JAX KOMP2 Production Pipeline

PIs

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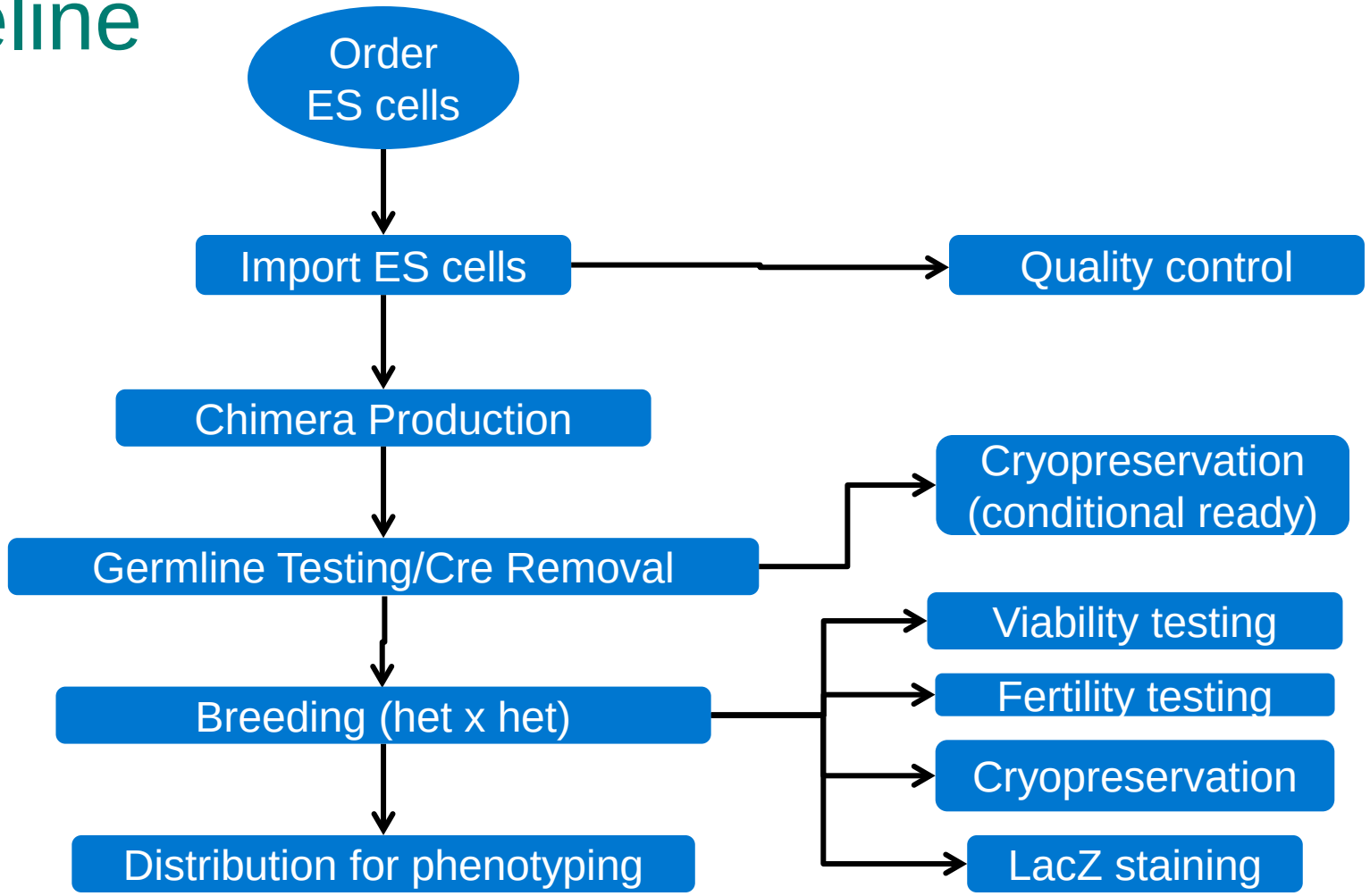
KOMP2 Objectives

- Produce mice from 833 IKMC ES cell lines
- Perform quality control (QC)
- Provide mice for phenotyping
- Cryopreserve germplasm
- Develop technology and process improvements that reduce cost and time of producing mice

Topics

- Pipeline
- Scale-up
- Innovation

Pipeline


Order ES cells
Import ES cells
Quality control
Chimera Production
Germline Testing/Cre Removal
Cryopreservation (conditional ready)
Breeding (het x het)
Viability testing
Fertility testing
Cryopreservation
LacZ staining
Distribution for phenotyping

Staying connected

KOMP Repository → JAX

- Throughput
- Logistics

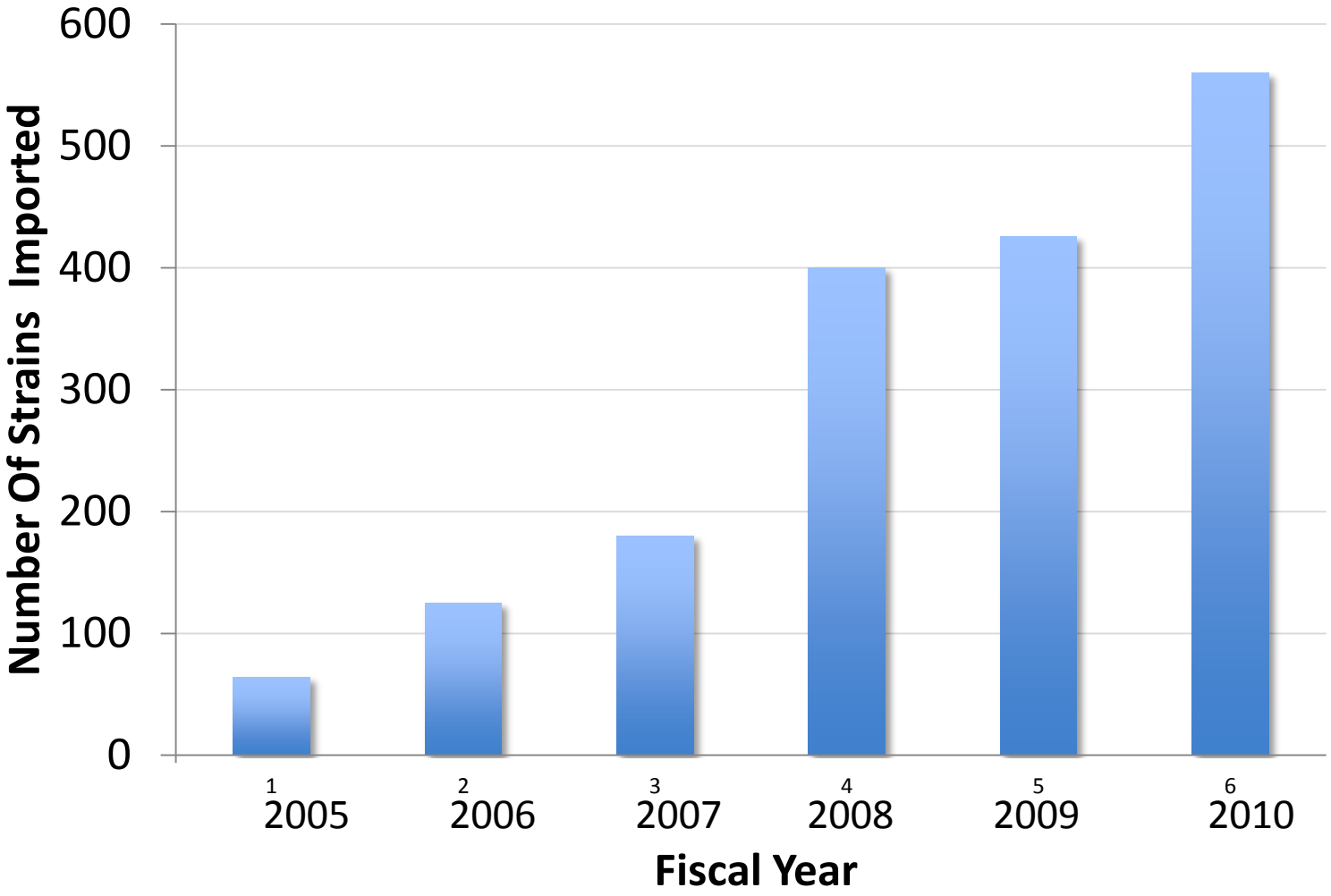
JAX Production→ JAX Phenotyping

- Logisitics
  - Keep phenotyping pipeline full
  - Minimize breeding costs

Preparing for expansion

- **Space:** >30,000 gsf new construction or renovation benefitting KOMP
- **Systems**: New Laboratory Information Management System
- **Staffing**: Hiring underway

Scalability- The JAX repository

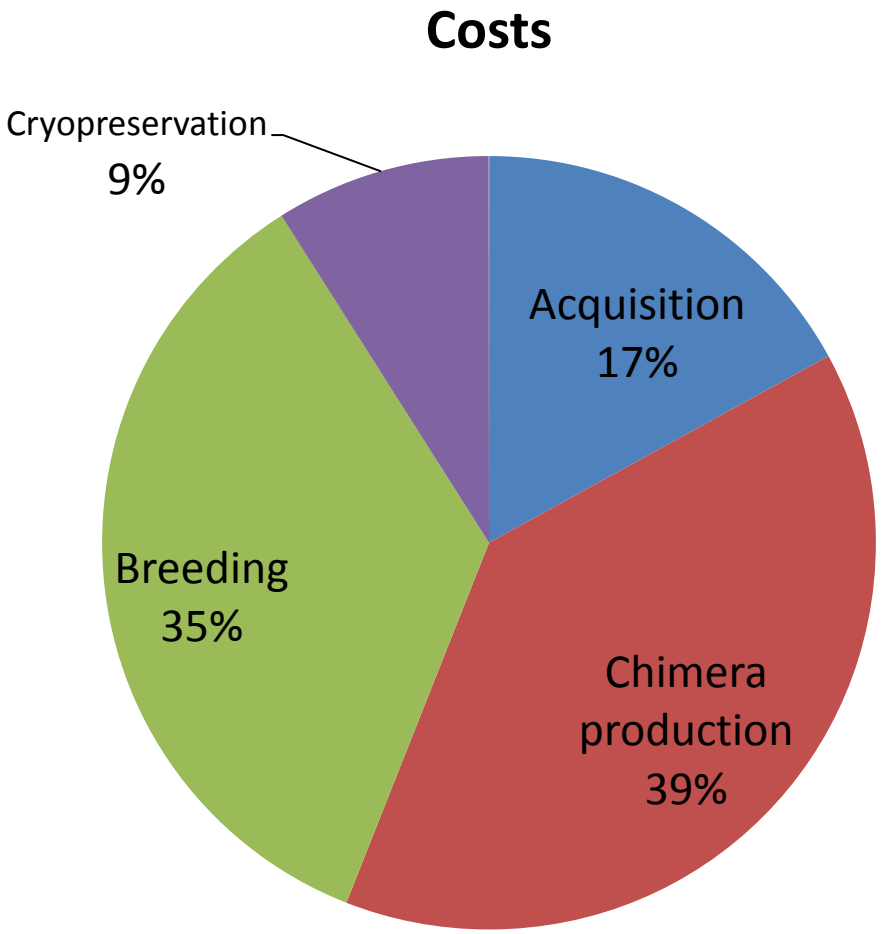


Looking ahead

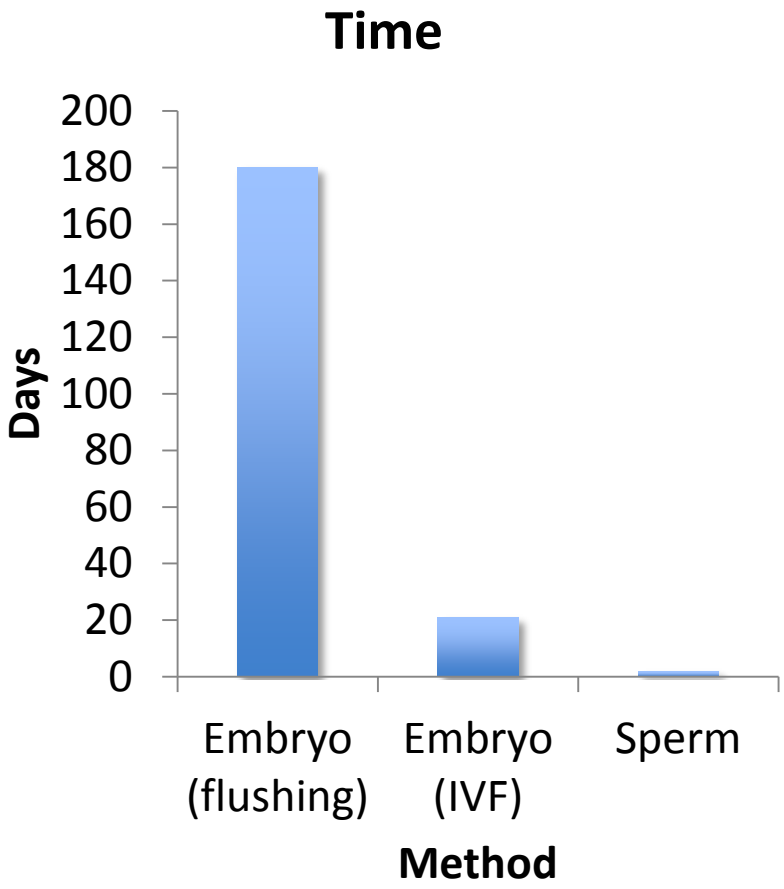
- Phase I
  - Reduce cost
  - Improve efficiency
- Phase II
  - Many more strains
  - Limited funding

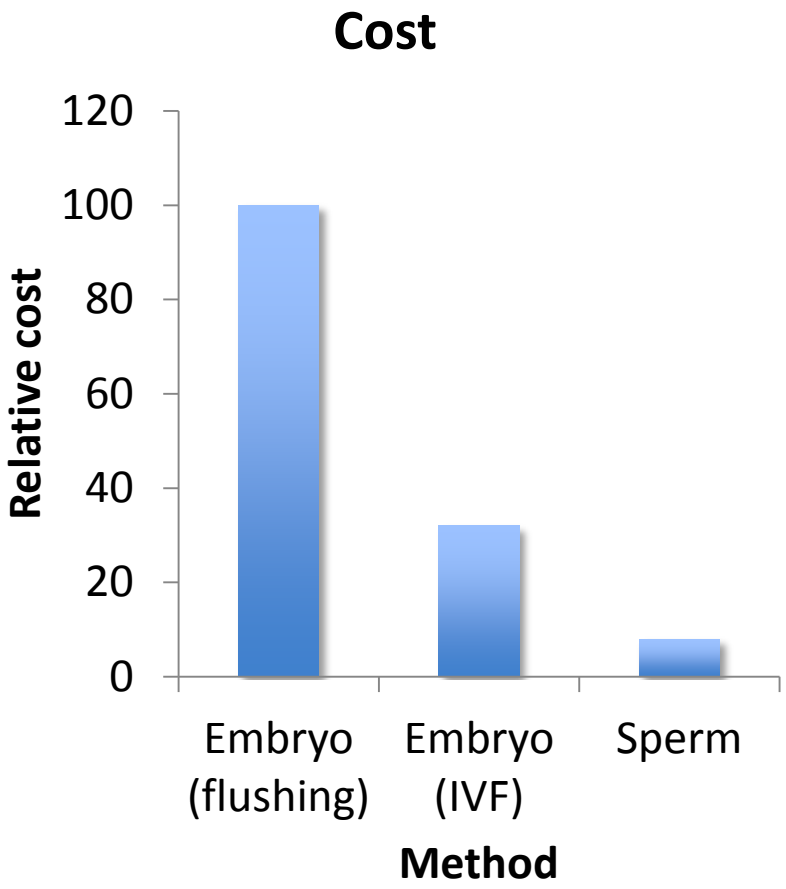
http://commons.wikimedia.org/wiki/File:NY_429_from_Upper_Mountain_Road_overpass.jpg

Cost drivers

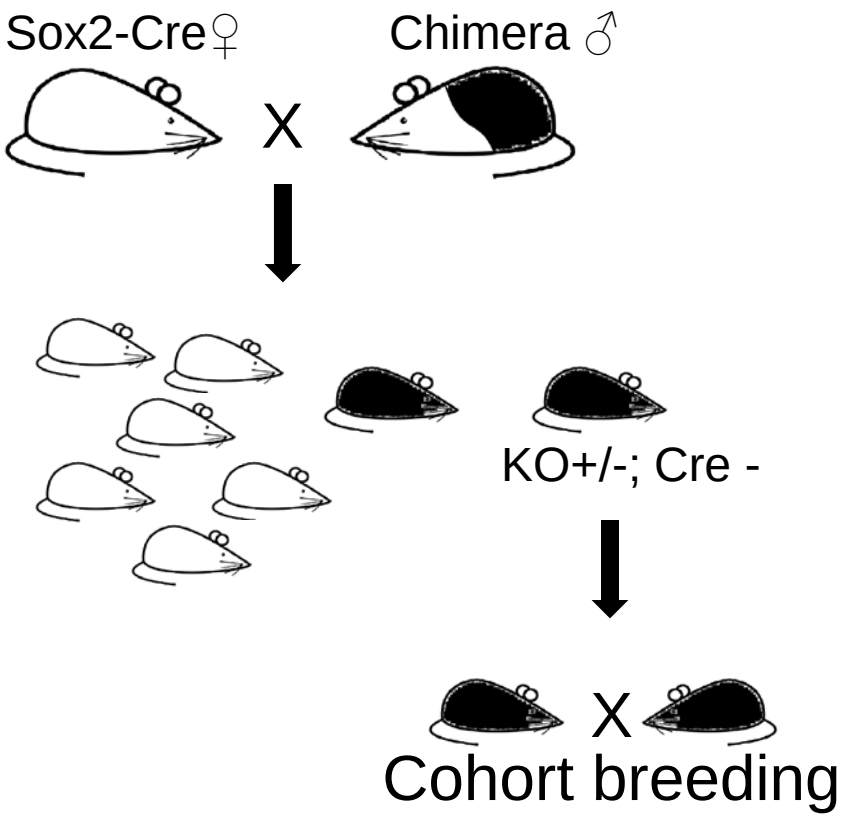


Use of technology to improve efficiency



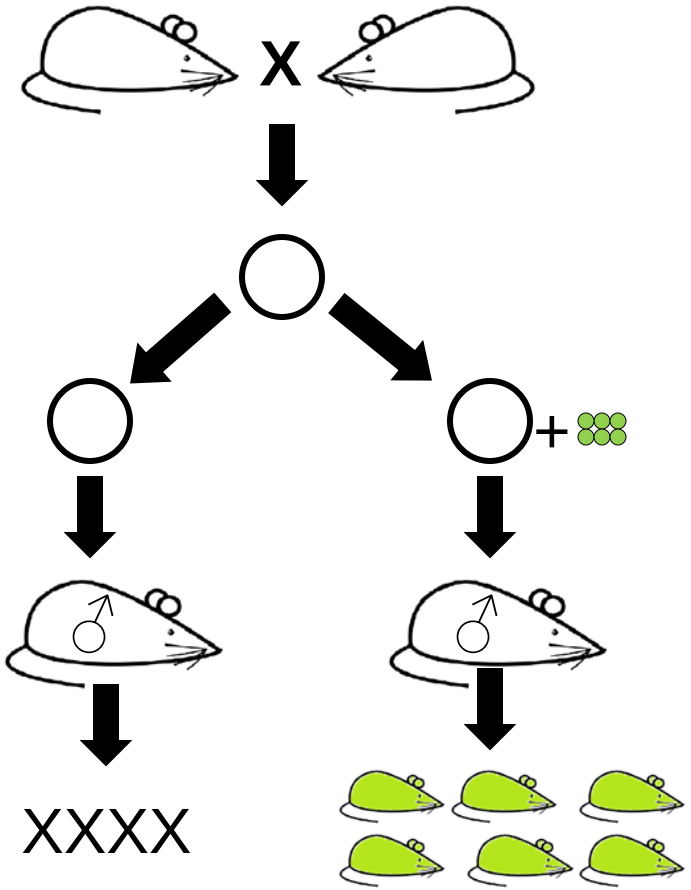


Cre driver development



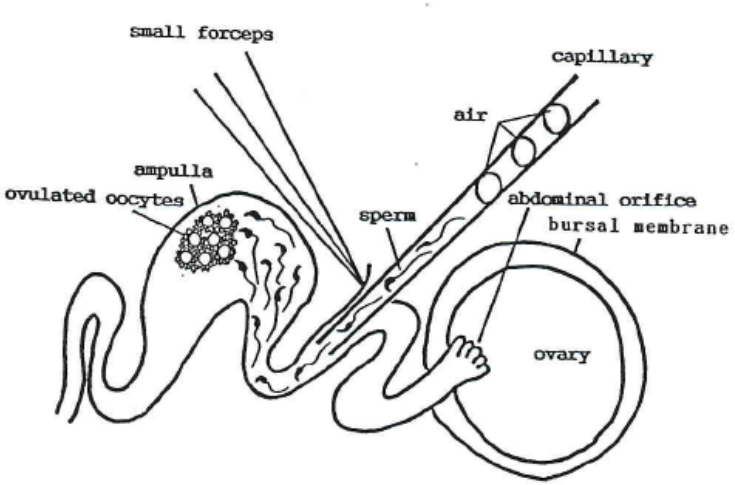
- Deletion activity independent of Cre allele segregation
  - Being backcrossed to C57BL/6NJ
- Alternative: ROSA26-targeted CAG-Cre allele
  - Targeting construct complete
  - Scheduled to be targeted to JM8.A3 ES cells late April
- Alternative: Import IKMC-recommended Cre line

Improving chimera production



- Inject fewer embryos
- Get results faster
- Reduce breeding
- Chimeras more useful
  - Sperm cryopreservation
  - IVF
- Proof of principle complete
- Status: Scaleup

Artificial Insemination



Nakagata, N. Exp Anim. 1992;41(4): 519-522.

- Standard approach in other species
- Historically unreliable
- Improved method
  - Litter size comparable to natural mating (fresh sperm)
- Value
  - Reduce breeding time
  - Reduce breeding cost

Summary

- JAX is prepared to meet the needs of the KOMP^2 Reanimation Project
  - Modular scalable pipeline based on existing infrastructure
  - Experienced microinjection group
- JAX is preparing to meet future KOMP^2 needs
  - Infrastructure investment
  - Technology development

Questions?