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ONE PURPOSE.

Genetic Diversity and Poultry Breeders

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Overview

- Poultry needs of the future
- Genetic diversity in broiler genetics
- New technologies to maintain diversity

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Future Needs

- Genetic diversity in poultry is the key to future product needs
  - Global markets
  - Climate change
  - Pathogen evolution
  - Pathogen migration
  - Nutrition source

Genetic Variation at Cobb

Cobb500™

The world's most efficient broiler.

Cobb700™

The standard in the high yield broiler market.

Commercial products

MV™ Male

Delivering superior breeder and broiler performance.

Vantage™ Male

Outstanding performer in the big bird debone market.

Genetic Variation at Cobb



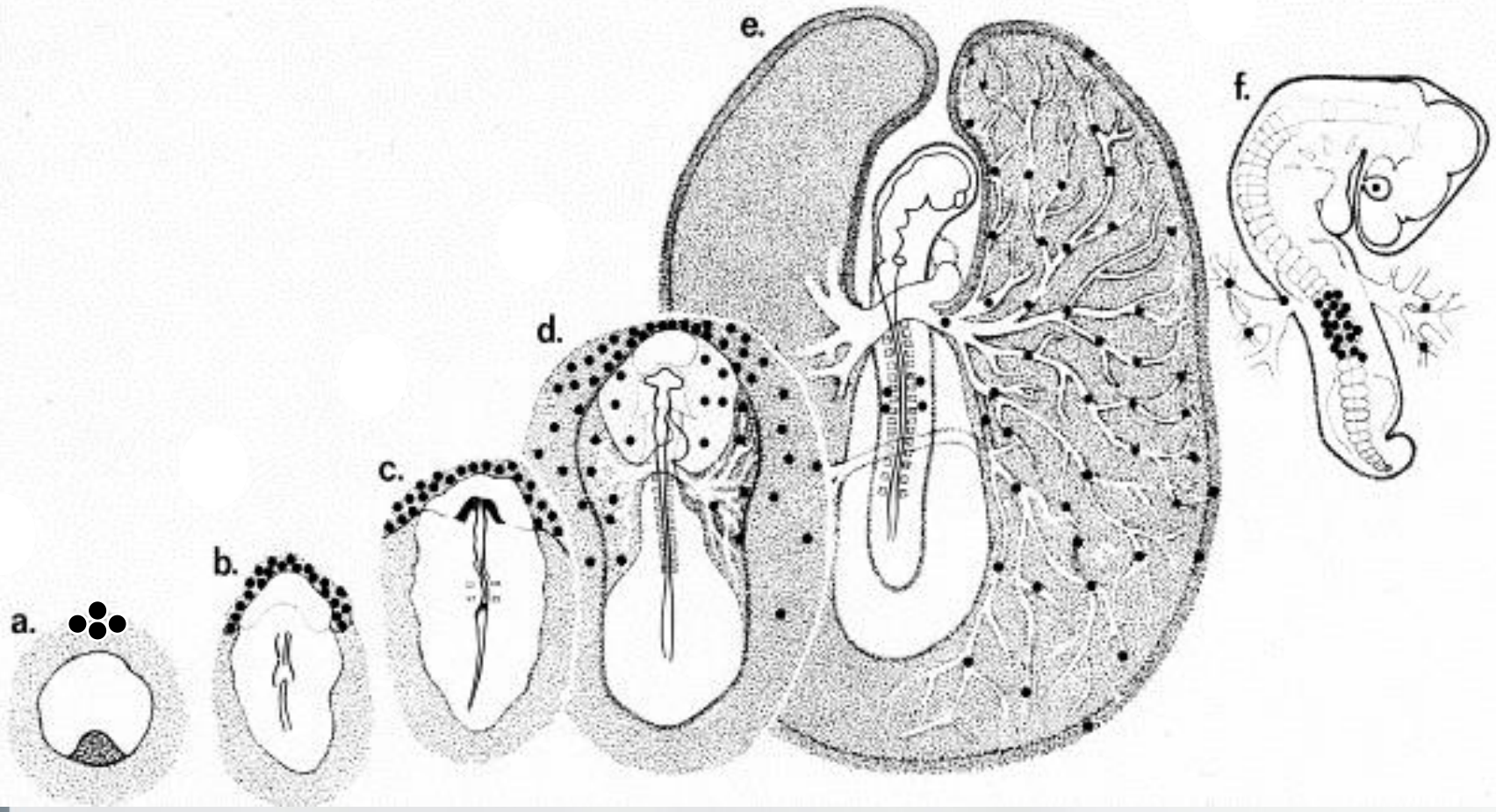





Options to Maintain GD

- Maintain live flocks
  - Expensive
  - Disease outbreak
- Freeze germplasm
  - Semen, Ovaries, Testis
- Freezing PGCs

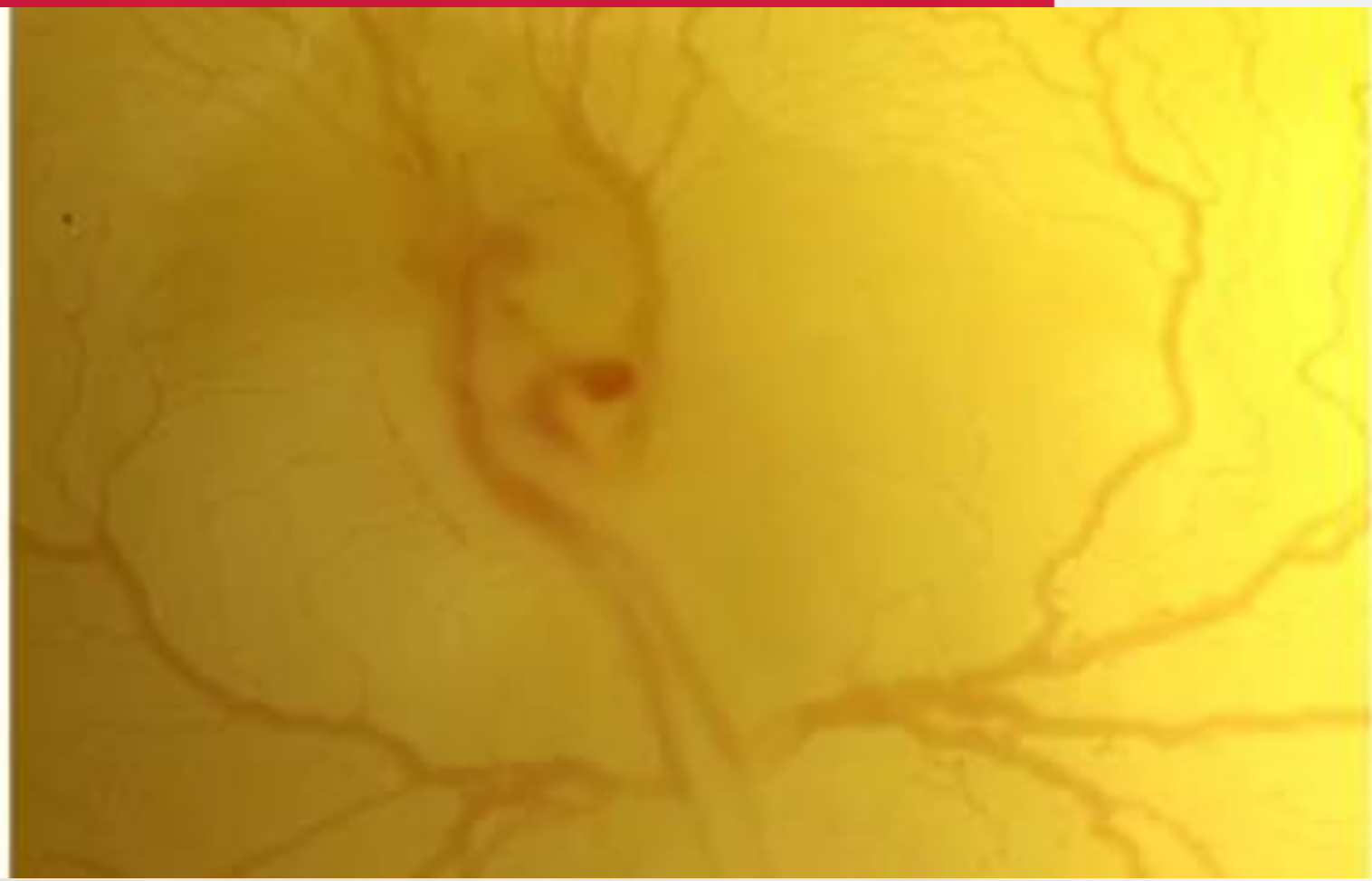
PGC technology(Roslin Institute)



Laid egg **Day 1** **Day 3** **Day 5**

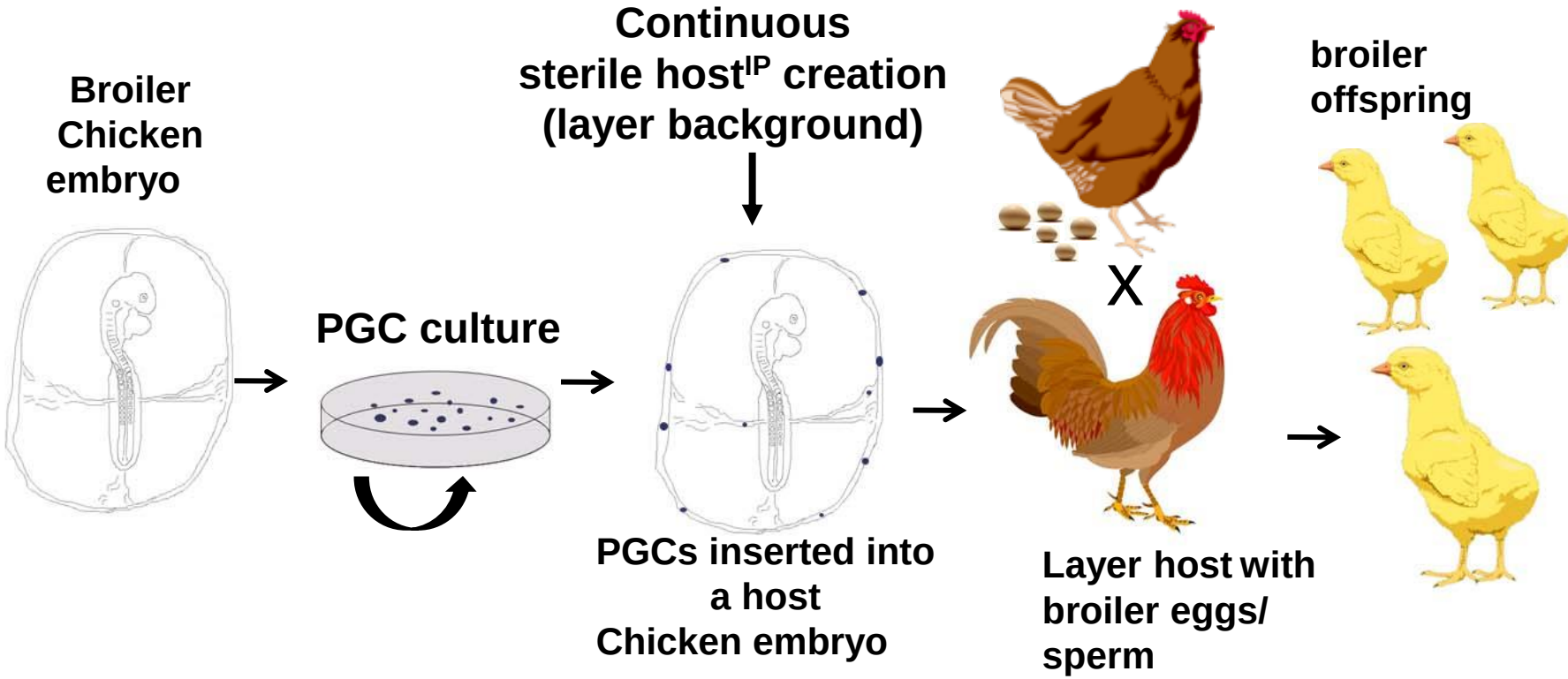
Sutasurya and Nieuwkoop, 1979

PGC Technology



Germ cells can be collected from the blood of a day 3 embryo

The Process



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Cobb POC

Offspring displaying black skin (right) derived from a surrogate host cockerel carrying male Silkie broiler PGCs mated to a surrogate host hens carrying female Silkie broiler PGCs (parents on left).

Offspring obtained from a surrogate hens carrying male Silkie broiler PGCs mated to a male brown layer cockerel.

Reviving rare chicken breeds using genetically engineered sterility in surrogate host birds

Mark E. Woodcock, Almas A. Gheyas, Andrew S. Mason, Sunil Nandi, Lorna Taylor, Adrian She…
+ See all authors and affiliations

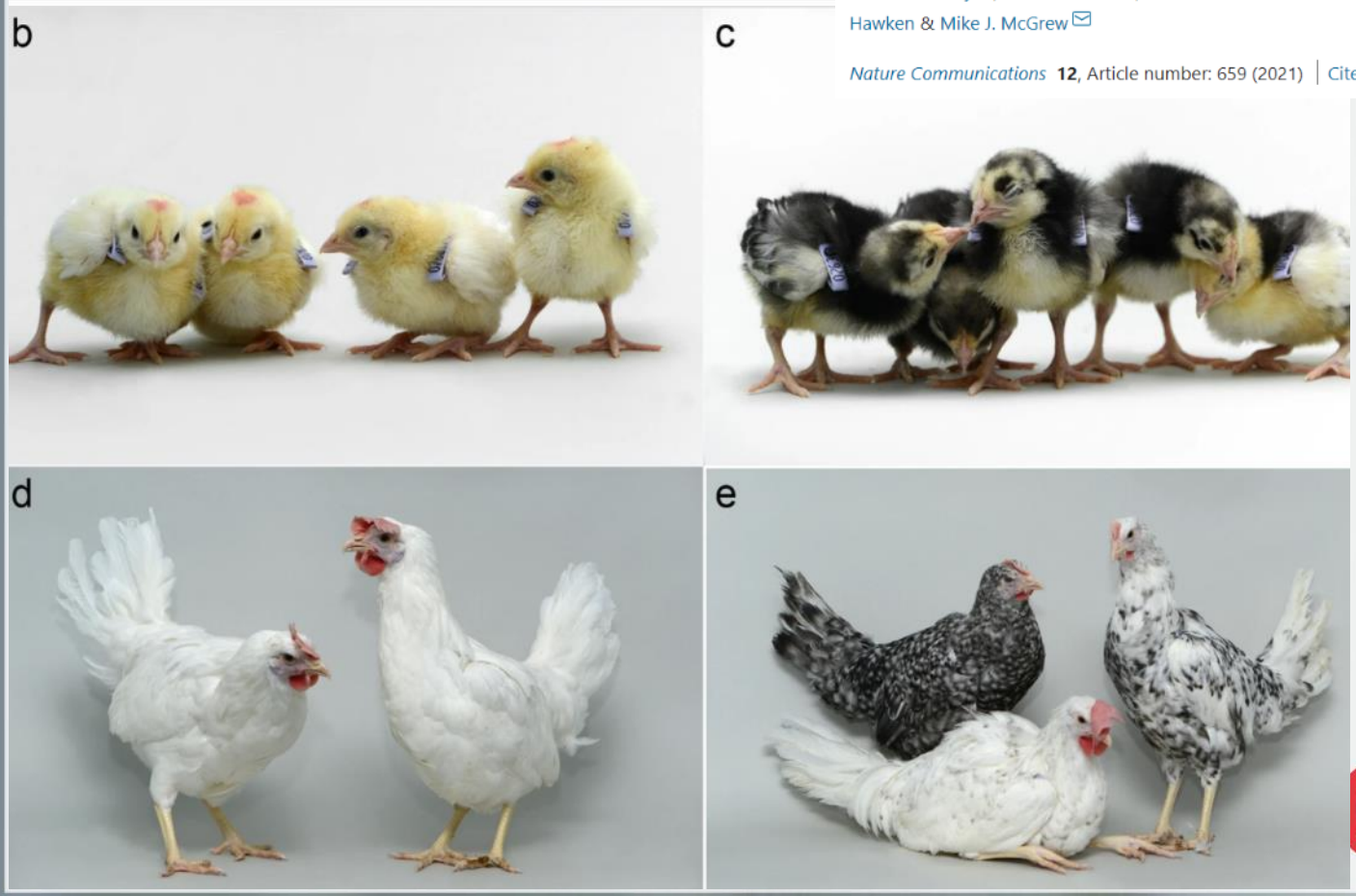
PNAS October 15, 2019 116 (42) 20930-20937; first published October 1, 2019; https://doi.org/10.1073/pnas.1906316116

Expanding Genetic Variation

Direct allele introgression into pure chicken breeds using Sire Dam Surrogate (SDS) mating

Maeve Ballantyne, Mark Woodcock, Dadakhalandar Doddamani, Tuanjun Hu, Lorna Taylor, Rachel J. Hawken & Mike J. McGrew

Nature Communications **12**, Article number: 659 (2021) | Cite this article



Conclusion

- New technologies provide an opportunity maintain genetic diversity for future needs
  - Flocks can be re-established using surrogate hosts
  - Genetics of current commercial lines may need to be enhanced through introgression (or gene editing) of alleles from other breeders to meet future market demands
  - Maintaining genetic diversity or biodiversity is Key for the poultry industry

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Thank you
Cobb
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