

In 2025, the Belgium-based biotechnology start-up Perseus Biomics introduced DynaMAP (Dynamic Microbiome Abundance Profiling), a metagenomic technology platform designed to deliver high-resolution microbiome analysis. In the same year, the company also launched MetaMAP, an integrated benchtop device that enables DynaMAP customers to perform analyses within their own laboratories.

Perseus Biomics traces its origins to a joint research project between the [Hofkens Laboratory for Photochemistry and Spectroscopy](#) at KU Leuven (Belgium) and the [École polytechnique fédérale de Lausanne](#) (Switzerland).



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Researchers at the Hofkens Lab repurposed methyltransferases and developed in-house a method to fluorescently modify the enzymes' substrate S-Adenosyl Methionine (SAM), to fluorocode metagenomic DNA. Fluorescent patterns along DNA fragments exceeding 20 kbp form robust taxonomic barcodes with strain-level resolution. This code can be resolved using optical mapping using fluorescence microscopy. These barcodes are resolved through optical mapping using fluorescence microscopy. Proprietary analysis software scans the fluorescent patterns and assigns them to their source organisms, allowing microbiome profiling at throughputs readily reaching the gigabase scale. Originally funded by an ERC Advanced Grant, and afterwards supported by FWO grants, this research ultimately led to the establishment of Perseus Biomics. The Belgian-Swiss collaboration inspired the company's name, as Perseus is also a binary star. The research project began in 2012, and the spin-off company was founded in 2016.



Prof. Dr. Johan Hofkens. © Hofkens Lab

Quick

DynaMAP combines advanced fluorocoding with optical mapping to enable rapid bacterial detection in complex samples, delivering results within a one-day turnaround time. The workflow begins with DNA extraction, yielding long DNA fragments suitable for analysis. These fragments undergo site-specific enzymatic labelling and are subsequently combed onto a flat surface. Single-molecule fluorescence microscopy generates a unique optical map for each fragment, and a finely tuned pattern-matching algorithm compares these maps against reference databases to identify and confirm bacterial strains.

Importantly, this process does not require DNA amplification or library preparation, resulting in an unbiased analytical workflow.

Easy

“The DynaMAP technology, which leverages optical mapping of fluorocoded DNA to resolve bacteria at strain level, has demonstrated its ability to distinguish between strains with as much as 99.5% average nucleotide identity (ANI)—a level of resolution that can be unreliable using traditional short-read next-generation sequencing,” explains sales manager Melissa Meert.



DynaMAP can analyse several samples at the same time. © Perseus Biomics

“By imaging genome structure rather than sequencing every nucleotide, DynaMAP rapidly reveals strain-defining features in complex samples. The technology supports a wide range of use cases, from biotic development to biomarker discovery, and is already

being implemented across several innovative projects. Biotics developers, for example, use DynaMAP's strain-tracking capabilities to monitor the impact of specific probiotic strains on gut microbiota composition. As many probiotic strains belong to species already present in the native gut microbiome, DynaMAP has become an indispensable tool for these studies."

Optimism About Depression

In the biomarker development domain, Perseus' clients employ DynaMAP's high sensitivity to identify microbial signatures associated with various conditions at strain level. An example is the EU-funded project [OPADE](#), which applies the technology to develop predictive biomarkers aimed at improving the diagnosis and treatment of patients with major depressive disorder.

Strain-tracking capabilities are not limited to in vivo applications. Fermented food and probiotic manufacturers also use DynaMAP to monitor strain composition during production and for quality control. A notable example is [DynaFERM](#), a collaboration between Perseus Biomics and the Belgian food producer [Puratos](#), supported by the province government. [This initiative](#) uses DynaMAP to monitor yeast and bacterial strains in industrial sourdough fermentation. Thanks to its high resolution and rapid turnaround, unwanted strains can be detected early, reducing contamination risks and minimizing waste, while also supporting consistent taste and product quality.

The benchtop laboratory device MetaMAP is used to perform gut microbiome analysis on site. It allows labs to process up to 8 samples in a single run and deliver same-day, strain-level results. "It is designed for laboratories that want fast turnaround times and full control over microbiome testing, without relying on external sequencing or data analysis services."



MetaMAP allows customs to perform analyses in their own labs. © Perseus Biomics

Many Applications

The global microbiome profiling and sequencing market is dynamic and exhibits strong growth potential. “While the market is currently dominated by biotics developers and the food industry, the strongest growth in the coming years is expected in clinical applications and drug development,” says Meert.

MetaMAP



Quick and easy. © Perseus Biomics

[MetaMAP](#) is positioned to perform gut microbiome analysis on site. It allows labs to process up to 8 samples in a single run and deliver same-day, strain-level results. The device is designed for laboratories that want fast turnaround times and full control over microbiome testing, without relying on external sequencing or data analysis services. It enables fast and cost-efficient microbiome analyses for personalized dietary advice in the consumer market, provides athletes with rapid insights to optimize training strategies, and supports acute healthcare scenarios where timely diagnoses and prognoses can be life-saving. “Concrete examples include the use of microbiome profiles as prognostic markers for inflammatory bowel disease, vaginal infections, and cancer, as

well as applications in faecal microbiome transplantation for athletes and patients with *Clostridium difficile* infections.”

Perspectives

Perseus Biomics currently employs 25 people, with potential growth to approximately 35 employees in the future. Most team members are postdoctoral researchers or PhD candidates, complemented by laboratory technicians and engineers. In addition to its headquarters in Leuven, the company maintains an IT department composed of remote specialists based in Poland.



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