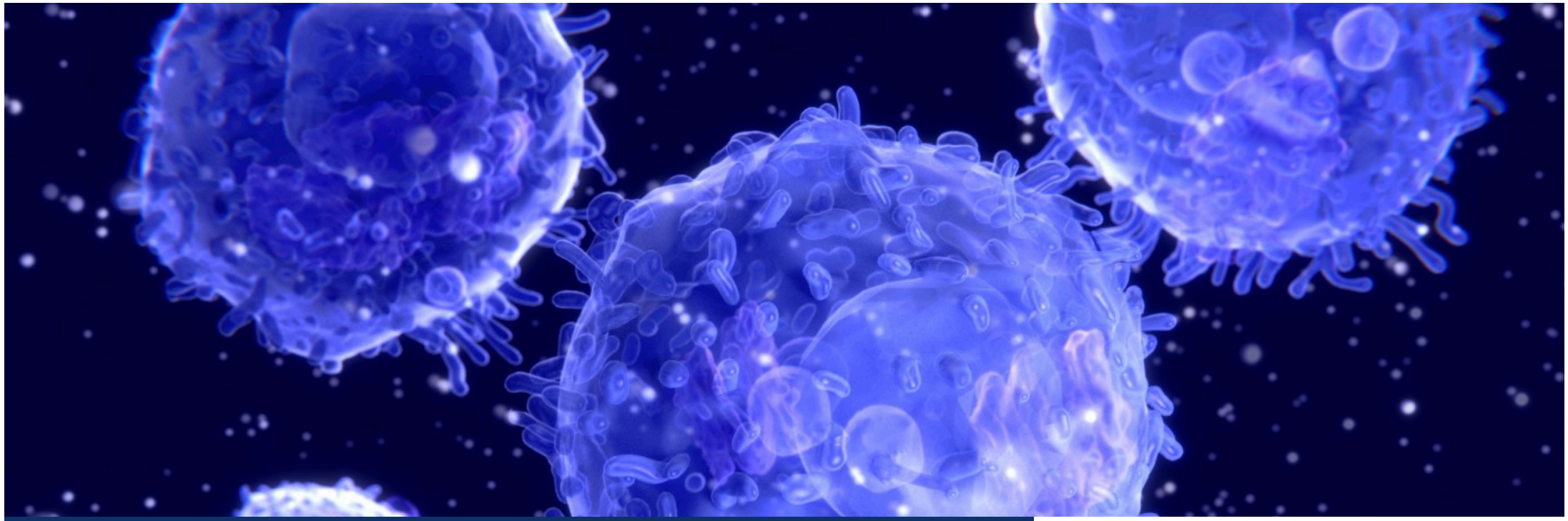


Scaling-up or scaling-out?

2020-11-18

Michael Chrobok

Acknowledgments

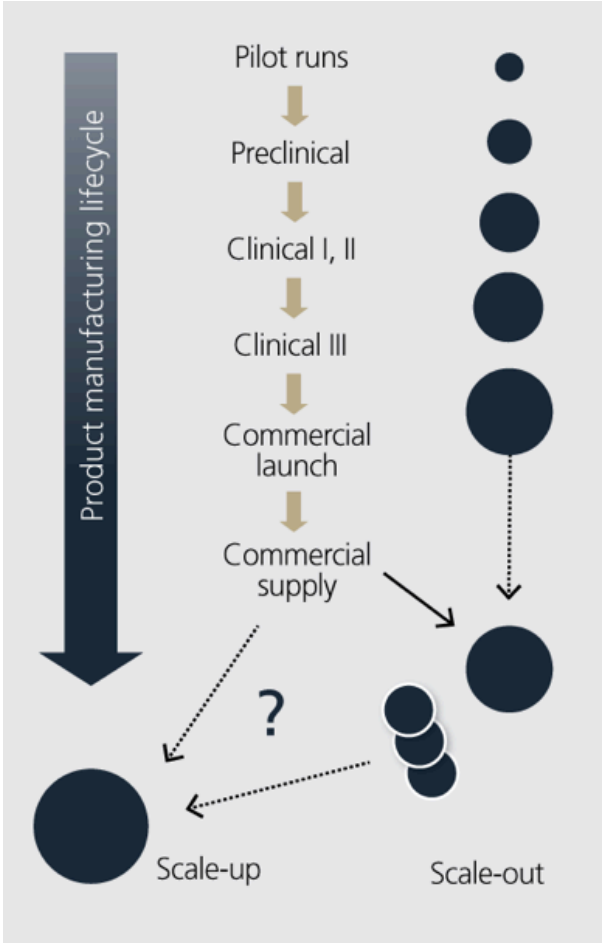
- Alici lab

- Sällberg/Pasetto lab

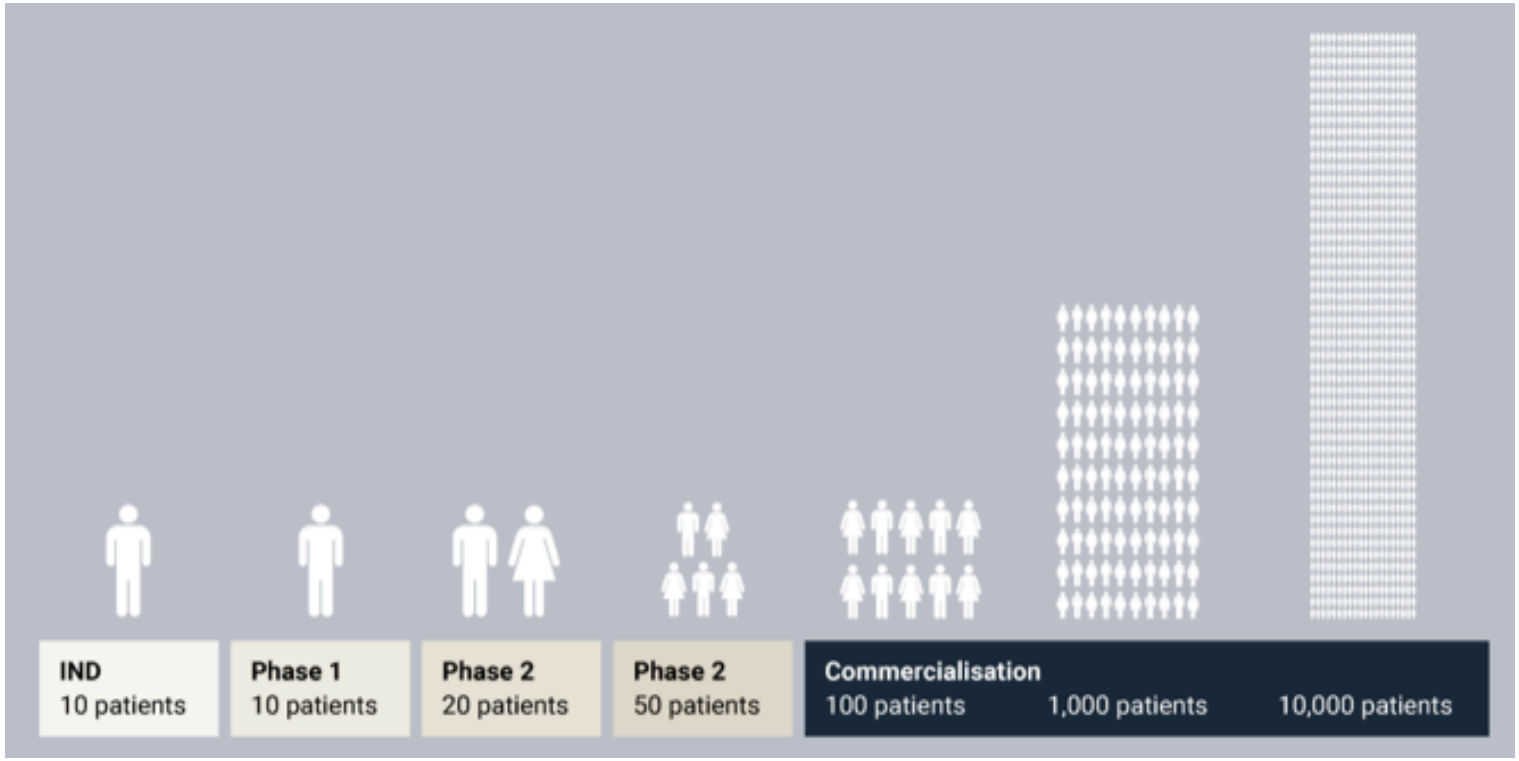
Scaling-up?

Scaling-out?

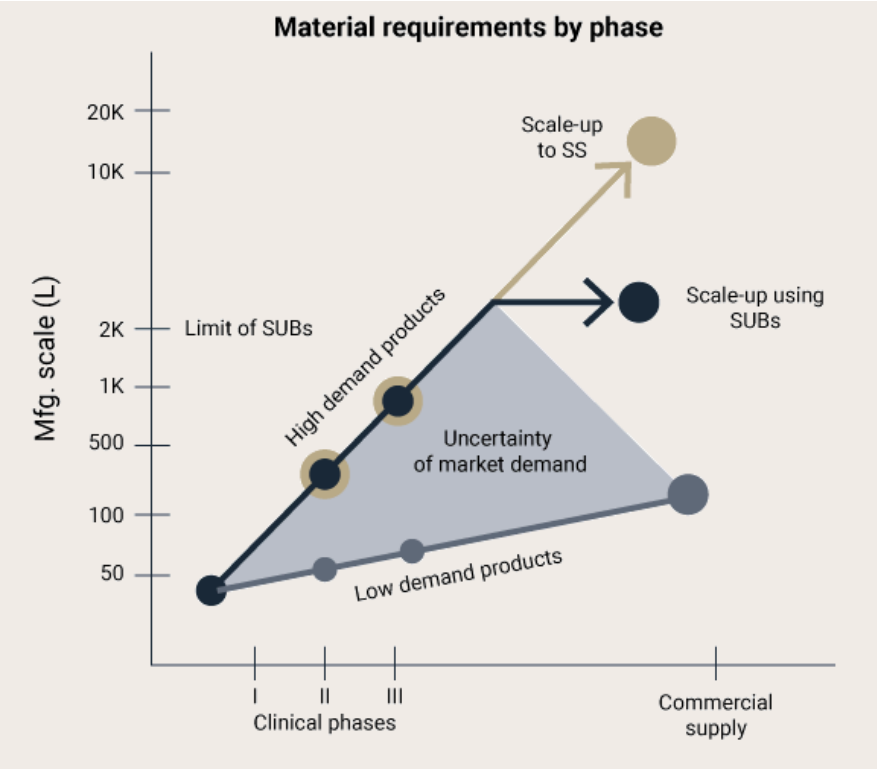
Product manufacturing model



Production scale up



Material requirement and scale per clinical phase



Scalable process

- Is your technology scalable? Either to scale up or out
  - Chose of manufacturing platform and supplier is important
- Is your protocol scalable
  - How much hands-on manual work needed.
  - Skills and training of the operator
- Time limitations and handling flexibility due to "better" reagents
  - Scalable suitable reagents
- Small scale tools available

- Gaps in scalability in the technology used
- Seed train?
- Reagent handling scalability? Powder vs. liquid, GMP certification
- Personal and skills needed to perform the process

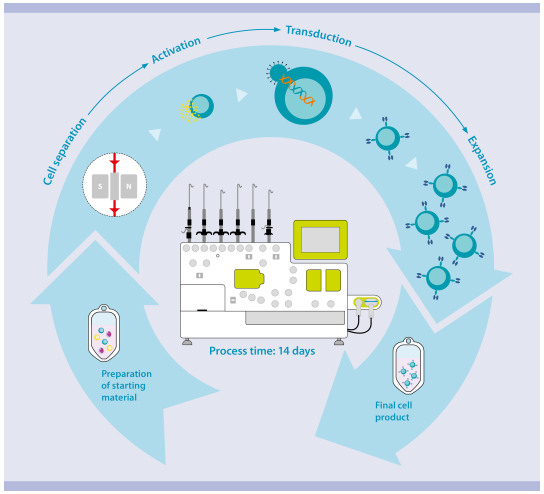
1 liter

VS

Up to 1200 liter

Automation

- Is the technology ready for automation
- How much would the process change when automated
- Flexible automated processes will ease the workload and bring reliability and reproducibility

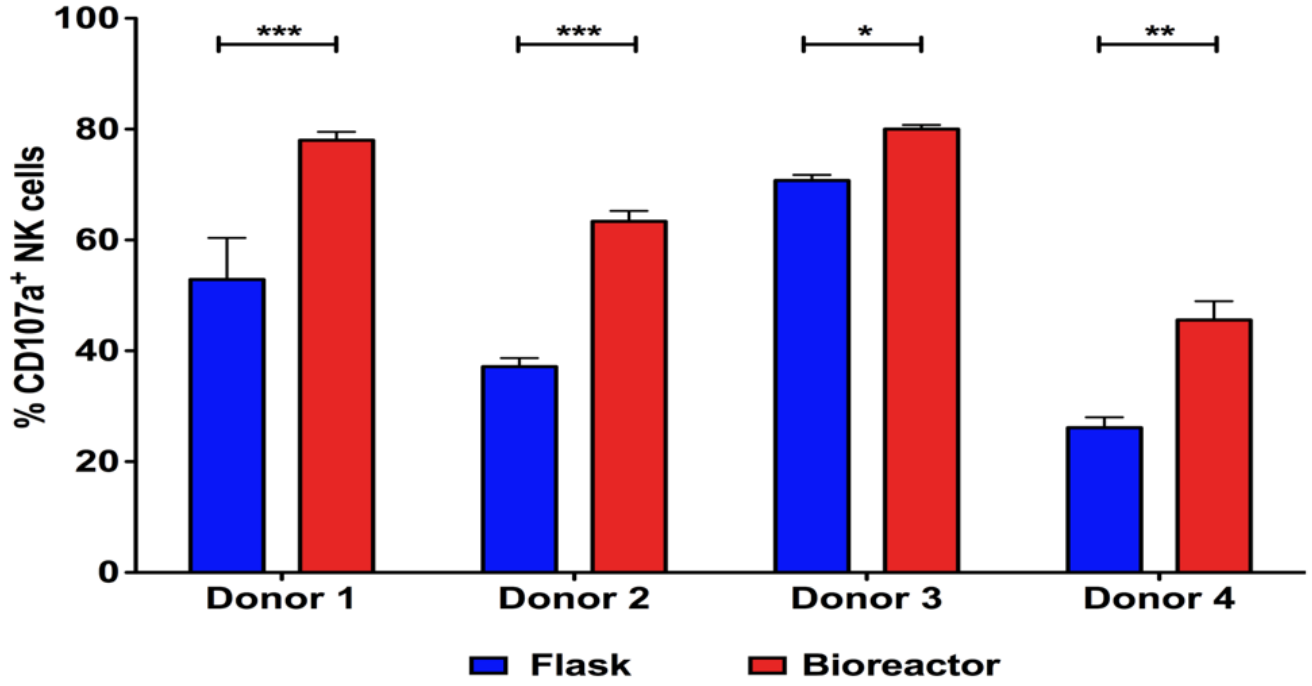


- Large equipment needed? Benefit/risks?
- Training for operators on automation platforms
- Higher throuput due to automation
- Automation of QC/QA
  - Bottleneck

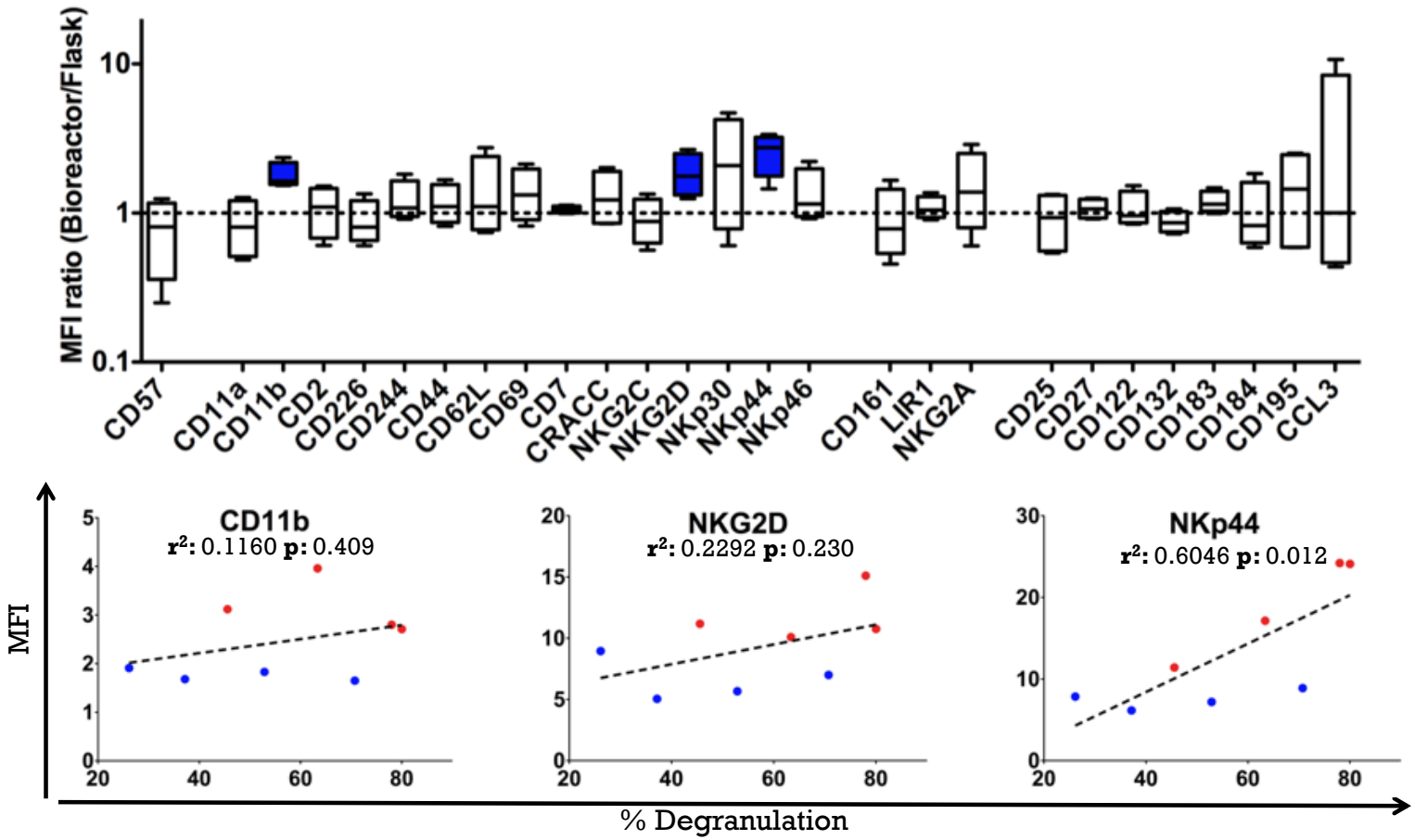
preGMP for PD

- Transition from R&D to small scale production to commercialization is not straightforward.
- Cytokines, small molecules, growth factors etc. are challenging at the transition step
- Chemically defined reagents
- Ancillary materials can be problematic

Practical consequences of automation and scalability



Phenotypic differences: Automated vs Static



Take home message

- Currently it is not clear whether scale-up or scale-out commercialization
- significant innovation will be required for the future
  - Transition from highly manual research to automated, appropriately-scaled systems
- Production costs that allows those therapies to reach the mainstream.