Does automating your bioanalytical laboratory have to cost excessive amounts of time and money?

Paul Heads

Reasons for Automation

- ✓ High throughput requirements and efficiency gains
- ✓ Long-term cost savings
- ✓ Reduced human strain and dependency
- ✓ Reduced scientist time from routine analysis

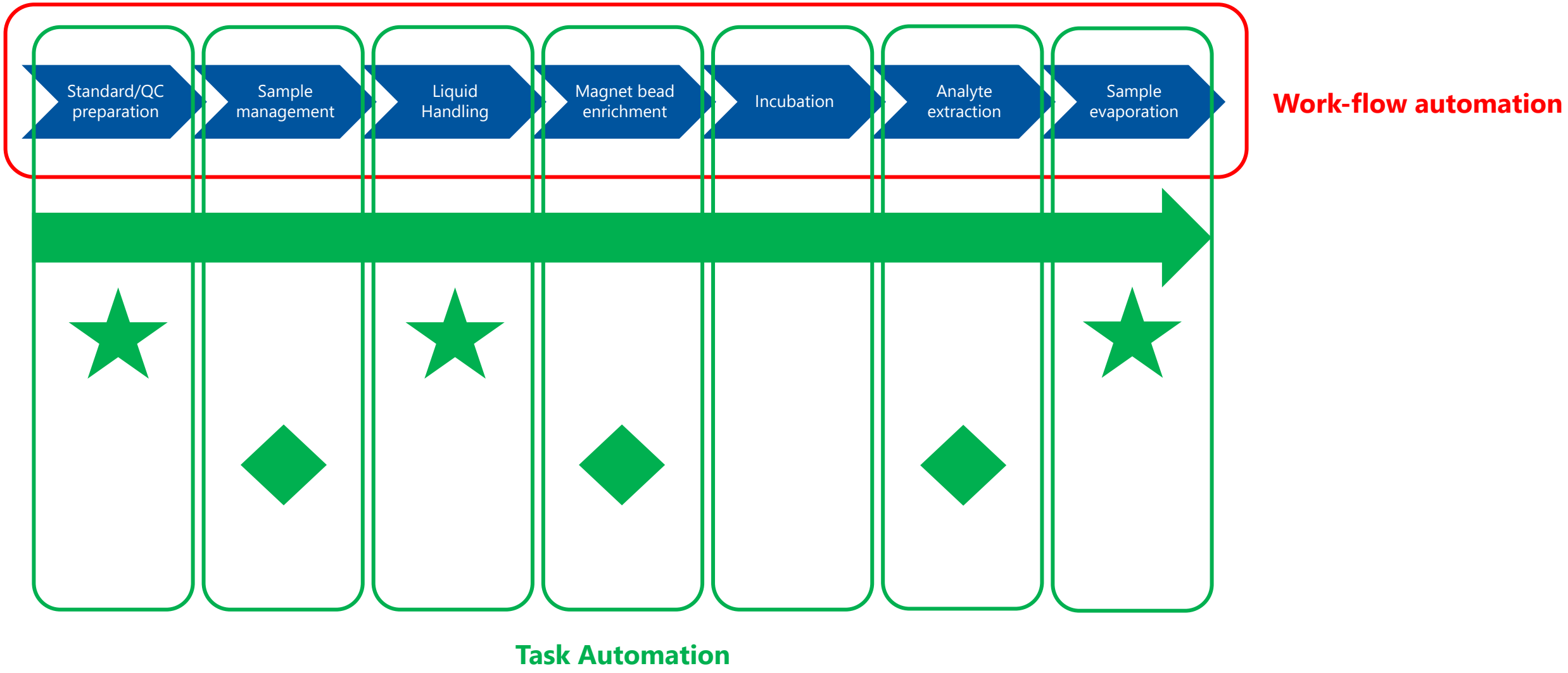
Q – When I mentioned automation, I bet for most people this is what came to mind…

Large automation – The good and the compromise

- End-to-end analysis
- Fully automated with minimal user input required
- High-throughput
- Robust and reliable

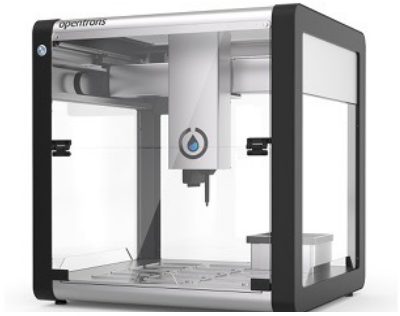
- Expensive
- Complicated software
- Large footprint
- Difficult maintenance
- Single-point failure

Modular Approach



Modular Approach - Examples

Sample Management



Liquid Handling

Sample Processing

Sample Concentration

Orion's Journey

Phase 1

- Uniform sample vials and storage platform
- Automation friendly platform
- Open discussions with In-vivo sampling team

Phase 2

- Simple laboratory task automation, e.g. Standard/QC preparation or sample aliquoting
- Low financial and training burden
- Easy “transition” towards automation for those less confident

Phase 3

- Sample preparation instruments
- e.g. SPE extractions, magnetic bead purification
- User-friendly interface, small footprint and relatively cheap (<€100k)

Orion's Results with modular automation

Theoretical concentration (ng/mL)	37500	5000	150	50 (LLOQ)
Interbatch precision (%CV)	8.1	7.9	9.4	11.6
Accuracy (%RE)	3.9	2.7	1.9	0.4

Timeline	In Vivo Studies	Standards & QCs prepared	Validation batches	Samples analysed
10 weeks	6	739	6	1302 plasma + 60 tissue

Before automation:

x **60** samples per day max
- Generally, LLE methods with HPLC vials

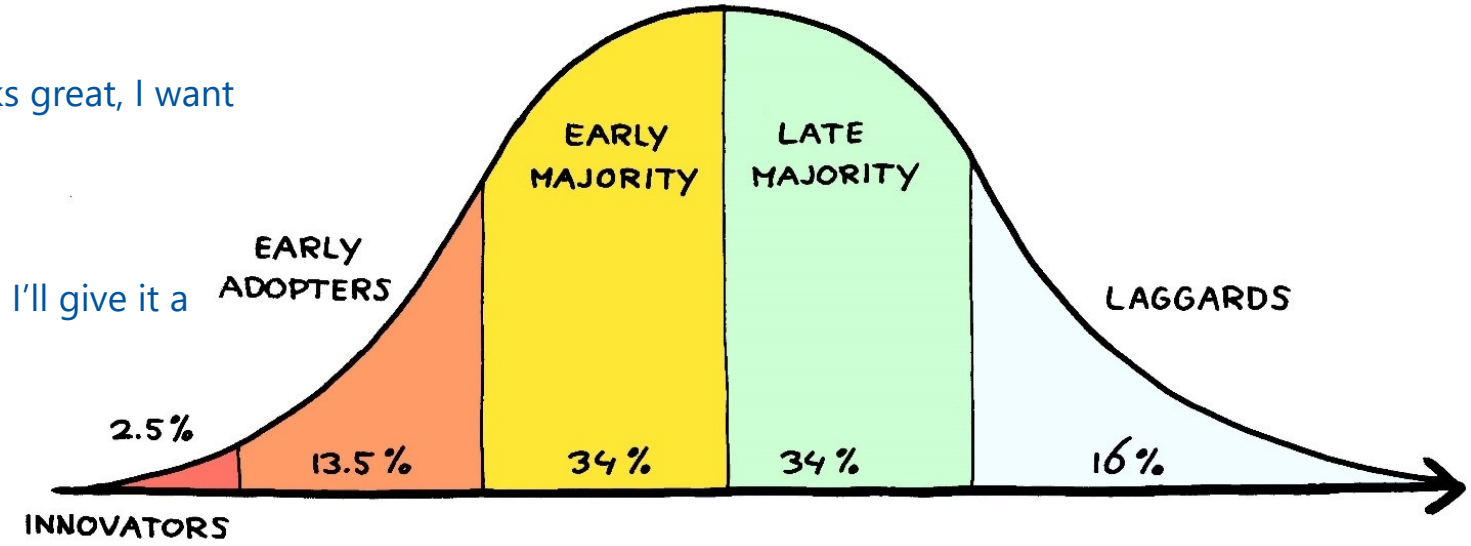
With automation:

✓ **110** samples per day comfortably
- Generally, Protein precipitation methods in 96-format

Learnings

Innovators: “This looks great, I want it for my lab”

Early Adopters: “Sure, I’ll give it a go”



Early majority: “Show me the evidence and I will adapt”

Late majority: “Not yet, it will never last”

Laggards: “Eugh, now I have to use this”

Diffusion of Innovation Principle

User friendly interfaces and instruments

Address individual lab needs

Look to the future – automation doesn’t stop

Summary

Automating a Bioanalytical laboratory is possible without purchasing expensive, complicated instruments

“Task-based” automation can be just as efficient as “work-flow” automation for smaller throughput labs

Important things to consider when automating your lab:

- Be sure to address bottlenecks specific to your lab
- A single sample platform is most efficient
- Take into consideration the cultural changes and needs of your lab

Orion
Building well-being

Paul Heads