Case Study

New target discovery

in the role of the mechanical microenvironment of fibrotic tissue

At Boehringer Ingelheim (BI)

Boehringer Ingelheim is a leading research-driven biopharmaceutical company, focusing on creating value through innovation in areas of high unmet medical need. Senior scientist & lab leader Dr. Vincent Fiore focuses his research on immunology and respiratory diseases, with groundbreaking research in the field of mechanobiology for the microenvironment (ECM) of fibrotic tissue. Dr. Nicolas Villa-Roel, a postdoctoral researcher, specializes in gastrointestinal fibrosis and smooth muscle cell biology.

Dr. Fiore and Dr. Villa-Roel currently work on advanced *in vitro* models that reproduce fibrotic tissue's mechanical environment using synthetic-based hydrogels associated with cells, such as fibroblasts. They are focusing on monitoring the microenvironment of their fibrotic 3D models for drug development research. For this reason, they are using Optics11 Life's Pavone platform, which offers high-throughput mechanical screening in well plates with a combination of both optical and fluorescence imaging.

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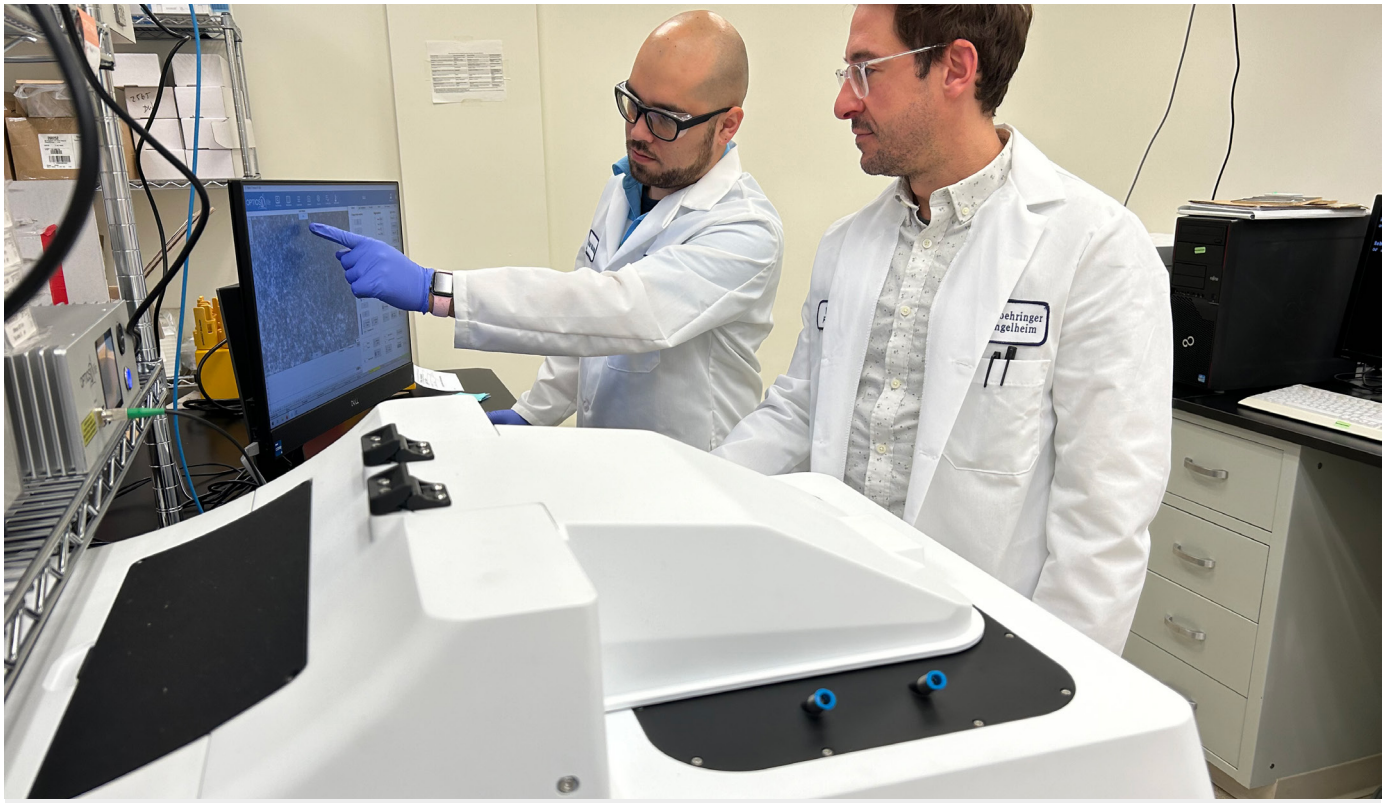

“We utilize mechanics in addition to transcriptional profiling to determine how the cell biology of our models compares to the cell biology within a patient” Dr. Fiore indicates.

Dr. Villa-Roel adds, *“I’ve been able to switch probes, test different materials and get the data we wanted to get so far, with yields in the high-90% range. Calibration is very straightforward and much easier than traditional technologies [for mechanical characterization]. We’re able to get consistent measurements from day-to-day using the same probe.”*

Dr. Villa-Roel especially appreciates the ability to perform automated matrix scans, indicating *“I’ve been using the matrix scan a lot, as the properties of the material are very localized. We want to measure the properties of the ECM. I set it up early in the morning and let it run. It runs even if there is a small error like in cases where it cannot get a measurement. It doesn’t stop. It’s nice to see the progress later in the day. I don’t have to constantly monitor it.”*

In the future, Dr. Fiore and Dr. Villa-Roel intend to scale up their experiments further with Pavone, perform live recordings, and correlate images with mechanical measurements using the fluorescence module. *“The unique capacity of the Pavone to expand the throughput is its strength.”*

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