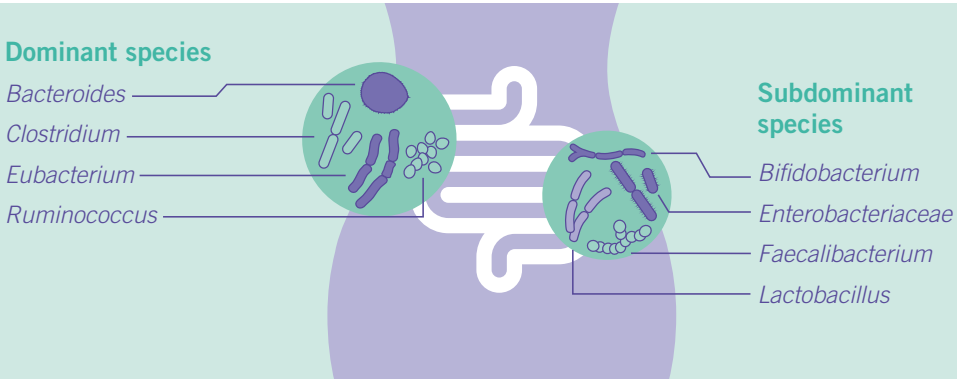
Gut microbiota in figures:

- **100 trillion bacteria,** 10 times the number of human cells,
- around **1000 different bacterial species,**
- **3.3 million genes,** 150 times more than humans,
- **10^{11} bacteria** per gram of stool,
- only **1/3 of species common** to all humans.

What is the composition of gut microbiota?

This ecosystem contains around one billion different species of bacteria, divided into the following three subcategories:

- **dominant flora,** 90% of which is made up of *Firmicutes* and *Bacteroidetes*. In many studies, the *Firmicutes*/*Bacteroidetes* ratio has proved to be a good indicator of the balance of the digestive microbiota and sometimes also a biomarker of certain pathologies,
- **subdominant flora,** which may contain pathogenic bacteria that are kept in check by the dominant flora,
- **transitional flora,** which originates from food.



Gut microbiota plays a central role in human physiology and serves several functions, including:

Nutritional and metabolic function:

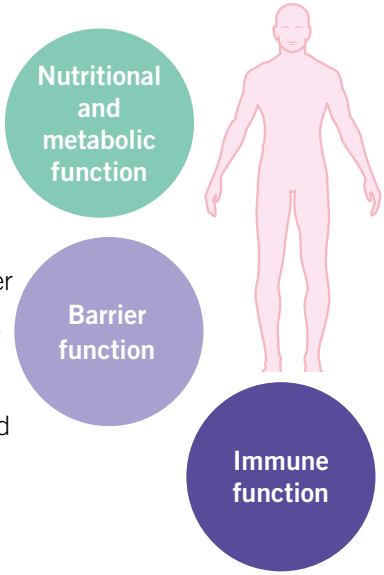
- Degrading dietary fibre
- Participation in the production of certain vitamins

Barrier function:

- Establishes and maintains the intestinal barrier
- Limits the proliferation of pathogenic bacteria.

Immune function:

- Participates in immune system formation and maturation
- Produces anti-inflammatory molecules



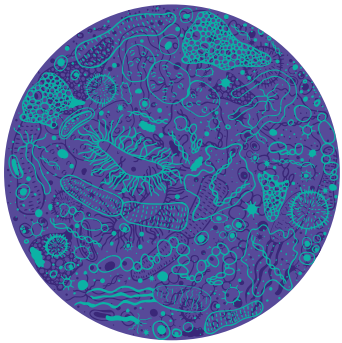
Why must gut microbiota be kept in balance?

To adequately fulfil all of its functions, gut microbiota requires a balanced population of bacterial species. A rich microbiota has a diverse bacterial composition, which is often associated with a good state of health, i.e. a state of **eubiosis**.

Any disturbance due to extrinsic factors (antibiotics, chemotherapy, diet ...) or intrinsic factors (infections, stress ...) leads to a state of **dysbiosis**, potentially causing disorders and conditions such as:

- digestive pain associated with irritable bowel syndrome,
- bowel dysfunction,
- chronic intestinal inflammations,
- obesity,
- diabetes,
- cardiovascular illnesses,
- metabolic disorders,
- allergies and asthma,
- inflammatory bowel diseases.

(Non-exhaustive list)



Extrinsic factors influencing the gut microbiota equilibrium:

- an insufficiently varied and balanced diet,
- too little dietary fibre,
- repeated medication (antibiotics ...),
- regular consumption of alcohol and tobacco,
- stress,
- etc.

Analysis of microbiota

The gut microbiota test from Eurofins Biomnis is based on a metagenomic analysis of stool samples. From the bacterial DNA obtained from the sample, the bacterial 16SRNA gene is amplified by PCR *(Polyremase Chain Reaction)* and then sequenced using a high-throughput sequencer (NGS technology). A minimum of 30,000 sequences must be generated to validate the sequencing of a sample.

The bacteria are identified according to the official taxonomy of the *National Center for Biotechnology Information* (NCBI), comparing the sequences obtained from a database with more than 20,000 references. The technique used here does not allow all bacteria to be identified down to species level, but at least down genus level. The identified populations are defined by the most reliable taxonomic rank in order to optimize the accuracy of the results.

The results of the sequencing are then analysed by microbiota experts.

The gut microbiota analysis is suitable for anyone who:

- suffers from irritable bowel syndrome,
- after taking a broad-spectrum antibiotic treatment, suspects dysbiosis,
- is overweight,
- wishes to assess the impact of a new diet, treatment, or the use of prebiotics or probiotics,
- is curious, concerned about his/her "intestinal balance".

Knowledge of the diversity and richness of the gut microbiota enables patients to adjust their lifestyles and diets.

What are the benefits of the microbiota analysis?

The report issued at the end of the tests details the relative abundance of organisms of proven biomedical interest, comparing the values measured in the patient with those of a population of 100 asymptomatic controls. It details the various phyla and enterotypes, evaluates the biodiversity and highlights the major imbalances. A microbiota expert creates a profile and takes into account the clinical background of the patient to create an overall interpretation of the data.

From a stool sample, the iBiote® test enables the creation of a chart of your patient's gut microbiota, to define his/her eubiotic or dysbiotic state and to identify any dysfunctions.

This test is aimed at men and women of all ages. It is not recommended for children under 3 years of age, as their microbiota is unlikely to have reached a stable state.

Practical details

- **Preanalysis:** stool sample
- **Technique:** New generation sequencing
- **Turnaround time:** 4 to 6 weeks

References

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