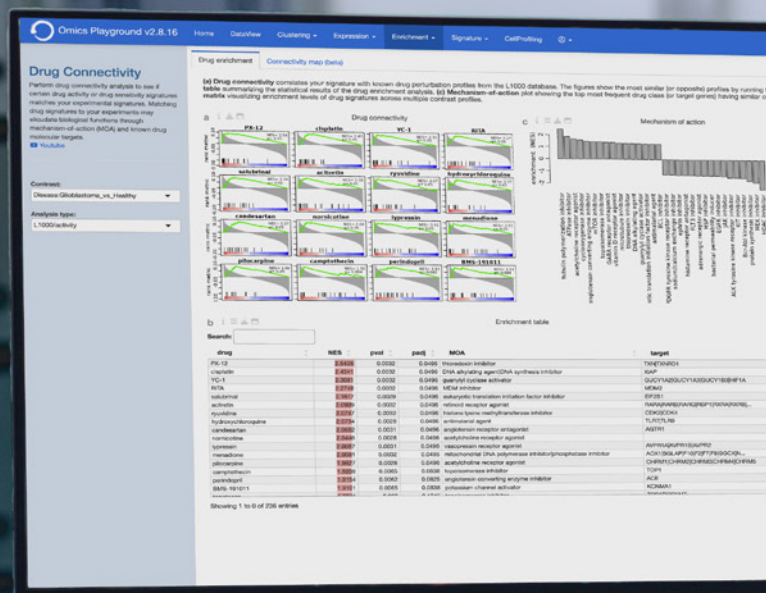


Intuitive and Easy-To-Use Omics Data Analysis

**Using Human Brain Organoids
for Drug Screening**



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CASE STUDY

CASE STUDY

INTUITIVE AND EASY-TO-USE OMICS DATA ANALYSIS

Using Human Brain Organoids for Drug Screening

Field: Biologically inspired engineering

Headquarters: Boston, Massachusetts

GOAL

A leading interdisciplinary research institute in Boston with an expert team of >350 full-time staff uses biological design principles to develop new engineering innovations that have the potential to transform medicine and solve healthcare and environmental challenges. By bridging the gap between science and industry and mimicking biological principles of self-organization and self-regulation, scientists are developing breakthrough technological solutions in diverse fields such as healthcare, energy, architecture, robotics, and manufacturing. The goal is to turn these into commercial products and therapies through the creation of new startups and corporate alliances.

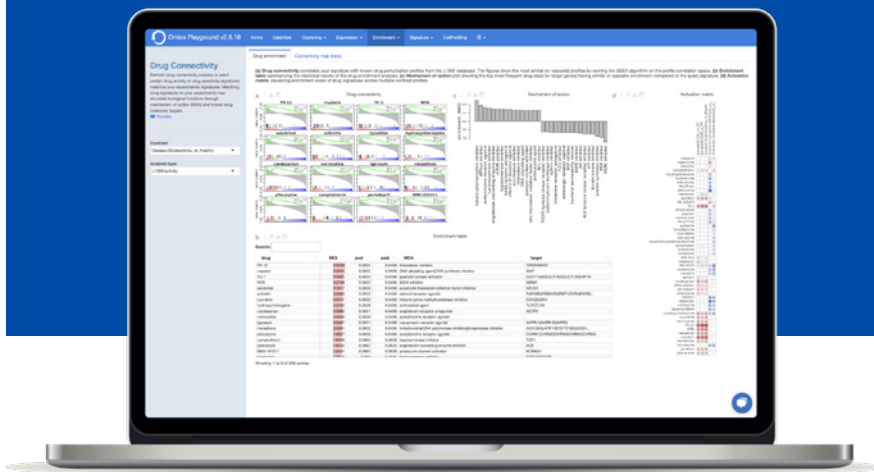
CHALLENGES

- Outsourcing data analysis to external service providers or internal bioinformaticians caused a time bottleneck and was not flexible enough. The researchers needed to visualize more and dig deeper into the data themselves.
- With previously used software it was complicated or impossible to create many diagrams at the same time. The researchers needed a solution that would allow them to upload many data sets and run multiple comparisons simultaneously.
- A solution was needed that suggests which biostatistical tests to run while also being intuitive to use.

RESULTS

- It was observed that treatment really affected protein expression compared to healthy, untreated samples.
- Several specific protein targets and pathways have already been identified.
- Significant time savings and flexibility in the analysis of omics data could be achieved.

«Using the BigOmics platform, we were able to observe that treatment really affected protein expression compared to our healthy, untreated samples. It already allowed us to identify several specific protein targets and pathways. It's really useful to see major effects on proteins and comparisons between data sets.»



MARIANA
RESEARCH ASSISTANT –
HUMAN CEREBRAL ORGANOID

Mariana, Research Assistant in the field of human cerebral organoids, has thoroughly evaluated the Omics Playground in her research. Mariana and her team are currently focused on 3D organ engineering and are using human brain organoids for drug screening and repurposing. The focus of their project is to use a human rather than mouse model to develop drugs for specific diseases, so that there are more similarities to human proteins and the structure of the human brain.

In which research context do you use Omics Playground?

“We have a pipeline proposing drugs that we can repurpose for different diseases. The main disease we are testing our pipeline on is bipolar disorder. We use the hits that the pipeline suggests and test the drugs on brain organoids. Our goal is to find out if these drugs are useful or not, and our approach is multi-omics. We do RNA-Seq, we do proteomics, and we also do a lot of functional assays.”

What made you work with Omics Playground?

“When I started working with Omics Playground, I already had a large amount of RNA-Seq data that was processed at a very early stage of analysis.

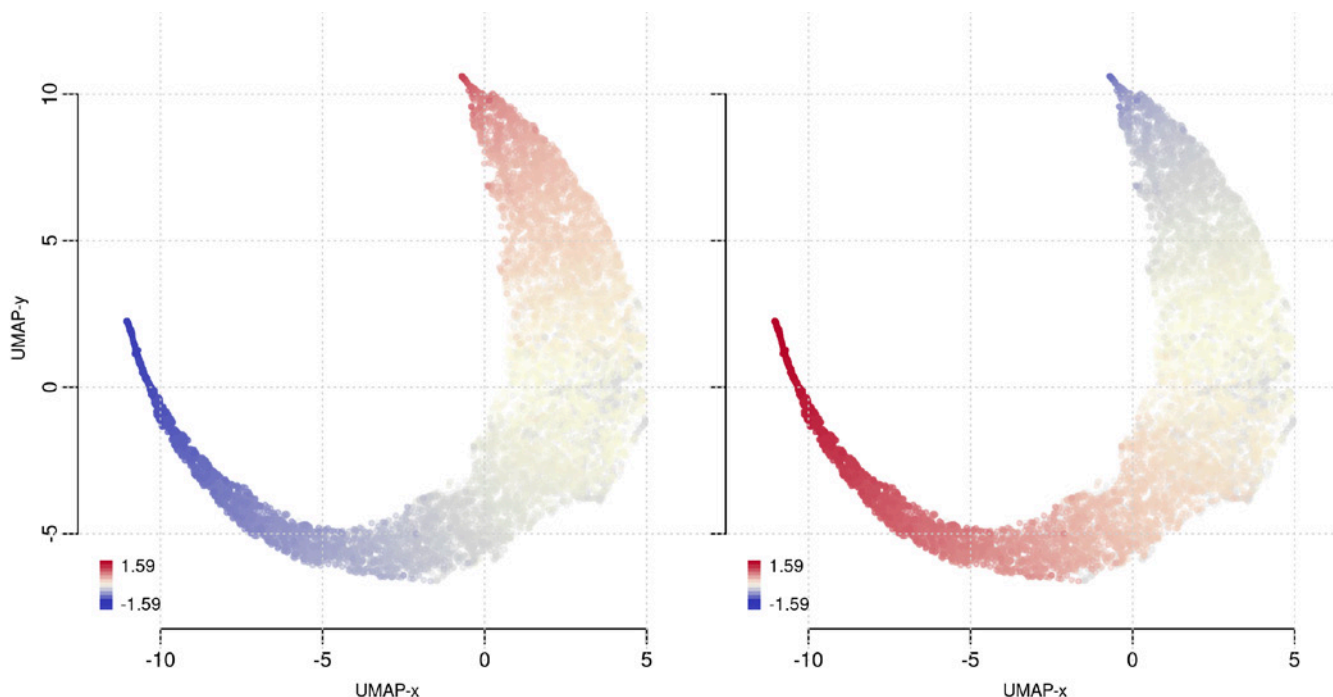
We sent it to a company for sequencing and they just handed us a file. But we wanted to visualize more and dig deeper into the data,” Mariana continues. “We do have a bioinformatician in-house, but they are very busy, and it takes at least 3 to 5 days, if not longer, to get an image that we then want to process again and look at in a different way.”

« When I first heard about BigOmics, I was excited to be able to just upload the datasets we already had and play with the data myself. As we don't know too much about programming, we wanted to search the data with the freedom that the platform offers. »

What advantages has Omics Playground offered you?

“The analysis tools that are commonly used are often based on Python or R, which are already somewhat programming-centered. For someone not coming from a biostatistics or bioinformatics background, the BigOmics platform is therefore very helpful as it suggests which biostatistical tests to run and it offers a lot of flexibility in visualizing the data with different graphs.

For example, we want to study differentially expressed proteins at the same time. Omics Playground gave us the possibility to do that, while other tools we evaluated only output what you ask them to.”



“Using the BigOmics platform, we were able to observe that treatment really affected protein expression compared to our healthy, untreated samples. It already allowed us to identify several specific protein targets and pathways. It's really useful to see major effects on proteins and comparisons between data sets,” Mariana describes the benefits of the platform.

« We have about 20 conditions we want to compare simultaneously. It takes much longer to do that the usual way. Also, allowing data from different sources such as RNA-Seq, proteomics, and single-cell RNA on the same platform is very useful. »

Mariana and her team were won over by the platform's intuitive design, which allowed them to learn how to use it effortlessly.

What further convinced the researchers to choose Omics Playground was the ability to upload many data sets and run multiple comparisons simultaneously.

BIGOMICS SOLUTIONS

CENTRALIZED, COST-EFFECTIVE DATA ANALYSIS STREAMLINES SCALING AND IMPROVES PRODUCTIVITY

- ✓ RNA-Seq data are analyzed through peer reviewed algorithms, so scientists can quickly identify the most promising therapeutic targets without requiring any coding knowledge.
- ✓ As more experiments are performed, the newly added data sets can be compared to previous results and more than 6,000 public data sets, providing the necessary context for scientific breakthroughs.
- ✓ Moreover, more than 50,000 public gene sets and pathways such as GO, REactome, Hallmark, and Msigs can be accessed, as well as drug connectivity and drug sensitivity databases with more than 30,000 drug expression profiles.
- ✓ Since all omics data is in one place, scientists spend 62% less time on rerunning.

INTERACTIVE VISUALIZATIONS GIVE LEADERS A 360-DEGREE VIEW OF R&D PROGRESS

- ✓ BigOmics helps managers and executives have an eye on day-to-day progress while also providing a cohesive overview of all different research projects.
- ✓ Across the numerous projects, many decisions have to be made rapidly yet confidently. With the full history of their experiments at their fingertips, executives can make prompt, data-driven decisions.
- ✓ Since BigOmics has improved the reproducibility of data, it's much easier for leaders to forecast and set informed timelines.

A UNIFIED DATA ANALYTICS SYSTEM ALLOWS FOR INTERDISCIPLINARY COLLABORATION

- ✓ Repetitive and time-consuming data analysis iterations can be avoided since biologists are able to gain insights from their data directly from the platform.
- ✓ Everyone can easily access the same version of data and share results in team meetings as scientists can present directly from the Omics Playground.
- ✓ Bioinformatics resources are conserved, allowing them to process requests faster.



« The BigOmics team supported us very well. From the beginning, the team got in touch to ask if there were any issues. Not only in terms of usability, but they also had a scientist who had done experiments similar to ours who guided us on what was useful to do. So it wasn't just about the biostatistical help, but also the biological insight. »

MARIANA
RESEARCH ASSISTANT - HUMAN CEREBRAL ORGANOIDS



Want to see it for yourself?

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