



Templating Complex R&D Workflows for Consistency and Traceability

For research teams handling intricate multi-step workflows across functions, inefficiencies and gaps in sample tracking are common. The cytogenomics team at the Astellas Institute for Regenerative Medicine, a biotechnology company developing therapies to rejuvenate, regenerate, and replace damaged tissues, tackled this challenge by using Signals Notebook, Revvity Signals' premier electronic lab notebook. They used templates to create end-to-end documentation, communication, and traceability for their complex RNA sequencing operations.

Tracking Multi-Person Experiments with Communication Across Continents

The Astellas cytogenomics team carries out complex RNA sequencing experiments. An internal team of eight shares the work, with various steps of an experiment—RNA extraction, library preparation, sequencing, mapping, and analysis—being handled by different individuals over several days, and with each person involved in multiple experiments in a single day. The work also involves ongoing communication with the scientists requesting the studies—often on another continent—about critical information needed to conduct the experiments, status updates, and discussions about results and interpretation.

Given the complexity and time-sensitivity of the work, the team was hindered by process inefficiencies. These included suboptimal tracking methods, errors and gaps in completing intake forms and experiments, cumbersome procedures to check on and communicate status, and delays through the iterative discussions involved in interpreting results. They needed a system that would streamline their workflows, facilitate communication, and ensure consistency and traceability.

New Capabilities Needed for Productive R&D Collaboration

To address these challenges, the Astellas team required an advanced electronic lab notebook (ELN). After careful consideration, Astellas selected the Signals Notebook solution for its comprehensive feature set that aligned with their R&D environment's needs. As a secure, cloud-native ELN, Signals Notebook enables users to capture, organize, and customize their data. Under managed permissions, internal and external colleagues can collaborate and share insights effortlessly within the ELN. Users can quickly and efficiently search millions of experiments across many projects and readily integrate data from multiple sources, streamlining their research processes and enhancing productivity.

"We have requesters from California. We have requesters from Japan. And the beauty of Signals Notebook is that we can communicate all the different ideas and...all the discussions will be part of the experiment. So at the end, whenever we close this experiment, it will have the entire package."

- Gabriel Gonzalez, Cytogenomics, Astellas Institute for Regenerative Medicine

End-to-End Templates for Effective Workflows

Once Signals Notebook was in place, the Astellas cytogenomics team created templates within the solution to enable effective workflows for their RNA sequencing experiments. By doing so, they achieved significant improvements in efficiency, traceability, communication, and audit trails.

Consistency in Multi-Person Experiments

The Signals Notebook solution allows for template customization, which makes it easy to create sections for multi-person experiments. In Astellas' case, they created three main sections:

1. For the requester
2. For analysts
3. For protocols.

Deploying these templates at Astellas greatly improved consistency across the workflows.

Requester Capabilities

Using these Signals Notebook templates ensures that the requester provides all the critical information needed for an experiment. The rationale tab in this section requires that the requester specify not only the type of analysis—such as single cell or bulk RNA sequencing—but also the specific information sought, such as the counts of a specific gene or identification of markers. This section also captures all the sample metadata, such as details about the origin and processing of cells, which can be crucial in interpreting differences in the results of sequencing experiments. A tab with sample preparation guidelines reminds requestors of the importance of preparing clean samples to ensure quality results.

Analyst Capabilities

The templates also ensure consistency and tracking of the work carried out in-house. As an analyst follows the protocol provided in the protocol section, all tasks performed are captured, including details such as sample names, reagent lots, and catalog numbers. The requestor can follow along live, seeing any annotations or changes as they happen.

Improved Tracking and Traceability of Samples and Experimental Data

Signals Notebook automatically timestamps and tracks the collection and storage of samples and data, along with the user who input the information, ensuring full traceability and accountability throughout the research process.

These features have provided valuable time savings to the Astellas team. Prior to using Signals Notebook, requestors often sent emails asking about the status of experiments, and the team had to dig through paperwork to find the answer. Now, the requestor has direct access to that information through the Signals Notebook.

Reduced Errors and Rework

The customizable templates in Signals Notebook also reduce errors and improves accuracy in multi-person workflows, especially when users input data using a portable tablet so nothing is missed. Upon completing a form, users must click the "complete" button, which automatically timestamps the task with the user's information. This feature provides visibility into any errors that may have occurred, enabling the team to identify and address issues early in the process. For the Astellas team, which is based in North America and collaborates with researchers in Asia, getting errors corrected through the online platform has enhanced collaboration and accelerated projects.

Enhanced Communication and Visibility Across Teams

Signals Notebook streamlines collaboration by allowing experiments to be easily shared with colleagues, while managed security ensures selective access. This targeted visibility promotes focused communication, transparency, and accountability. Team members can track experiment progress, view relevant data, and contribute when needed.

At Astellas, the new workflow is facilitating discussions about the analysis of each experiment. The analysis section of each RNA sequencing experiment goes through multiple revisions before being finalized, as internal and external collaborators review results, such as how many targets were found and the expression differential between sample A and sample B.

Here, for example, the requester might ask, "In the results I see a target that is differentially expressed between two samples. Can you add a third sample and compare it?" Within Signals Notebook, the team can respond rapidly by readily pulling in such data from another experiment, with a link that makes it clear which experiment the added sample came from.

Increased Efficiency with Templated Processes

By using pre-defined templates, researchers save time and effort, as they don't need to create workflows from scratch. At Astellas, for example, a template created for single cell RNA sequencing experiments could be edited and adapted for bulk RNA sequencing experiments as well as other types of testing being carried out in the group. Templates can be easily shared, too, promoting best practices and knowledge transfer, maintaining continuity and consistency.

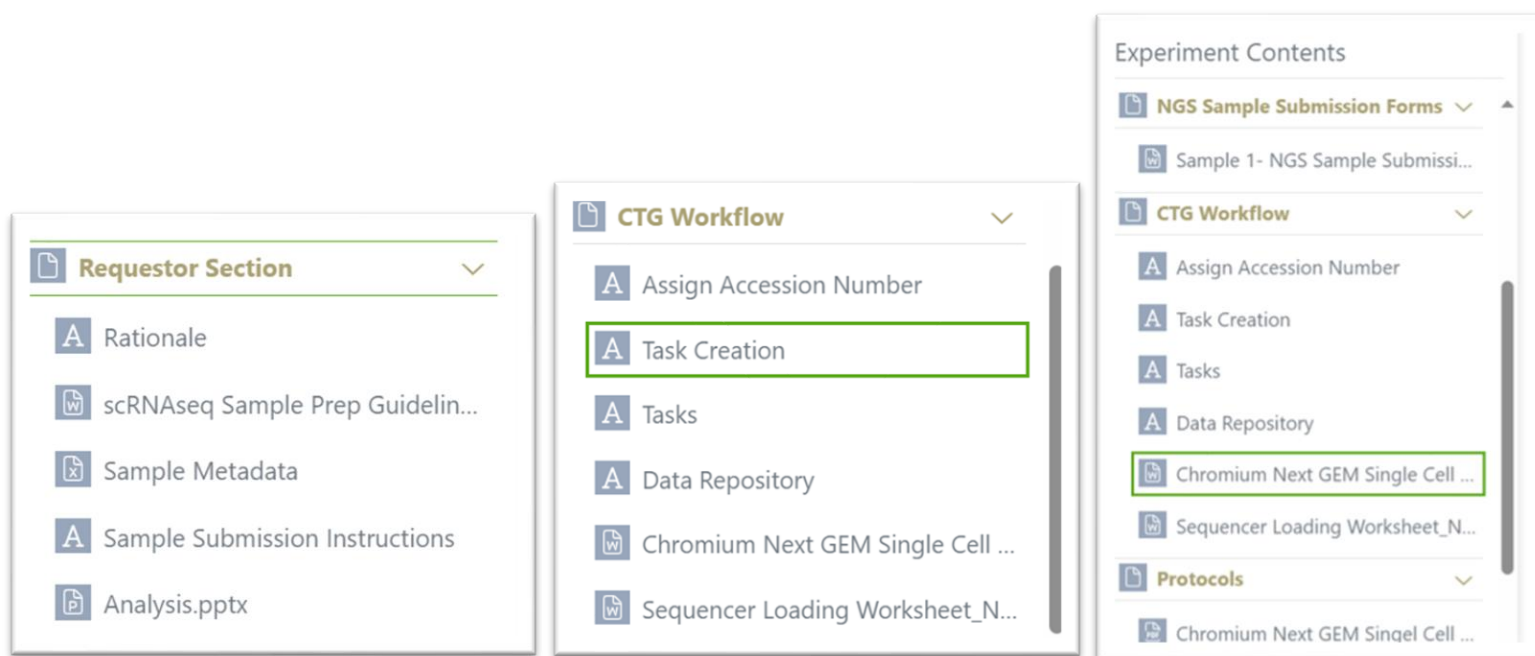


Figure 1: Astellas employed a template with 3 key sections: Requestor, Analyst and Protocols

Summary: Gaining Efficiency in Collaborative R&D Processes


For the cytogenomics team at Astellas, Signals Notebook has provided an end-to-end collaboration and data capture solution to track the entire life cycle of their RNA sequencing experiments. Signals Notebook has enabled the team to prepare customized templates with designated sections for requester needs, analyst instructions, protocols, and iterative analysis. The templates enable live quality control for sample submission data and ensure consistent experiment execution. Shared, controlled access allows for real-time tracking and efficient, interactive discussions among collaborators located on different continents. By templating workflows in Signals Notebook, Astellas gained sample traceability, improved efficiency, and cross-team transparency for their complex R&D processes.

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