INDUSTRY PARTNER

Microbiotica is transforming personalized medicine with leading microbiome science, identifying gut bacteria linked to patient phenotype with unprecedented precision for the discovery of novel microbiome-based medicines and biomarkers of drug response.

Microbiotica was spun out of Trevor Lawley's Lab at the Wellcome Sanger Institute and is founded on a unique pipeline for culturing and genomically characterizing the entirety of the bacteria in the human gut for the first time. It has the world's largest microbiome genome database and culture collection, a suite of translational in vitro and animal models, and state of the art bioinformatics and AI. The company has a focus on IBD and Immuno-Oncology, and a program in C. Difficile which is spearheading innovation in development of live bacterial products. Visit their website to find out more: **www.microbiotica.com**

Mike Romanos
CEO
Microbiotica

How did your journey in the human microbiome begin?

In 2015, I was contacted by my old colleague Gordon Dougan FRS, Head of Pathogens at the Wellcome Trust Sanger Institute. I was interested in working in a new therapeutic modality but knew little of the microbiome. Gordon introduced me to Trevor Lawley who had been building up a world-class microbiome program. Trevor had made key discoveries in C. Difficile infections and transmission, in rational design of live bacterial therapies, and in solving the challenges of mass culturing and genomic identification of human gut bacteria. Working together we designed a business plan and founded Microbiotica in December 2016.

What do you see as the greatest opportunities in the field?

It has become clear that the microbiome represents nothing less than a paradigm shift that requires us to re-evaluate almost every aspect of biomedicine. These shifts and opportunities come about rarely. The biggest impact is from the gut microbiome, though the importance of microbiota in other organs is being revealed. The microbiome field has re-emphasised the central physiological role of the GI tract in metabolism, immunity and other areas, while at the same time showing that the gut bacteria are key regulators of these functions throughout the body.

The opportunities that arise are major, whether from gaining new understanding of disease or from novel therapeutics. Re-setting the gut microbiota as therapy (Live Bacterial Products) is a direct novel approach that holds much promise for better therapies, for example in diseases such as IBD. At the same time it has become clear that the gut microbiota are key regulators of the response to immunotherapies including immuno-oncology (I-O) drugs. The bacteria themselves could provide biomarker signatures of drug response and LBP co-therapies that could extend the number of patients responding to these very important medicines.

How do you see the challenges and risks to realizing the opportunities?

A key challenge lies in the complexity and variability of the gut microbiome. Fewer than 20% of gut bacteria have been isolated and fully sequenced, and this limits the precision with which bacteria can be linked to patient phenotype. Since phenotypes differ at strain level and most studies do not reach this level of precision, there can be conflicting results. Another challenge is the functional redundancy of unrelated microbiota, which can confound the identification of microbiome signatures linked to phenotype. Solving these challenges is key both to discovery of drug response biomarkers and efficacious therapeutics.

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There are new challenges in the development of LBPs. First, in confirming preclinical efficacy of microbiome-modifying medicines since the translatability of microbiome modulation is not proven. Secondly, the manufacture of cost-effective multicomponent LBPs poses a set of new CMC development challenges.

> “Whether you buy into LBPs or not you have to be interested in the impact of the microbiome in disease and therapy.”

How is Microbiotica’s approach different?

Microbiotica has a suite of capabilities in microbiology, genomics and translational biology that addresses many of the challenges.
Of central importance is the world’s leading Culture Collection and linked Reference Genome Database that enables unprecedented precision of gut bacterial identification at clinical trial scale. The company is adding to this at a very rapid rate through its industrial culturing and sequencing pipeline, providing the best available representation of clinical trial samples for strain-level identification of bacteria. The data that arise from large clinical samples are complex, not least because of functional redundancy of unrelated bacteria, so we use AI techniques to discern microbiome signatures linked to phenotype. This integrated capability drives LBP discovery and clinical biomarker discovery.

The availability of the physical culture collection enables biological evaluation of bacteria in proprietary translational models including humanise microbiome mouse disease models.

What are the main activities and key opportunities for Microbiotica?

Microbiotica has a two-fold business strategy. First, we intend to use clinic-first discovery to identify next-generation LBPs. We are initially applying this to C. Difficile which is a pathfinder program for us to establish our development capabilities and to ulcerative colitis where we are engaged in discovery from an excellent faecal transplant trial sample set. Second, we aim to partner with pharma to apply our platform to discovering drug-response biomarkers and adjuvant co-therapies.

The company is still less than 18 months old and as we grow we intend to leverage our core strengths and expand into new disease areas and other product modalities.

With your broad experience in big pharma and biotech, and having founded Crescendo Biologics, what do you see as the differences compared to other therapeutic modalities?

Throughout my career I have been passionate about translating new molecular technologies into novel therapeutic products. In my career I have been involved in discovery and development of recombinant vaccines, biologics, antibodies, gene therapies and NCEs at Wellcome Biotech, GSK and Crescendo. I do not see the microbiome field as so different in that respect, though it has its own special challenges. However, the microbiome field is different in that it also represents a paradigm shift in biology, so the interest is universal. Whether you buy into LBPs or not you have to be interested in the impact of the microbiome in disease and therapy.

What are you looking forward to most at the 3rd Annual Microbiome Drug Development Summit?

This is a great meeting in a great location. It’s probably the best in the microbiome field for a biotech company, for networking and hearing the latest developments. So we are coming with several of the Microbiotica team.

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A huge thank you to Mike Romanos for taking the time to share his insights with us.

If you enjoyed reading about Mike’s experiences, there will be an opportunity to meet him at the Microbiome Drug Development Summit (June 20-22, Boston).

For more information about the event, please visit the website at: www.microbiome-summit.com