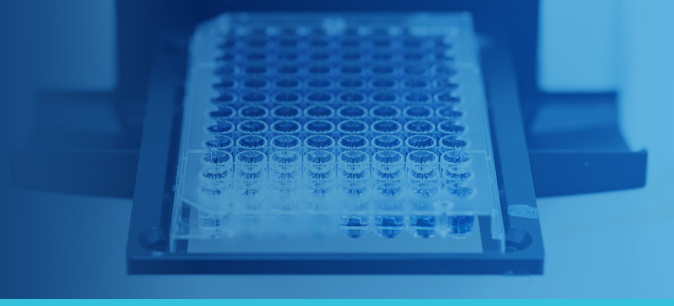
tetrascience

An optimized data workflow for drug transporter assays



CUSTOMER STORY

Drug transporter assays are essential in preclinical development to evaluate the pharmacokinetics and potential drug-drug interactions of lead compounds. Many biopharma companies outsource these tests to a leading contract research organization (CRO), which provides assays for over 80 transport proteins. Each study requires some degree of customization, such as custom microplate layouts and dilution schemes. Scientists at the CRO design and run the assays, perform a series of calculations, and package the results into a report for clients.

Challenge:

A leading CRO struggled with slow, error-prone data processes, impacting the scalability of drug transporter assays.

Solution:

The Tetra Scientific Data and AI Cloud streamlines the entire workflow by replatforming and engineering data from the assays.

Result:

- 50% decrease in manual data entry
- 80% fewer items for QA to review
- 3,000 hours per year reallocated toward increasing throughput

The Challenge

The original workflow for these assays was difficult to scale, as it relied heavily on manual data transcription and processing (Figure 1). Scientists recorded their work using tedious, error-prone practices with poor data traceability. *Ad hoc* calculations and data manipulations in Excel were common. Lab notebooks and spreadsheets, which total 100 to 250 pages per study, frequently contained inconsistencies in nomenclature such as study codes, test article names, and concentration units. This variability burdened the quality assurance (QA) team, increasing the likelihood of errors and slowing the review process. The large volume of paper-based documentation also complicated archiving and QA processes.

The Solution

The Tetra Scientific Data and AI Cloud™ automatically replatforms and engineers the scientific data from every study, resulting in a more efficient and reliable data workflow (Figure 2). Scientists design experiments in a third-party web application, where they enter study details and define plate maps in a guided stepwise manner. Upon completion of the assay, the Scientific Data and AI Cloud automatically assembles and harmonizes data from the instrument and web application, and then pushes it to the electronic lab notebook (ELN). Lastly, an automated process generates the final report.

The Result

The new workflow reduced manual data entry by roughly 50 percent, resulting in 80 percent fewer items for QA to review. This efficiency gain frees up about 3,000 hours per year for scientists and QA staff, allowing them to redirect this time and boost testing throughput.

The Tetra Scientific Data and AI Cloud enhances data integrity by mitigating the risk of human errors through automation. It also makes the data far more searchable by centralizing it in the cloud and contextualizing it with consistent and relevant metadata.

AI Readiness

The scientific data from each study is converted into AI-ready Tetra Data. These large-scale, compliant, liquid, and purpose-engineered datasets empower the CRO and its clients to leverage AI for deeper insights into the results.

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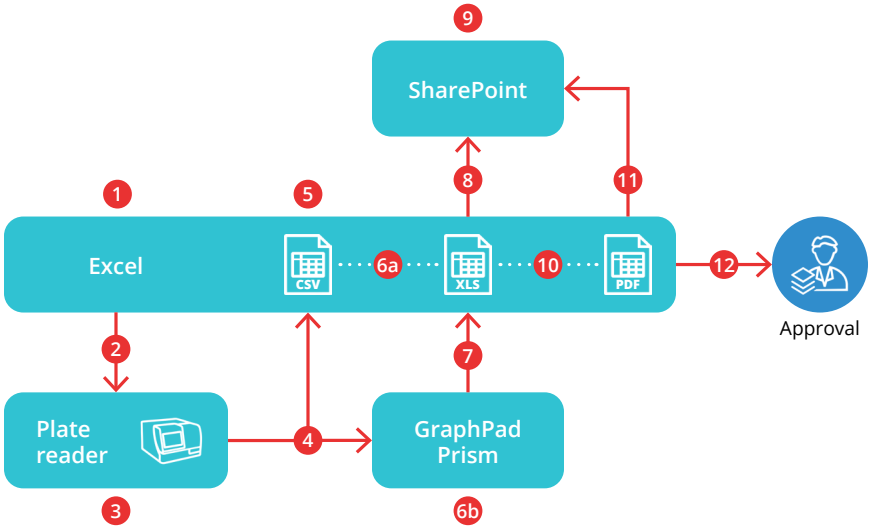
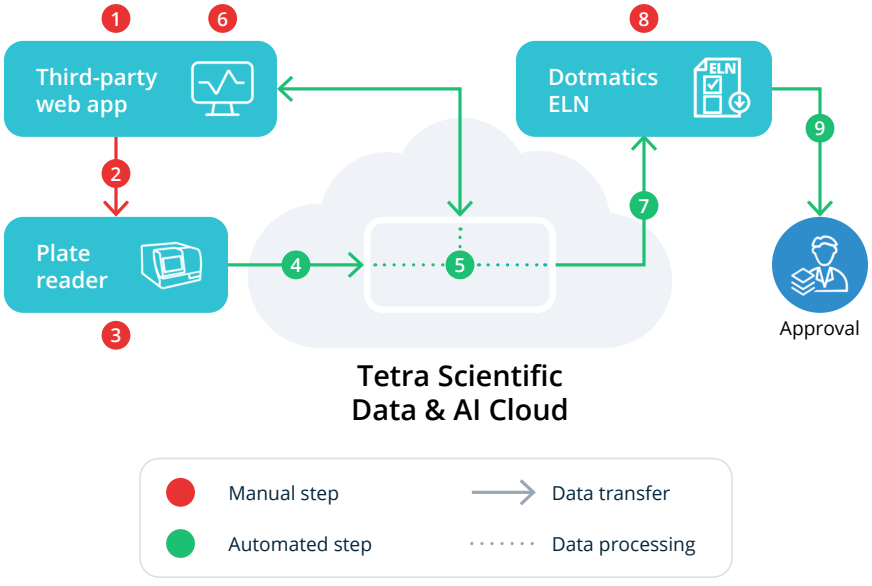
Figure 1. Initial workflow



1. The scientists enter assay information.
2. They enter relevant metadata on the instrument (BMG LABTECH FLUOstar Omega or Revvity Microbeta).
3. They perform sample analysis.
4. They export CSV files.
5. They review the raw data.
6. They process the data and perform calculations, such as data reduction, normalization, and curve fitting, in (a) Excel or (b) Prism.
7. They export and merge processed data.
8. They upload XLS files to SharePoint and are expected to adhere to filename conventions.
9. The QA team reviews the results.
10. The scientists generate a PDF report.
11. They upload the report and are expected to adhere to filename conventions.
12. They submit the report to the lab supervisor for approval.

Figure 2. Tetra workflow



1. The scientists enter assay information in the web application.
2. They enter relevant metadata on the instrument (BMG LABTECH FLUOstar Omega or Revvity Microbeta).
3. They perform sample analysis.
4. The Scientific Data and AI Cloud automatically collects the instrument data.
5. The platform contextualizes it with metadata from the web app, harmonizes it into an open, vendor-agnostic format, and sends the engineered data to the web app.
6. The scientists review the data.
7. The platform pushes the data to Dotmatics ELN.
8. The QA team reviews the results.
9. The final report is automatically generated and sent to the lab supervisor for approval.

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