

Streamlining cross-interaction chromatography for faster antibody discovery

Cross-interaction chromatography (CIC) is an analytical technique for assessing the binding interactions of antibody candidates by comparing their retention times across different chromatographic conditions. This method helps scientists evaluate antibody stability and developability early in the discovery process.

The Challenge

A leading biopharmaceutical company aimed to enhance its CIC workflow (Figure 1). Scientists manually transcribed retention time values from Agilent ChemStation, overlaid chromatograms, and transferred data into a custom laboratory information management system (LIMS) and IDBS electronic lab notebook (ELN), leading to several inefficiencies:

- **Time-consuming workflows** – Processing a full plate required up to 384 manual steps, consuming up to 4 hours of hands-on scientist time.
- **Error-prone processes** – Scientists manually entered retention times into a spreadsheet for LIMS upload, captured chromatograms via screenshots, and performed multiple data transfers.
- **Low throughput** – The complexity of data handling discouraged scientists from running CIC assays frequently, limiting insights and slowing research progress.

The Solution

To address these challenges, the company partnered with TetraScience to implement an automated workflow powered by the Tetra Scientific Data and AI Cloud™ (Figure 2). The new solution enables:

- **Automated data capture** – The system ingests a folder containing raw files from the chromatography run, eliminating manual transcription.
- **Data engineering** – Raw CIC data is automatically contextualized with experimental metadata and converted into an open, vendor-agnostic format. The resulting Tetra Data is optimized for advanced analytics and AI.
- **Seamless LIMS and ELN integration** – The results, including retention times and chromatogram overlays, are automatically transferred to both systems, ensuring traceability and accessibility.

The Result

By automating CIC data workflows, the research team achieved transformative improvements:

- **Saved 3 to 4 hours per run** by eliminating 384 manual steps. Scientists can now focus on high-value research activities instead of routine data processing.
- **Increased assay throughput** as automation reduces workload, enabling scientists to run CIC assays more regularly and efficiently.
- **Safeguarded data integrity** by reducing manual entry errors and ensuring all relevant metadata is captured.

This streamlined workflow accelerates antibody discovery, driving faster and more data-driven decision-making.

Challenge:

Researchers at a top biopharma relied on inefficient manual processes to record and analyze cross-interaction chromatography data.

Solution:

The Tetra Scientific Data and AI Cloud streamlines the entire process by automatically replatforming and engineering the data.

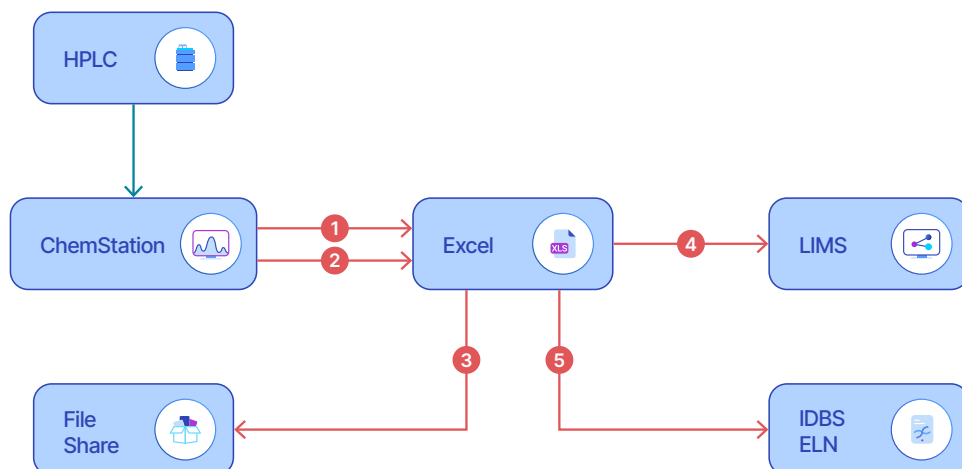
Result:

- Saved 3 to 4 hours per run by eliminating 384 manual steps
- Increased assay throughput
- Improved data accuracy by reducing errors and inconsistencies
- Enabled future use of data for advanced analytics and AI

AI Readiness

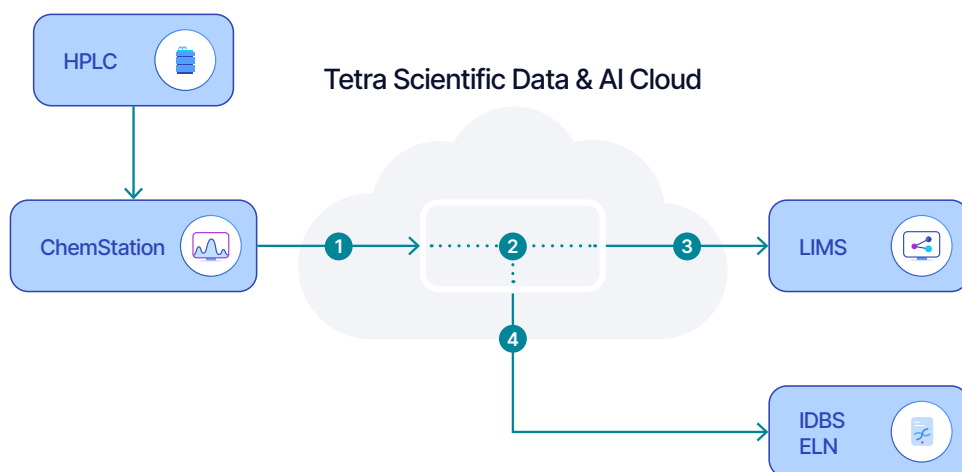
The Scientific Data and AI Cloud engineers the CIC results into AI-native datasets at scale. This enables the biopharma to harness these datasets for future AI applications, such as predictive modeling of antibody properties.

Figure 1. Initial workflow



1. Scientists manually extract retention times from Agilent ChemStation and enter them into an Excel template formatted for the LIMS.
2. Chromatogram overlays are manually created and pasted into Excel.
3. The processed Excel file is saved and manually transferred to a shared file system.
4. Scientists upload the Excel file to the LIMS.
5. Results are manually entered into the IDBS ELN.

Figure 2. Tetra workflow



1. The Tetra Scientific Data and AI Cloud automatically ingests the raw chromatography data from ChemStation via the Tetra File-Log Agent.
2. Raw data is engineered into contextualized, harmonized Tetra Data through a series of automated pipelines.
3. Processed results are automatically pushed to the LIMS for tracking and further analysis.
4. Results are also sent to the ELN.

