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E-Notebook and Spotfire™ for Biologics

Supporting Biologics R&D with Revvity Signals

E-Notebook, Structured data, and Spotfire™ Enable a Biologics-Specific Workflow

An innovative, global healthcare leader that is committed to improving health and well-being worldwide built a biologics R&D workflow that, incorporates Revvity Signals E-Notebook electronic laboratory notebook with structured data management and the Spotfire™ data analysis and visualization platform. In addition to efficiently capturing, correctly structuring, and appropriately sharing data and collaborating more broadly, the integrated solutions have reduced time spent on administrative tasks by 30-50%.

The Need for Integrated Informatics Solutions

The biologics R&D group, comprising over 120 scientists, is actively growing and purifying biologics from cell lines to discover candidates that:

- Can be consistently produced

- Effectively work against the disease or indication

- Are safe

The complexity of the biologics workflow requires centralized, integrated solutions that standardize methods around collecting, analyzing, managing, aggregating, and displaying data. Without harmonized tools, the group encountered challenges in capturing and organizing data in a way that could be consumed by downstream scientists, and with ensuring that the proper information traveled with each drug candidate. Centralized solutions, therefore, presented opportunities for improving productivity and reducing information loss or experiment do-overs to generate a positive return on investment.

The director of scientific modeling platforms, says it "takes a village" to develop biologics, because it involves so many different types of scientists, researchers, principal investigators, and project managers, working in multiple organizations across widespread geographic locations. Each functional area focuses on its own technologies, but must understand the inputs and outputs required of all functions in the workflow. Not only must everyone receive and have access to data and information where and when they need it, but they must share an appreciation of others' need for and use of data. Therefore, informatics solutions must be tools for collaboration as well.

When E-Notebook was deployed in this organization's R&D labs more than a decade ago, it was regarded as a breakthrough in intellectual property data capture compared to paper lab notebooks. Well-established across the company's R&D organization, E-Notebook has replaced paper and emailing of results. Over time, and as the number of users grew – to now well over 3,000 – E-Notebook's greater capabilities for analytics began to be realized. Templates in E-Notebook have helped to standardize formatting of data to make it more useful for upstream and downstream use. In addition, structured data can be captured for experimental results while sample and request tracking can be carried out through user defined templates. Structured data templates are formatted to minimize data entry, based on a thorough understanding of upstream and downstream data requirements and the workflow. The templates can be drugcentric or study-centric, to suit the users' needs.

The Structured Data Module from E-Notebook helps with automating calculations, graphs, and tables, with its own graphing capability. Or users can use the Report module or third-party solutions such as GraphPad Prism.

While E-Notebook is primarily regarded as the domain of data producers, facilitating data entry, Spotfire™ is deployed for data consumers, to help them more easily view and interpret biologics data and results in a visual platform.

Today, with the ability to query results and see visualizations directly from Spotfire™, scientists, business leaders and other throughout the organization are able to make effective, strategic decisions from E-Notebook data. Throughout this evolution, E-Notebook has increased the ease of access to information, which is then consumed by a broader audience.

Querying structured data from E-notebook data within Spotfire™ is very straightforward. Once in Spotfire™, it is easy to aggregate

data and transform it in multiple ways. The choice of visual presentation of results can be decided by end users to address their specific needs.

Advice for Implementing Integrated Biologics Solutions

To achieve the level of success this R&D organization has, the scientific modeling platform director recommends organizations acknowledge researchers' reaction to new tools and use effective change management – particularly communication. He suggests involving end-users in the evaluation and selection phase to garner buy in from both bench scientists and senior science management. To eliminate pain points within the workflow, it is important to understand the needs and responsibilities of both data generators and data consumers. This ties closely to the second recommendation, which is structuring data.

This organization devoted time to understanding how the biologics lab researchers worked, and the difference between generating biologics and characterizing them. They established a model for data organization by learning what kind of information was needed for various people to perform their roles, and avoided asking data generators to capture data in a structured way if it was not required for downstream analysis. People were asked what data they needed, and what decisions the data would support.

A third recommendation is to "lean out" processes. By mapping out the biologics workflow, the R&D group was able to determine where technology could reduce administrative tasks. This led to a 30-50 percent reduction in administrative tasks and time within the biologics discovery process.

Finally, adopting iterative, collaborative development principles is also recommended. With the idea of getting to opportunities faster, the organization involved the correct subject matter experts to design and create the workflow, test it among stakeholders, and change, test, and polish it.

Different Perspectives

To win over bench scientists, the organization helped them see how the new informatics solutions could make their lives easier. The Structured Data Module from E-Notebook enables researchers to, for example, randomize animals into groups to study tumors. In Spotfire™, those same samples can be presented in a colored scatter plot to easily sort different animal proteins, which enables the researcher to readily evaluate whether the random results meet the study criteria.

For principal investigators overseeing many study groups, the integrated solutions would, in the same example as above, let the PI quickly see results and monitor tumor growth by treatment group over time.

Project managers overseeing many projects, each with many studies, can use Spotfire™ visualizations to easily monitor the status of projects to determine proper resourcing and note any delays.

Revvity Signals E-Notebook, with its ability to manage structured data, and Spotfire™ allow data to flow outward and upward, and more people closer to the data. The program director said it has created a data democracy that leads to better drug development decisions.

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