

Genetics of extreme body size evolution in mice from Gough Island

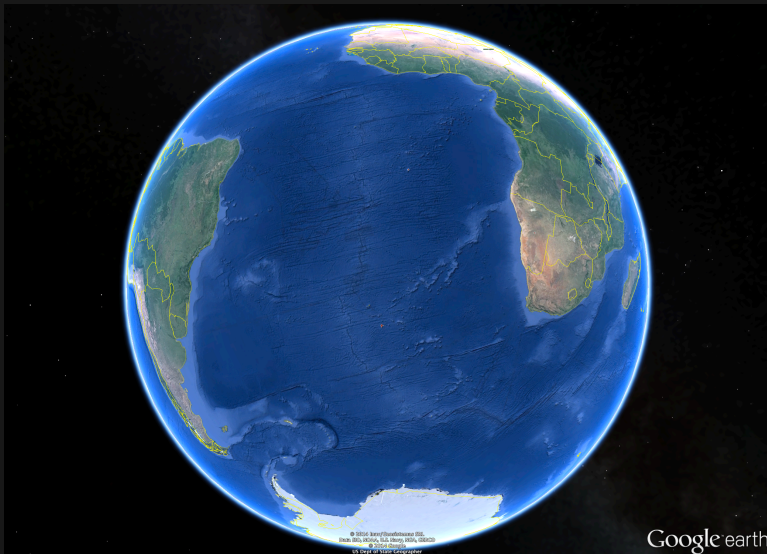
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bit.ly/BDS2017-07

Gough Island



Gough Island



Gough Island



Big rodents



Big rodents



Big rodents



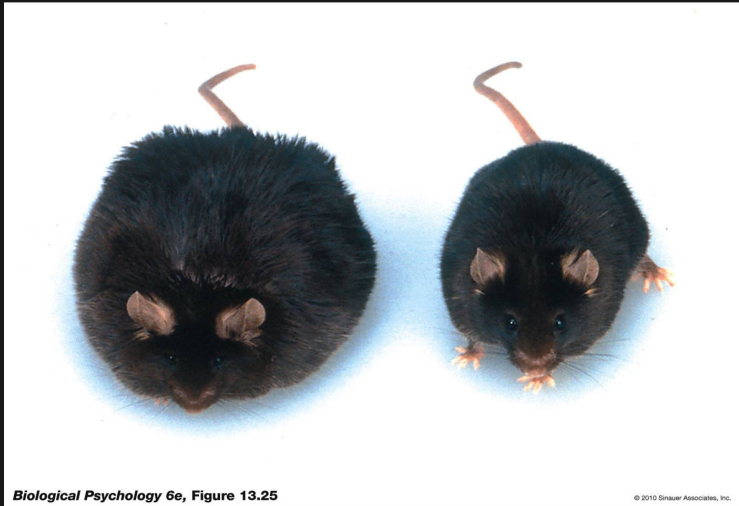
Gough mice



WSB and Gough mice



Leptin knockout



Biological Psychology 6e, Figure 13.25

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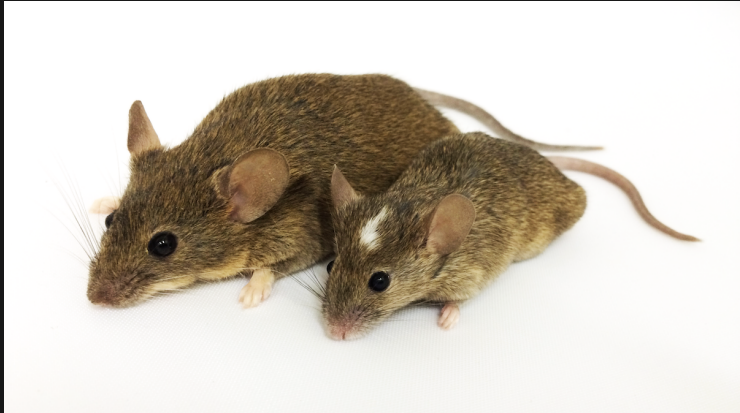
WSB and Gough mice



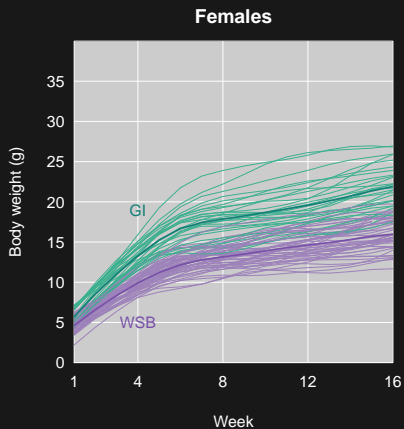
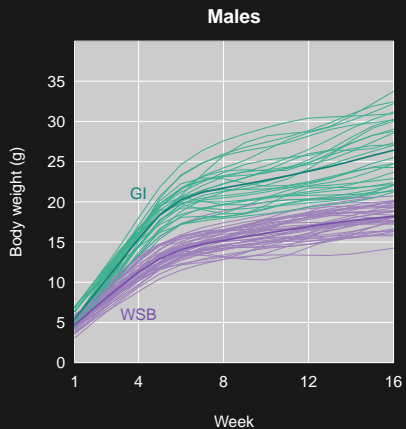
The Island Rule



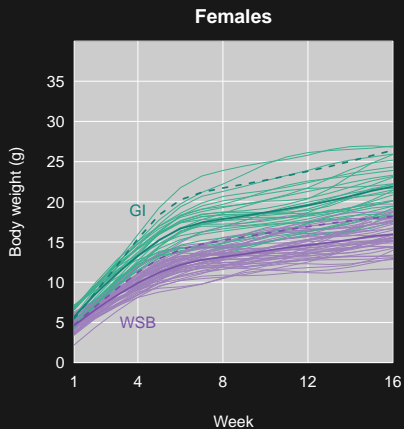
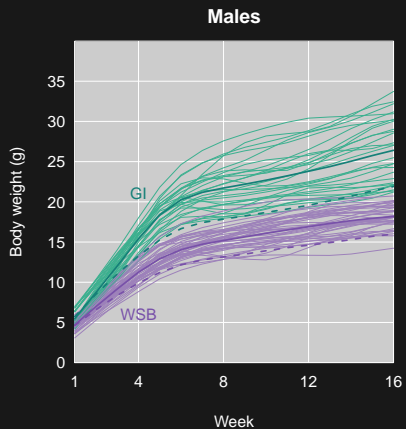
Gough and WSB mice



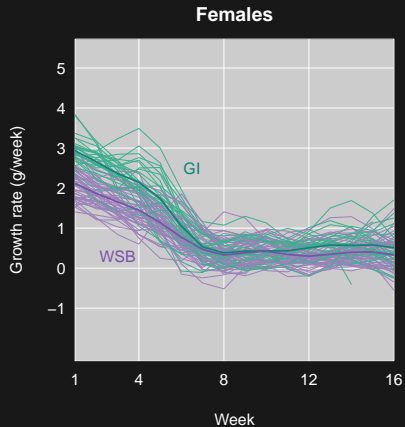
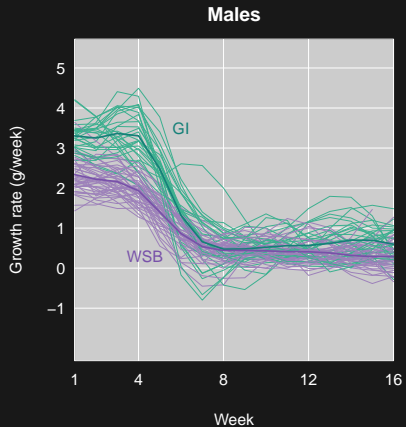
Body weight



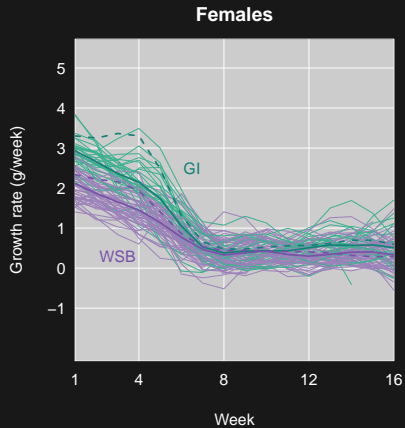
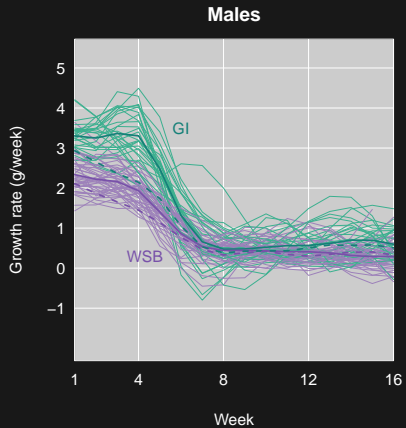
Body weight



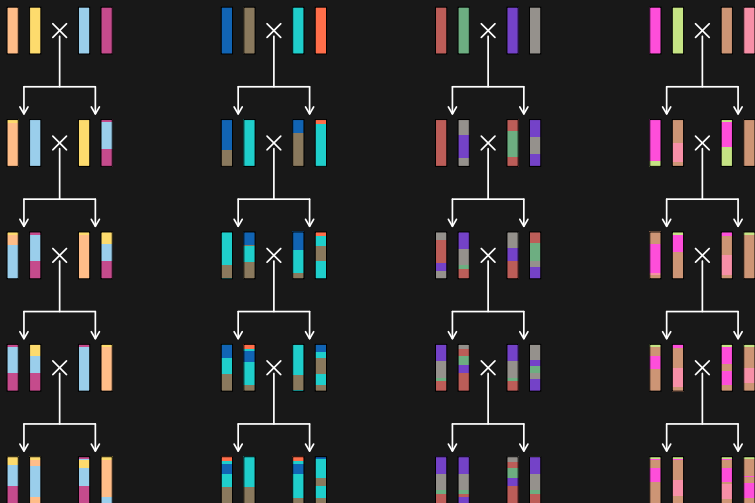
Growth rate



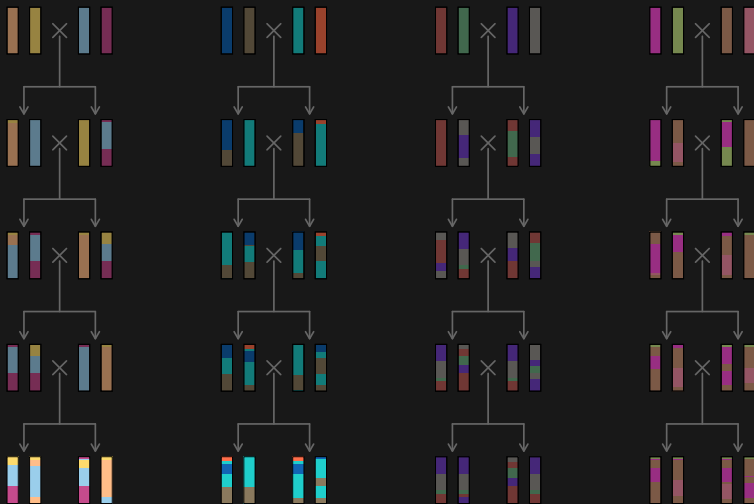
Growth rate



Partially-inbred Gough lines



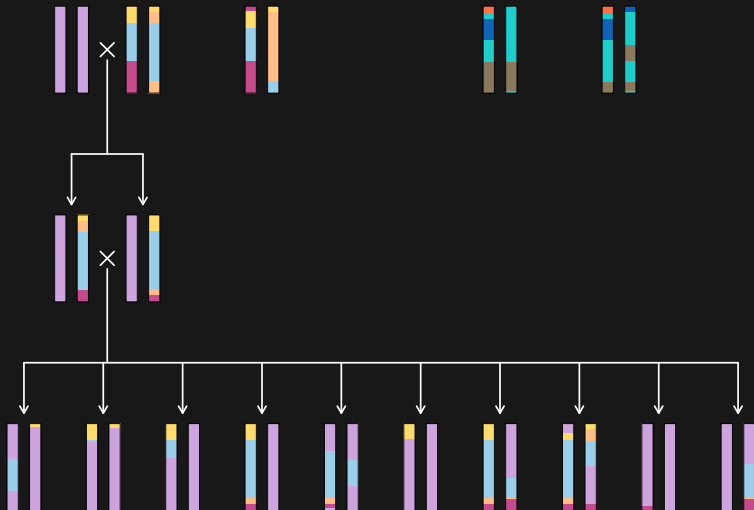
Partially-inbred Gough lines



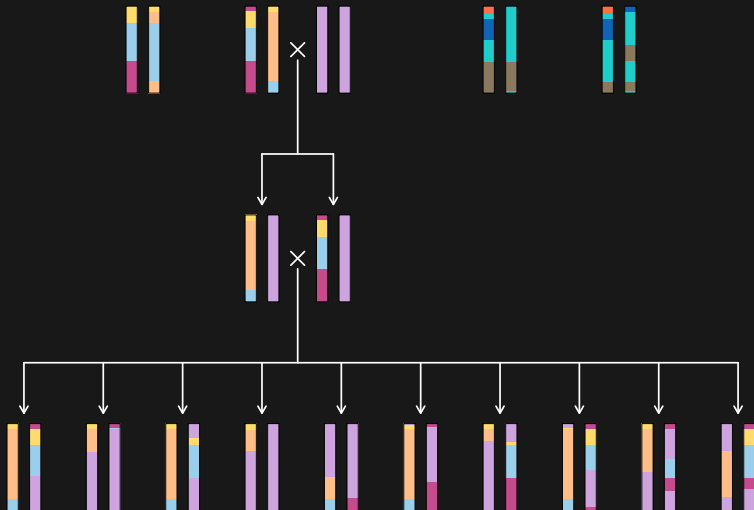
Partially-inbred Gough lines



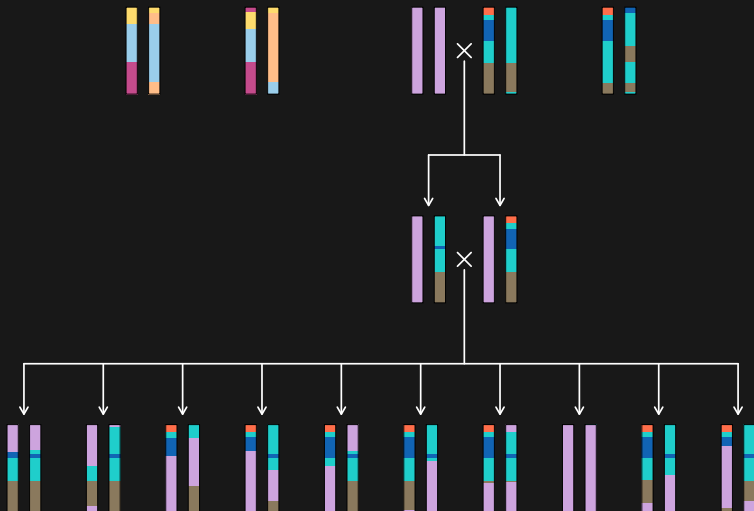
Gough × WSB crosses



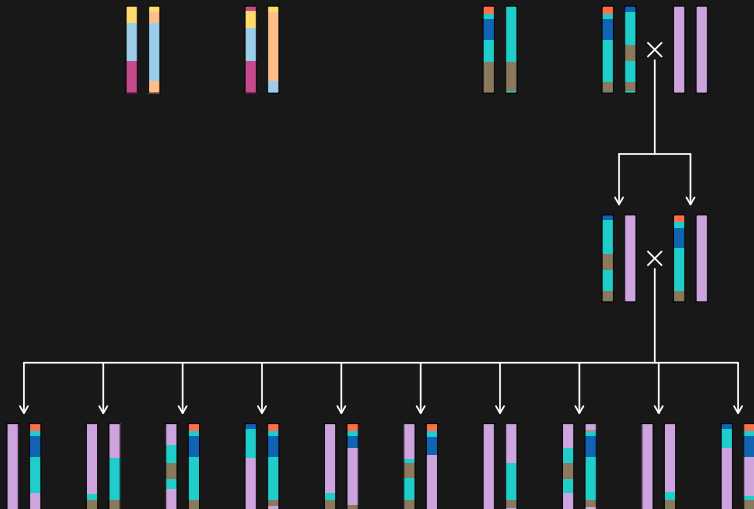
Gough × WSB crosses



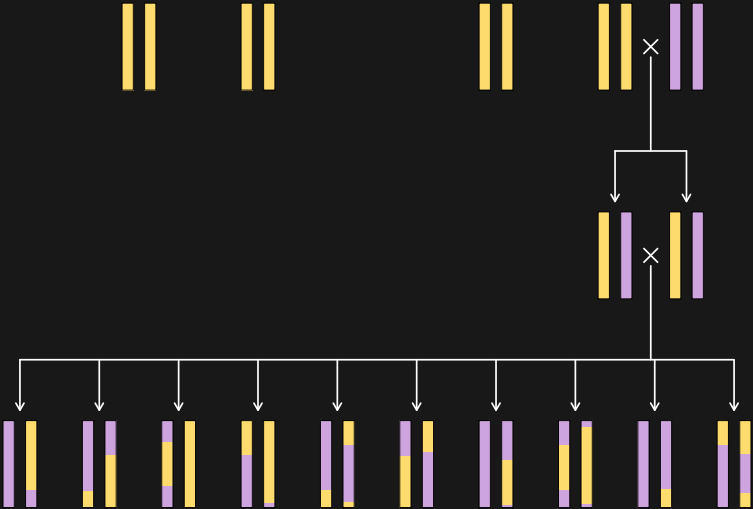
Gough \times WSB crosses



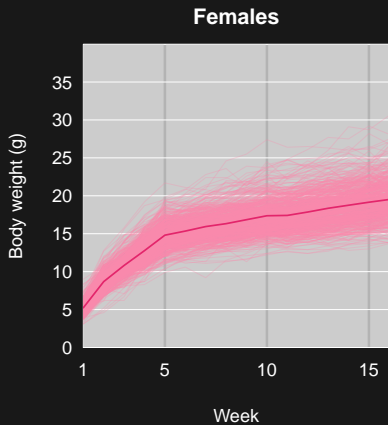
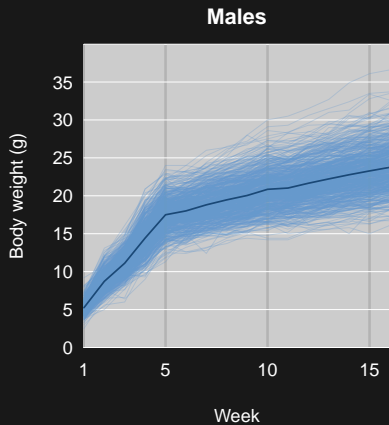
Gough \times WSB crosses



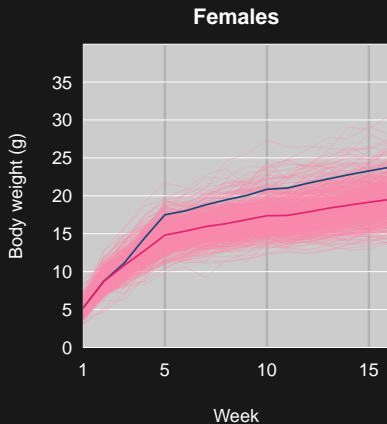
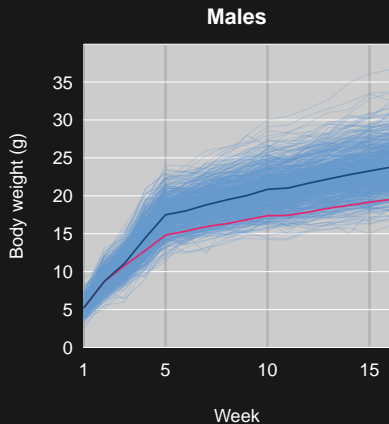
Gough × WSB crosses



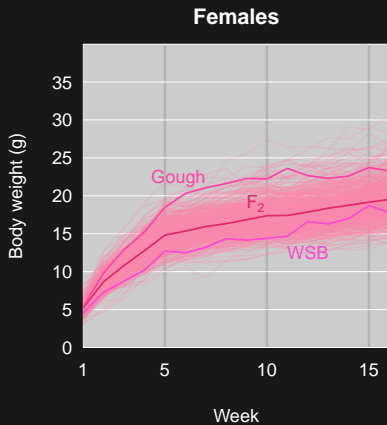
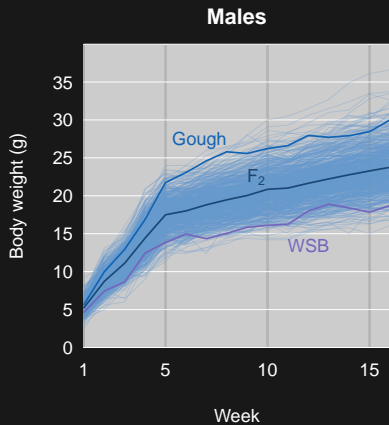
Growth curves



Growth curves

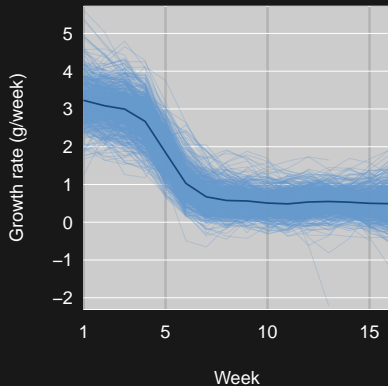


Growth curves

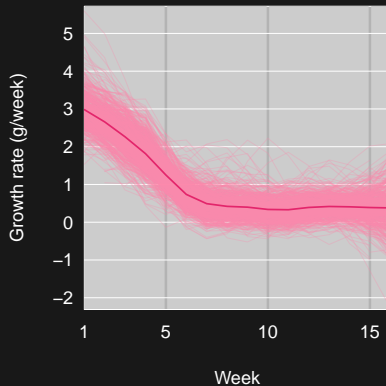


Growth rate

Males

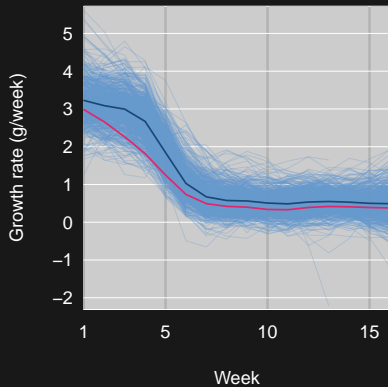


Females

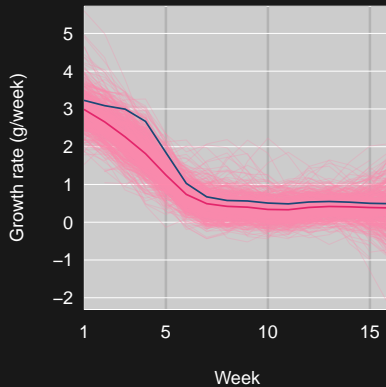


Growth rate

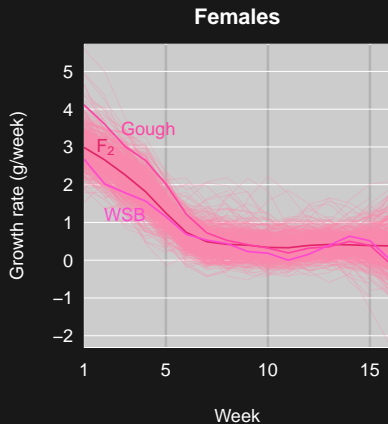
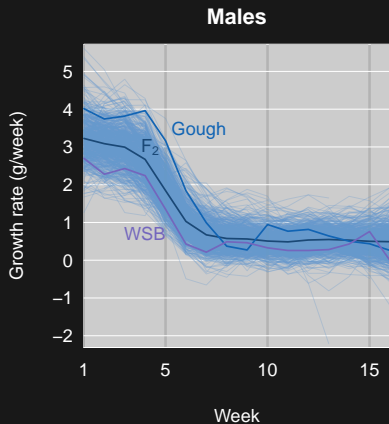
Males



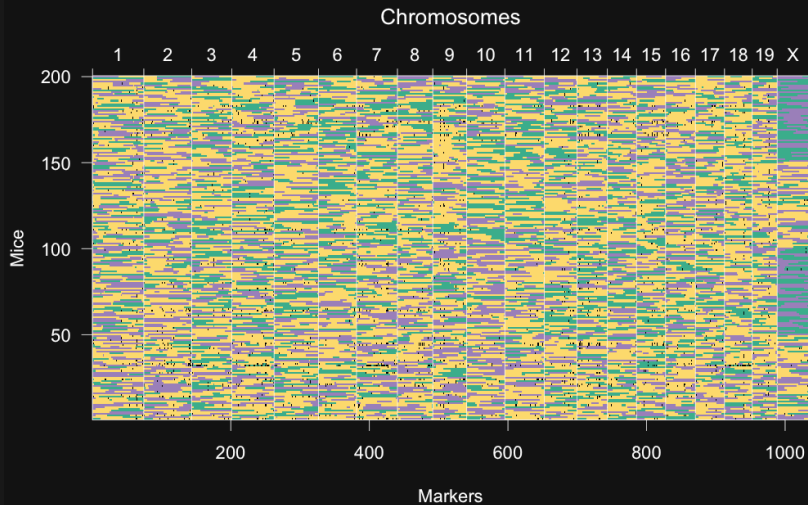
Females



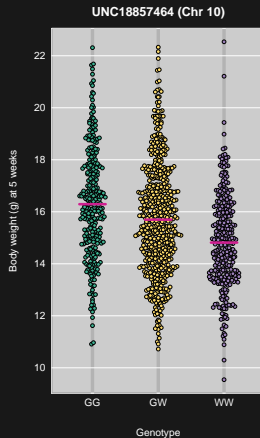
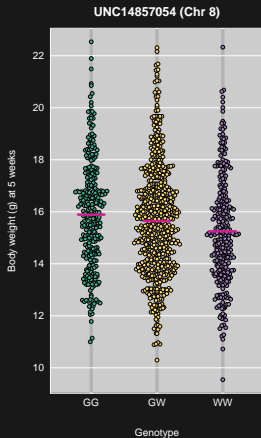
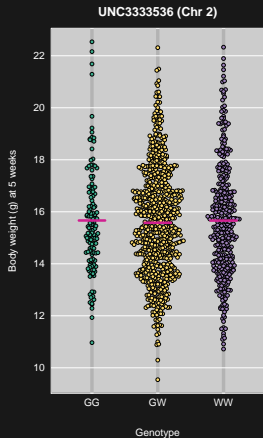
Growth rate



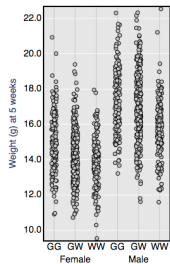
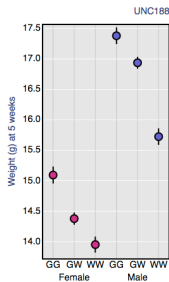
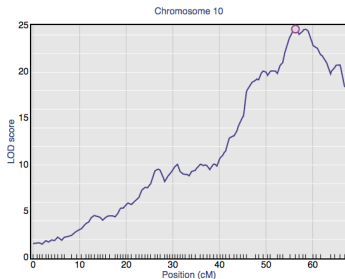
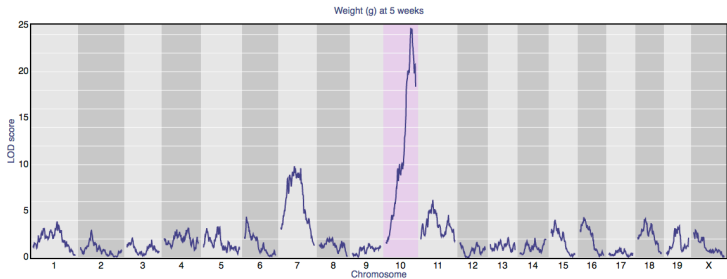
Genotypes



Weight at 5 weeks vs genotype



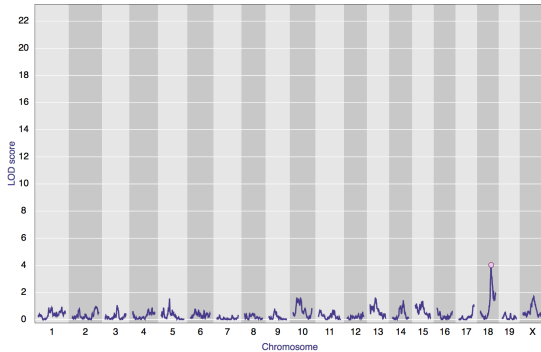
Genome scan



Permutation test

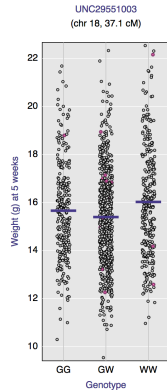


Permutation test

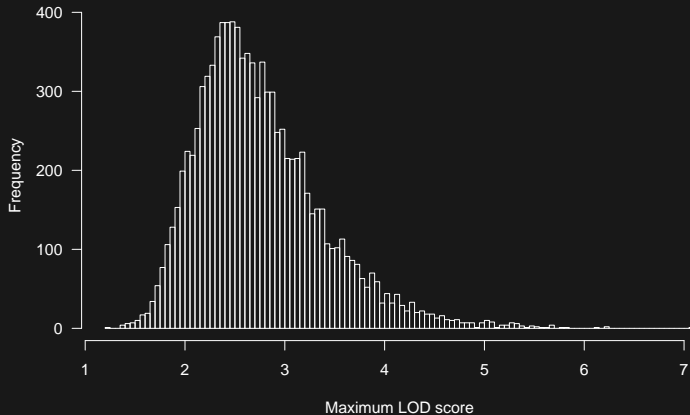


Randomize!

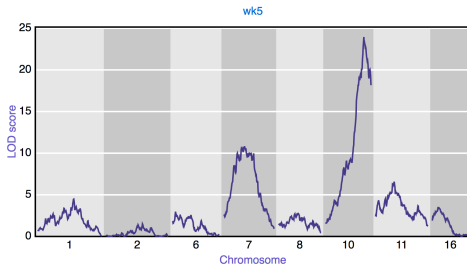
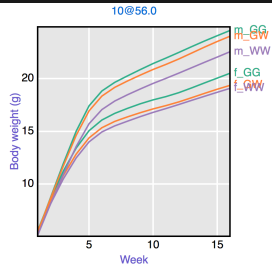
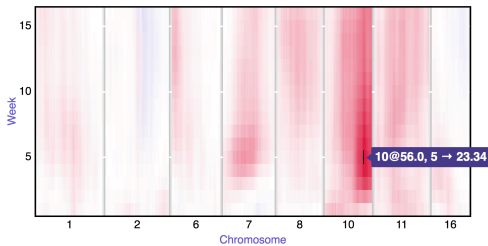
Back



Histogram of permutation results



Genome scan for body weight



Summary

- ▶ Multiple genetic loci contribute to body size in Gough × WSB.
- ▶ Gough alleles result in increased size.
- ▶ The major effects are on growth rate in first five weeks.

Acknowledgments

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Ornithology, University of Cape Town

NIGMS/NIH

Life of a data science prof

- ▶ Collaborative data analysis
 - Gough Island mice
 - Obesity/diabetes in mice
 - Flu infection in mice
 - Meiotic recombination in mice and humans
 - Other projects in maize, rice, deer mice, ...
- ▶ Methods and software development
 - QTL mapping in multi-parent populations
 - Interactive graphics for statistical genomics
 - R/qtl2, R/qtlcharts, GeneNetwork
- ▶ Teaching
 - Tools for Reproducible Research
 - Statistical Genomics
 - Data Analysis and Visualization
 - Software and Data Carpentry workshops
- ▶ Mentoring
 - One grad student + 2 summer students

Life of a data science prof (2)

- ▶ Program administration
 - Director of new PhD program in Biomedical Data Science
- ▶ Journal editing/reviewing
 - Senior editor for *Genetics*
 - Editorial boards at *PeerJ* and *BMC Biology*
 - Frequent reviewer for other journals + book publishers
- ▶ Committees
 - Faculty Senate
 - Steering committee, MD/PhD program
 - Genomics Advisory Committee, SMPH
 - Departmental committees
 - PhD thesis committees
- ▶ Travels
 - Scientific meetings
 - Departmental seminars
 - Various workshops