A Fully Automated Workflow for Gyrolab Assays

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celerion
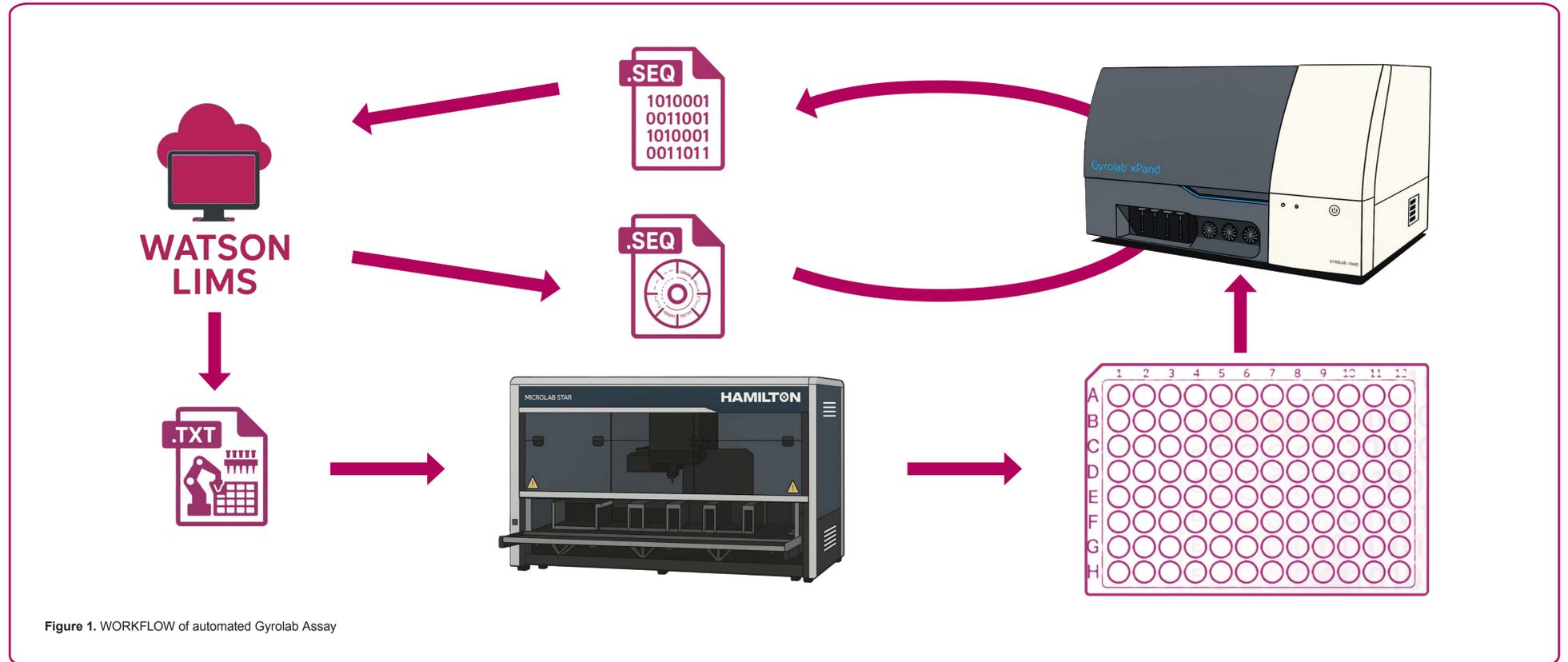*Translating Science to Medicine*

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Figure 1. WORKFLOW of automated Gyrolab Assay

INTRODUCTION

Implementing a High-Throughput, Regulatory-Compliant Workflow

Gyrolab platform
- Microfluidic disk with nanocolumns as carrier
- Reduces matrix effects and improves selectivity
- Rapid turnaround 1 hour per CD

Watson LIMS
- Sample tracking, run planning and evaluation

Hamilton STARline pipetting robot
- Worklist driven pipetting robot with barcode scanning capability
- Pressure curve monitoring for reliable and compliant pipetting

AUTOMATION OBJECTIVE

- Fully automated workflow from sample identification to evaluation
- Integration of run setup and evaluation in existing Watson LIMS processes and data flows
- Worklist driven sample pipetting using Hamilton STAR robot
- Sequence file-based run execution on Gyrolab xPand

CHALLENGES

Gyrolab Run Planning

The Gyrolab planning algorithm assigns samples by row, separating **standards**, **unknowns** and **QCs**. This setup follows an alternative arrangement to the QC bracketing approach described in ICH M10.
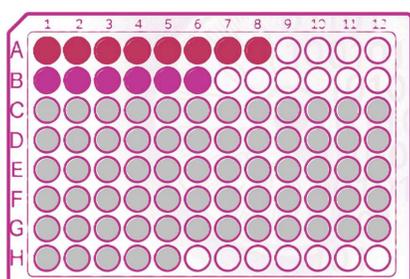
Assigned placement on 96 well plate by Gyrolab algorithm:
- **Standards** in row A
- **QCs** in row B
- **Unknowns** separated
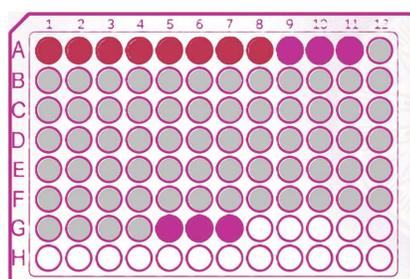
Updated placement according to Watson LIMS run planning following Celerion standardized run setup.
- **Standards** in row A
- First set of **QCs** bracketing **Unknowns** with second set of **QCs**

WORKFLOW

1) **Watson LIMS analytical run planning**
   - Sample planning on 96-well plate
   - Export of worklist for Sample Pipetting on Hamilton robot
   - Export of sequence file for sample positioning on Gyrolab

2) **Hamilton STAR robot**
   - Load worklist from Watson LIMS
   - Robot pipettes samples according to worklist

3) **Gyrolab xPand**
   - Load sequence file from Watson
   - Load 96 well sample plates from Hamilton robot
   - After run is finished the sequence file filled with the raw data is saved on a secured server location

4) **Watson LIMS run evaluation**
   - Raw data filled sequence file uploaded for evaluation

IMPROVEMENTS

Watson LIMS setup
- Optimized study setup in Watson LIMS for an automated dataflow and process execution.

Gyrolab xPand and software
- The Gyrolab xPand can be used perfectly standalone with the supplied software but is now fully integrated into our existing dataflows and processes.

RESULTS & CONCLUSION

Regulatory compliant: ICH M10, FDA 21 CFR Part 11
- **Fully automated:** minimal human interaction
- **High throughput:** up to 5 CDs per batch
- **Reagents & Samples:** volume efficient workflow

Straight Forward — Highly Efficient!

The implemented solution significantly reduces manual handling and repetitive tasks, enabling seamless integration with Watson LIMS and establishing a robust, regulatory-compliant immunoassay workflow.

REFERENCES

Nauer, A., Friedhoff, E., Köhler, C., Vagaday, M., & Gröschl, M. (2025).
A fully automated workflow for Gyrolab assays. White paper, Celerion Switzerland AG.