Press Release

Intestinal Microbiota:
Evolution of research towards the medicine of tomorrow

Alcimed, an innovation and new business consulting company, offers insights into the prospects related to the intestinal microbiota and the therapeutic issues arising from it.

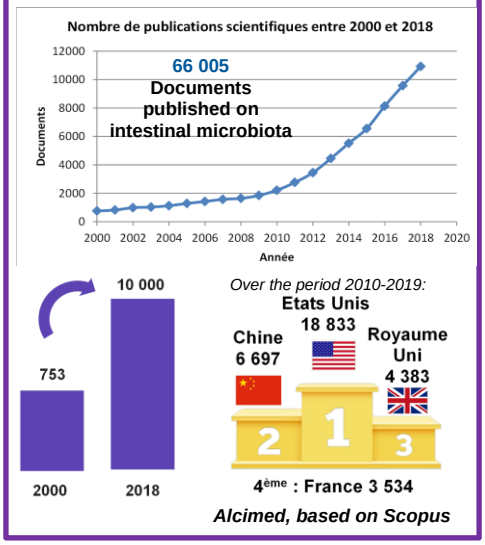
Toulouse, May 22, 2019 - Over the past ten years, there has been a real interest in researching the role of the intestinal microbiota. Located in the digestive tract, the microbiota is the set of 100,000 billion microorganisms with which we live in symbiosis.
So far, the discoveries have demonstrated the crucial importance of the subject to better understand or treat diseases as diverse as diabetes, inflammatory bowel diseases, certain cancers, neurodegenerative diseases etc.... Many opportunities are still to be explored and challenges remain to be overcome in order to move from the area of "possibility" to the medicine of tomorrow.

Interest in the intestinal microbiota has steadily increased since the 2000s, as evidenced by by the more than doubling number of scientific publications between 2013 and 2018.

The hypothesis of a **symbiosis between the human organism and all the microorganisms in our intestine** has been considered for more than a century.

It was only in 2007 that second generation sequencers appeared and made it possible to perform human sequencing at a more reasonable cost. This development of **high-throughput sequencing techniques for genetic material** has accelerated new discoveries about the nature of host-microorganism interactions and their **impact on health**.

Evolution of the number of publications on intestinal microbiota



Thanks to the information it offers on the state of our health and its interactions with our body, the intestinal microbiota opens up many perspectives for the medicine of tomorrow.

The intestinal microbiota has an **important protective role, but is nevertheless involved in many inflammatory, metabolic or neurological diseases.** Research is providing a better understanding of the link between its dysfunction and obesity, diabetes, allergies, anxiety, autoimmune diseases or even autism.

Recent discoveries are opening up opportunities for new tailor-made diets, personalized drugs and therapies, and even preventive medicine.

- **Diet:** diet influences the functioning of the microbiota, for example by promoting the development of certain bacteria that are beneficial to the intestinal flora.
- **Diagnosis**: the link between the presence of certain bacteria in the intestine and diseases allows the study of the microbiota to be used as a diagnosis, for example to detect cirrhosis of the liver. In this case, a test based on the presence of intestinal bacteria can detect and determine the stage of the disease's progression.
- **Personalised care and preventive medicine:** understanding the microbiota makes it possible to develop personalised care and preventive treatments, by providing oral prebiotics (non-digestible food components useful for the activity of certain bacteria), probiotics (non-

pathogenic and beneficial living micro-organisms) or symbiotics, all in accordance with the patients' specific needs. Another method is fecal transplantation, which allows a normal microbiota to be implanted in a sick patient. This therapeutic strategy is already in use and its efficacy is approved in some severe intestinal infections.

- **Prediction of treatment effectiveness:** Finally, the effectiveness of some cancer treatments is correlated with the presence or absence of certain species of intestinal bacteria. **Microbiota analysis could become a systematic test before the implementation of this type of treatment, in order to predict its effectiveness on the patient.**

However, the microbiota is a complex ecosystem which requires extensive research in order to understand it, and whose therapeutic implementation requires special conditions to be able to benefit from its full potential.

Research is carried out in **complex bacterial environments with multiple interactions**: the mechanisms and their consequences on our body are based on several genomes, which considerably slows down therapeutic progress. The causal role of the intestinal microbiota as a cofactor in many diseases is already recognized, but one of the major current issues is to clarify whether disturbances in the intestinal ecosystem are the cause or consequence of other diseases, such as psychiatric diseases. In addition, this work is only carried out in **animal models**. Given the impact of the microbiota on multiple body functions, this could compromise the extrapolation of results to humans.

Secondly, the use of the therapeutic potential of probiotics, and of the microbiota as a biomarker for diagnosis, requires the **establishment of pharmaceutical standards adapted** to microorganisms, both at the level of sampling and storage. Nevertheless, this emerging field of research, while still facing many challenges, holds as many hopes as immunotherapy did 20 years ago!

About Alcimed - www.alcimed.com
Founded in 1993, Alcimed is an innovation and new business consulting firm specialized in life sciences (healthcare, biotech, agri-food), chemicals, materials, energy and mobility; as well as in aeronautics, space & defense, and public policies. Today Alcimed works with major industrial groups, SMEs, private equity players, start-ups, and institutional players. ALCIMED relies on a team of 180 highly-skilled individuals to help its clients in the exploration and development of their unchartered territories: new technologies, new offers, new geographies, possible futures, and new ways to innovate. Alcimed is headquartered in Paris and has offices in Lyon and Toulouse in France, as well as in Germany, Belgium, Switzerland, the United-States and Singapore.

Alcimed is a member of CroissancePlus and the ACI (Association des Conseils en Innovation – Association of Consultants in Innovation).

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