

Agilent case study: 4200 TapeStation system

Driving Omics Excellence: OHMX.bio's Innovative Solutions for Common to Exotic Research Projects

Pushing the boundaries of multi-omics research

Multi-omics research is transforming various scientific fields by enabling researchers to explore complex biological systems through advanced techniques. By integrating data from genomics, transcriptomics, proteomics, and other omics disciplines, scientists can gain deeper insights, leading to a more comprehensive understanding of biological processes. Scientific curiosity to explore life's complexities continues to drive discovery. An expanding array of technologies is essential to achieve higher levels of insight, providing focused opportunities for deeper exploration.

OHMX.bio, founded in early 2019 as a spin-off from Ghent University in Belgium and now part of anacura, embodies this innovative spirit. The company provides a comprehensive suite of state-of-the-art omics solutions in five key areas: bioinformatics, epigenomics, genomics, proteomics, transcriptomics, and translationalomics—with ribosome profiling being a cornerstone of their offerings. "Ribosome profiling attracts certain kinds of exotic samples. There aren't many companies that offer solutions for these unique project requirements," explained OHMX.bio's Chief Operating Officer Hendrik Van de Voorde. These exotic samples are rare or unusual specimens that aren't common in typical laboratory settings but offer specialized insights.

Over the years, OHMX.bio has evolved into a specialized Clinical Research Organization (CRO), delivering tailor-made research projects that address the unique biological and scientific questions of their clients. Central to OHMX.bio's success is their unwavering commitment to a customer-first approach. The team prides itself on collaborating closely with clients, providing high-quality solutions targeted to their specific needs. This dedication to customer satisfaction has built a reputation for reliability and excellence, making them a valuable partner in multi-omics research.



Hendrik Van de Voorde, chief operating officer and lab operations expert at OHMX.bio, with the Agilent 4200 TapeStation system.

Advancing unique research projects

OHMX.bio offers start-to-finish omics solutions, from sample extraction and quality control (QC) to high-throughput next-generation (NGS) library preparation and sequencing. Their services cater to many applications, including expression analysis, clinical research, biopharmaceutical QC, and single-cell sequencing. The company's strong focus on third-generation sequencing (TGS) techniques sets them apart. Unlike NGS, which relies on short read length and PCR amplification, TGS allows for long-read sequencing capabilities. This difference enables more accurate and comprehensive analysis of complex genomic regions, structural variations, RNA expression, DNA methylation, and metagenomics.¹

Technologies like TGS have allowed the OHMX.bio team to explore more challenging areas of research, where the diversity of sample types matches the complexity of the questions they aim to answer. OHMX.bio recognizes the importance of accommodating this diversity, offering custom workflows that support analysis of both common and exotic sample types. This flexibility not only distinguishes the company within niche scientific research industries, but also underscores the significance of their work in advancing multi-omics.

Their expertise spans a broad spectrum of sample types, from cell lines and tissues—whether fresh or formalin-fixed, paraffin-embedded—to blood and body fluids. Notably, the team has handled exotic samples such as muscle tissue from Arctic ground squirrels collected in Alaska, and seawater containing phytoplankton for research on the impact of microplastics in marine environments.

These diverse studies contribute uniquely to the scientific community. By addressing critical questions in health, environmental science, and more, OHMX.bio's work has a tangible impact. Their ability to adapt library preparation workflows to the specific needs of each project—whether through established protocols or highly customizable workflows—ensures that they can meet the unique research questions of their clients.

Overcoming growth challenges

As OHMX.bio continues to expand, the company has faced inevitable challenges. "As we continue to push the boundaries of omics research, of course it brings challenges," emphasized Mr. Van de Voorde. "Upscaling our services for higher throughput while maintaining the high quality and operational excellence that we stand for, was one of these challenges."

To address these difficulties, the team has incorporated new workflows and equipment. For QC purposes, the Agilent 4200 TapeStation system has provided significant enhancements. Mr. Van de Voorde highlighted the importance of QC in their activities, noting that the team often undertakes lengthy and higher-cost projects with the expectation of high-quality data. "We work under the principle of avoiding garbage in, garbage out," he explained. "If we start with samples of low quality, it's difficult to generate data of high quality. So, it's very important to perform thorough quality control on samples as well as the final sequencing library products."

The TapeStation system plays a crucial role in many aspects of their workflows. The system is used to determine the integrity of DNA and RNA samples and to assess the quality of prepared libraries before downstream applications. OHMX.bio implemented the TapeStation system in early 2021 to support higher throughput projects, upgrading from the lower-throughput Agilent 2100 Bioanalyzer system.

Choosing an ideal QC system

Despite many other options, the team knew they needed a system that provided detailed data on nucleic acid quality and integrity while allowing for high-resolution and sensitive visualization of libraries. "The 4200 TapeStation system was the logical choice for our quality control needs," said Mr. Van de Voorde. He noted that the learning curve when switching between the two systems was minimal. The team appreciates the intuitiveness of the TapeStation system, including the straightforward manuals that clearly explain system operations.

As OHMX.bio has moved towards more high throughput projects, the use of the TapeStation for sample and library QC has increased accordingly. However, the Bioanalyzer system is still incorporated into ribosome profiling workflows, which require small RNA analysis. "It's quite important to have an intermediary quality control system for these instances," said Mr. Van de Voorde.

Along with the TapeStation system, the team uses different ScreenTape assays, emphasizing the system's versatility. One of the most frequently used is the Agilent Genomic DNA ScreenTape assay to assess the quality of the DNA samples used for long-read sequencing. "The Genomic DNA ScreenTape assay gives us a clear visual of degradation and the DNA Integrity Number (DIN) provides a numerical assessment of gDNA integrity, both crucial elements for downstream nanopore sequencing technologies," Mr. Van de Voorde explained.

Additionally, the Agilent High Sensitivity RNA ScreenTape assay is used for workflows requiring RNA quality analysis of low-abundance samples, and the Agilent High Sensitivity D1000 ScreenTape assay is applied to visualize the final NGS libraries.

Maintaining excellence through high-quality data

By integrating advanced technologies and maintaining rigorous QC standards, OHMX.bio continues to uphold its commitment to excellence, ensuring that their omics services deliver high-quality and reliable results. Since implementing the TapeStation system into their workflows, the team has seen improvements, especially as they transition to higher-throughput operations.

Mr. Van de Voorde highlighted that the robustness of the TapeStation was a key factor in facilitating this transition. "For example, we know that if the system is left idle for two weeks, then we can just start using the system wherever we left off, without issue." This reliability has been essential for maintaining consistent QC across different projects

Working toward future successes

Looking to the future, OHMX.bio has begun to expand its focus towards clinical research trials as of 2024. The company has been investing significantly in the certification aspects of clinical trials, as well as the development of related solutions.

"We are aiming to keep expanding our role into clinical trials," Mr. Van de Voorde stated. "We use advanced omics expertise from early discovery trials to late-stage validations, such as phase I or II studies, applying broad techniques like RNA sequencing that enable comprehensive biomarker discovery and provide broad views of the data." He added, "We are also moving toward phase III clinical trials where we will refine our approach and use more targeted techniques like PCR." The TapeStation software security module will provide the audit trail feature required for clinical research trials.

Furthermore, OHMX.bio plans to expand their biologics QC portfolio, which is becoming increasingly relevant in the omics field. The company aims to concentrate on areas such as QC of mRNA vaccines, transfected satellite cells, immune cells, CAR T-cell lines, and even microbiome studies.

OHMX.bio is poised for further growth opportunities after being recently acquired by anacura. anacura, a Ghent-based company, oversees various organizations operating as independent analytical centers of excellence in healthcare and life sciences that provide analytical services to pharma and biopharma companies. Mr. Van de Voorde emphasized that the team will continue to leverage the versatility of the Agilent 4200 TapeStation system for critical QC analysis across its expanding projects.

High-quality data is critical to successful results no matter the multi-omics application, whether working with simple cell lines or exploring niche markets that require exotic sample analysis. OHMX.bio's dedication to versatility and innovation in handling a wide range of biological questions solidifies their leadership in multi-omics research.

Learn more about [OHMX.bio](#)

Reference

1. Scarano, C.; Iolanda Veneruso; Redenta, R.; Gennaro Di Bonito; Secondino, A.; D'Argenio, V. The Third-Generation Sequencing Challenge: Novel Insights for the Omic Sciences. *Biomolecules* **2024**, *14* (5), 568–568. <https://doi.org/10.3390/biom14050568>.

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