

# Genetics of extreme body size evolution in mice from Gough Island

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# Gough Island



Google earth

# Gough Island



# Gough Island



*Chantal Steyn © 2009*

# Big rodents



# Big rodents



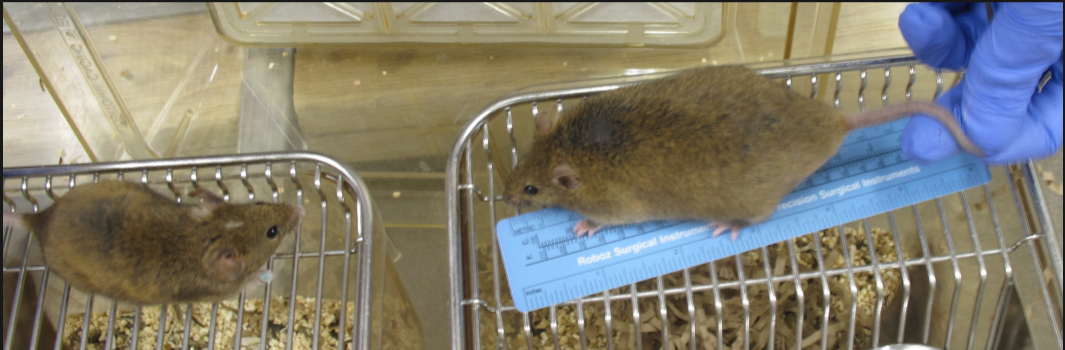
# Big rodents



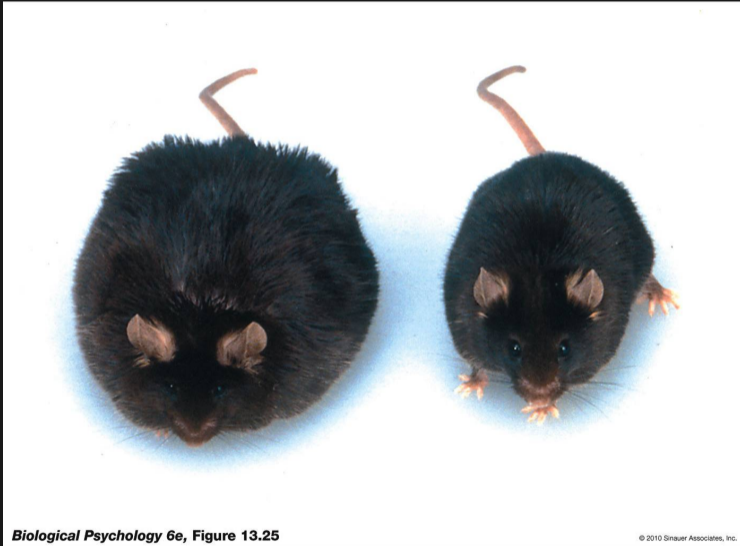
# Gough mice



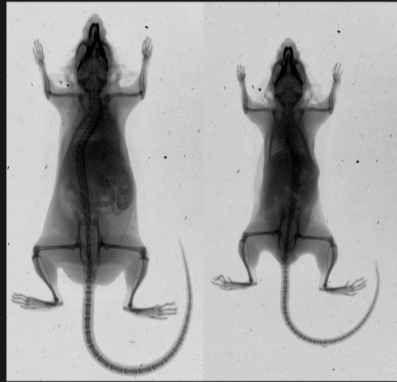
# WSB and Gough mice



# Leptin knockout



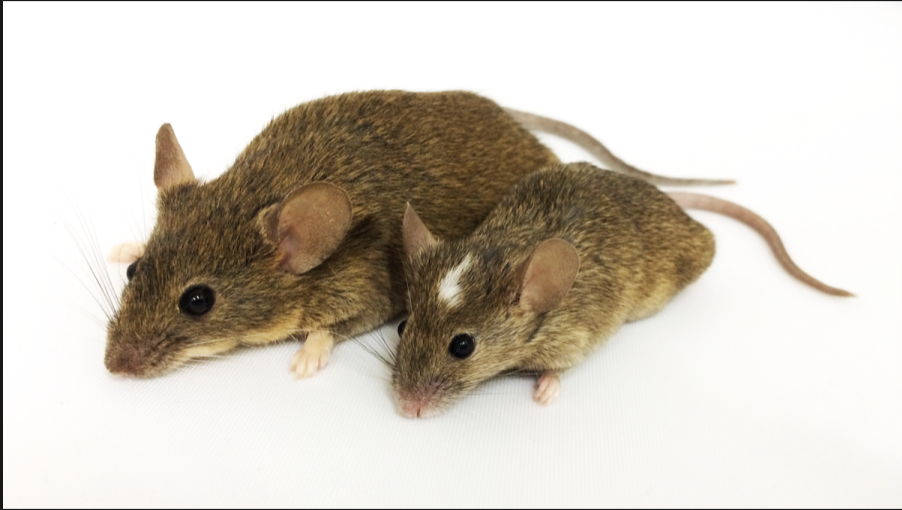
# WSB and Gough mice



# The Island Rule

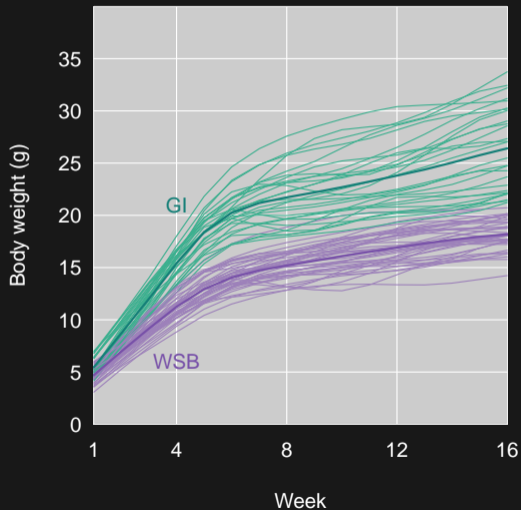


# Gough and WSB mice

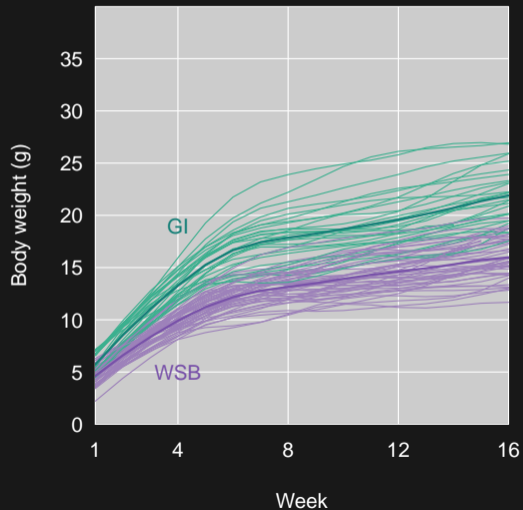


# Body weight

## Males

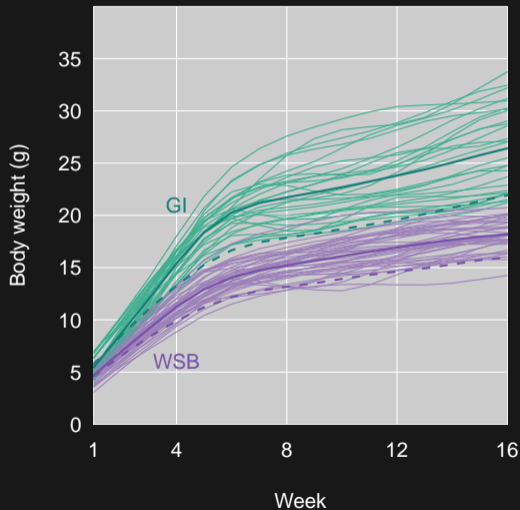


## Females

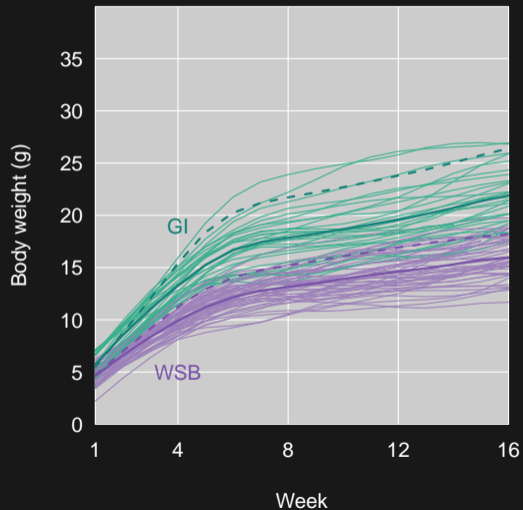


# Body weight

## Males

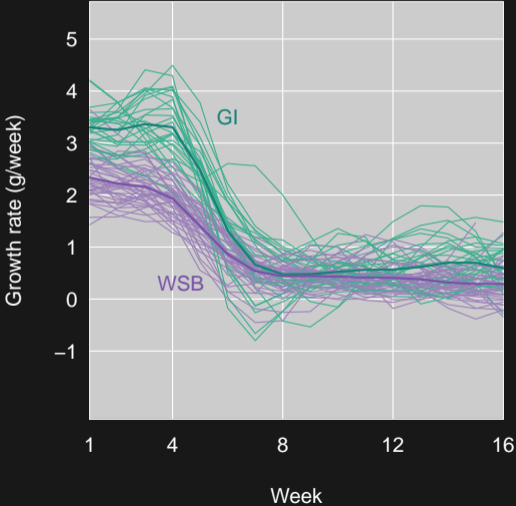


## Females

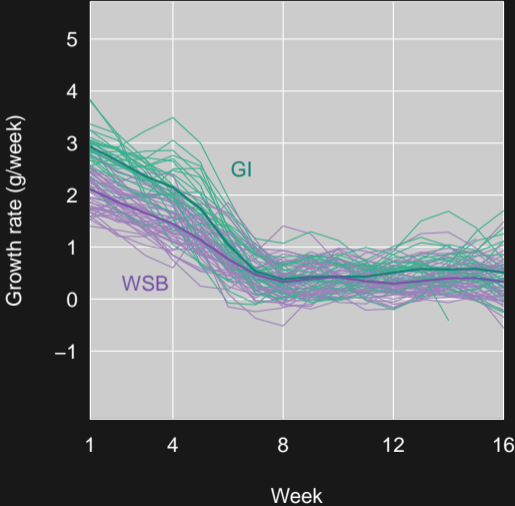


# Growth rate

## Males

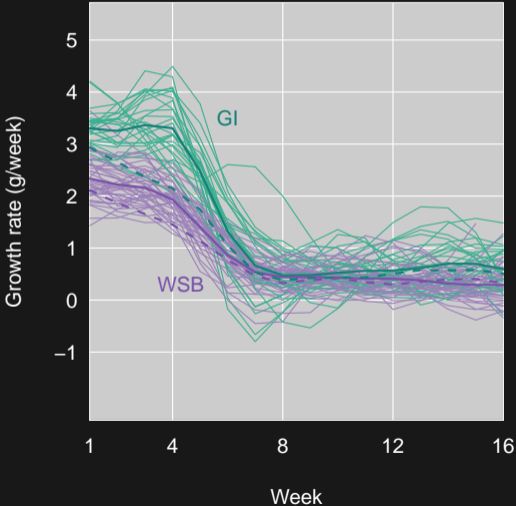


## Females

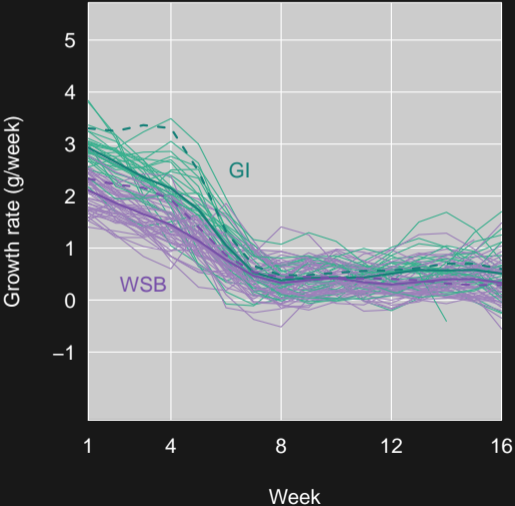


# Growth rate

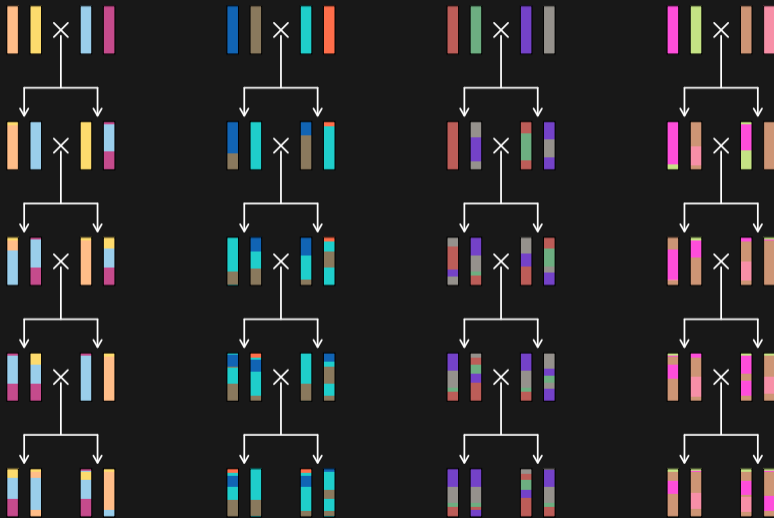
## Males



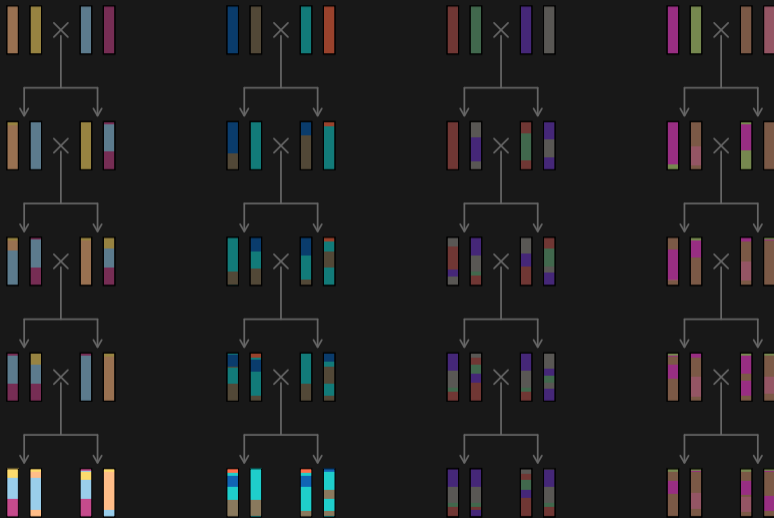
## Females



# Partially-inbred Gough lines



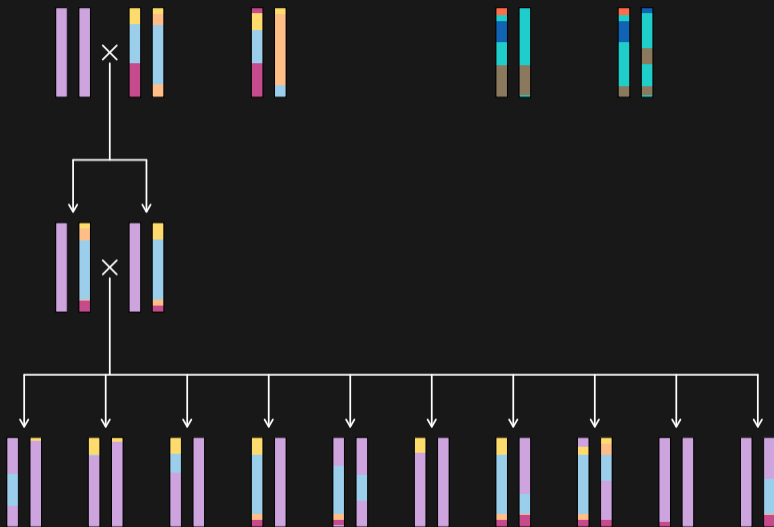
# Partially-inbred Gough lines



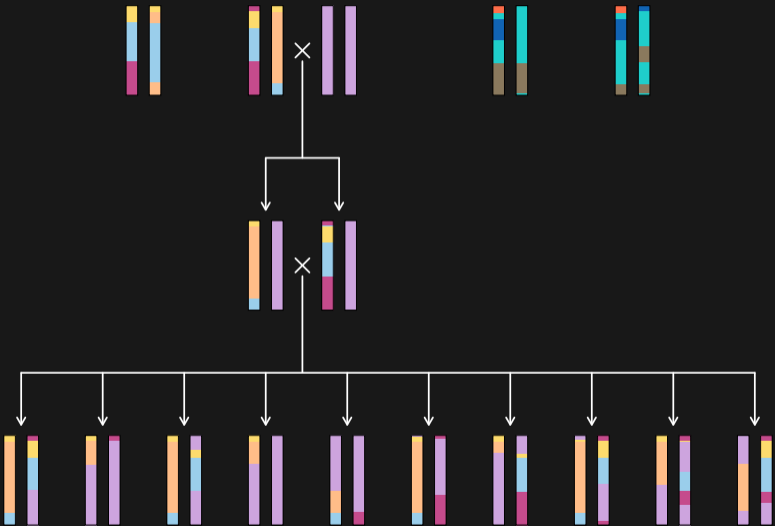
# Partially-inbred Gough lines



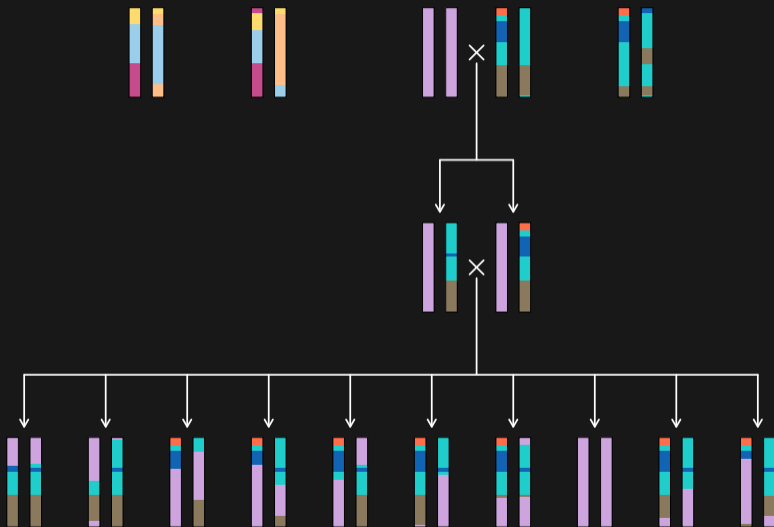
# Gough $\times$ WSB crosses



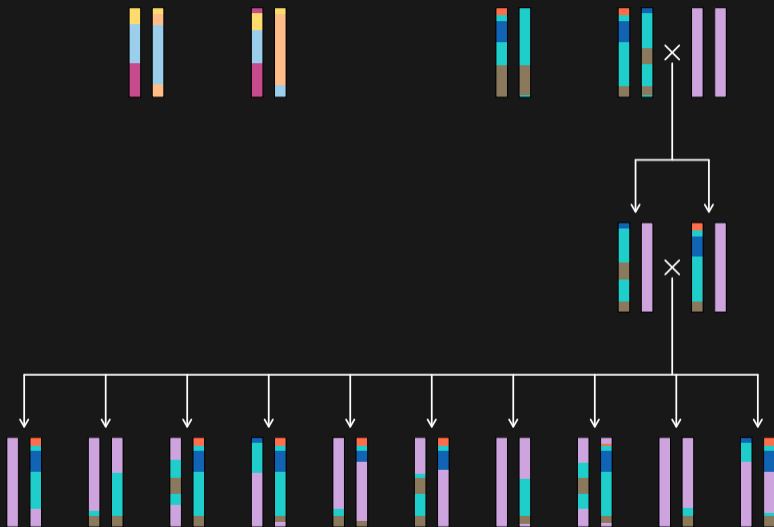
# Gough $\times$ WSB crosses



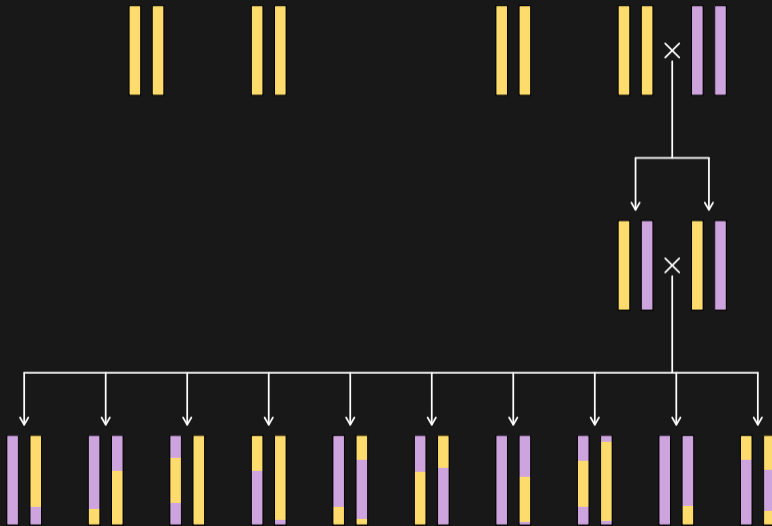
# Gough $\times$ WSB crosses



# Gough $\times$ WSB crosses

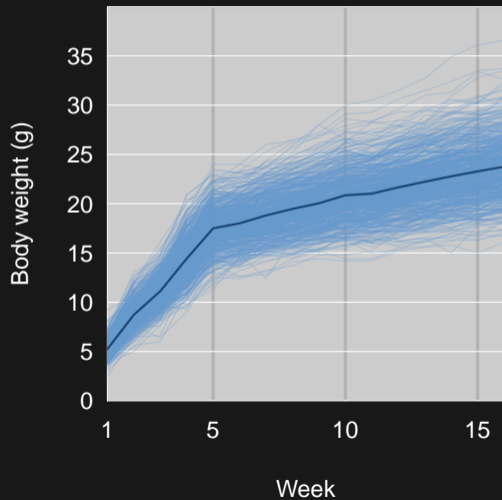


# Gough $\times$ WSB crosses

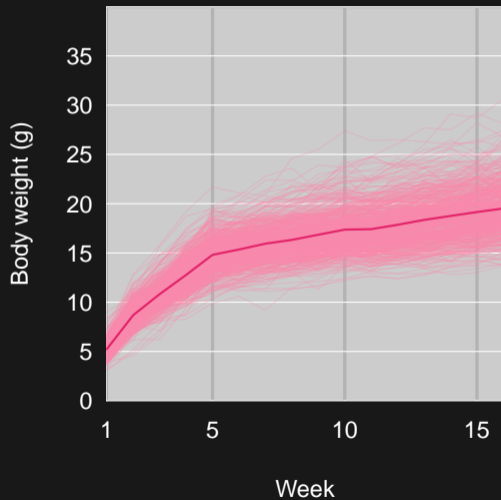


# Growth curves

## Males

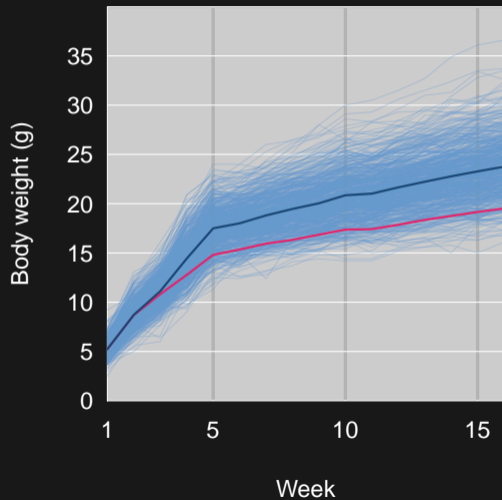


## Females

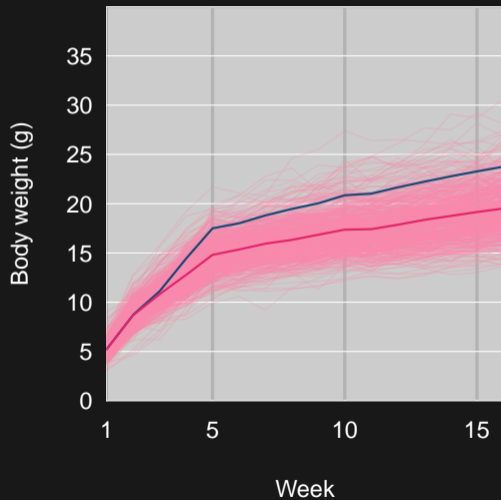


# Growth curves

## Males

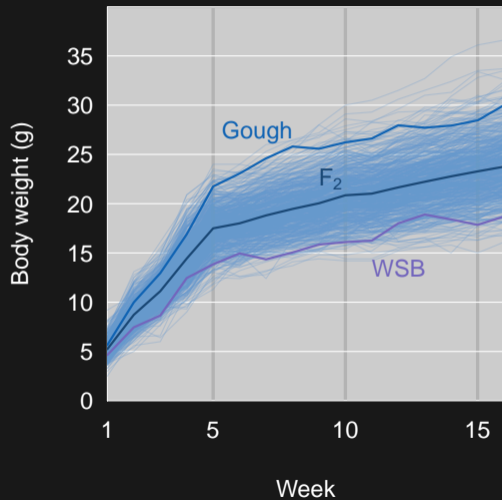


## Females

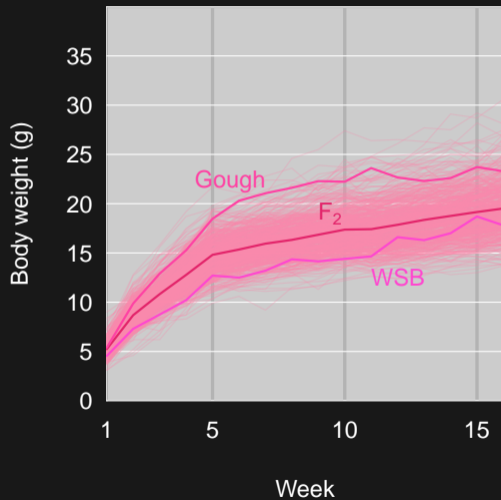


# Growth curves

## Males

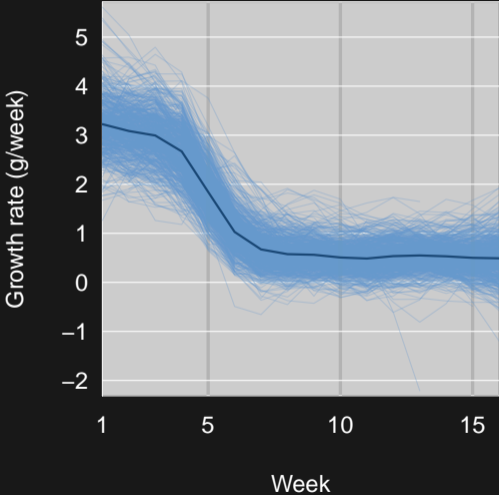


## Females

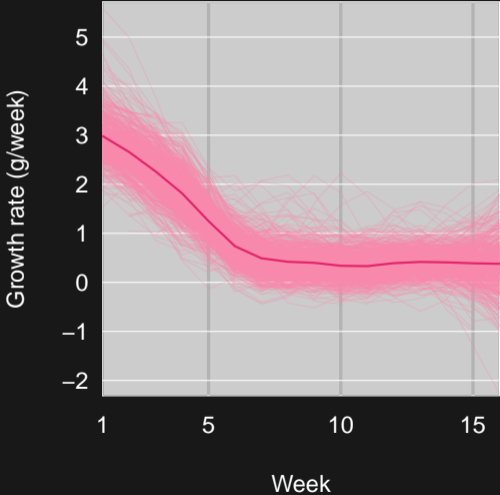


# Growth rate

## Males

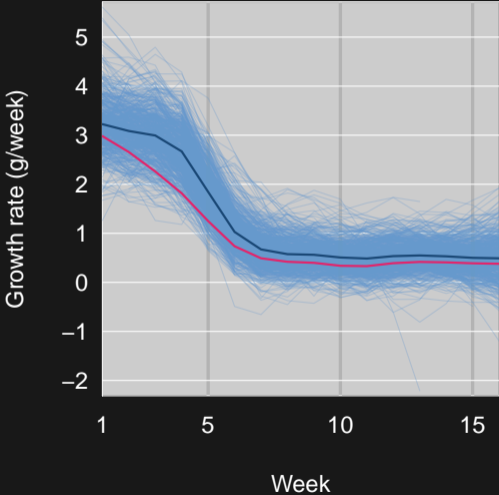


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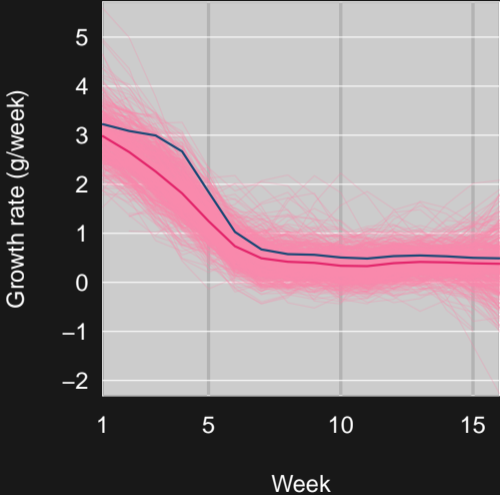


# Growth rate

## Males

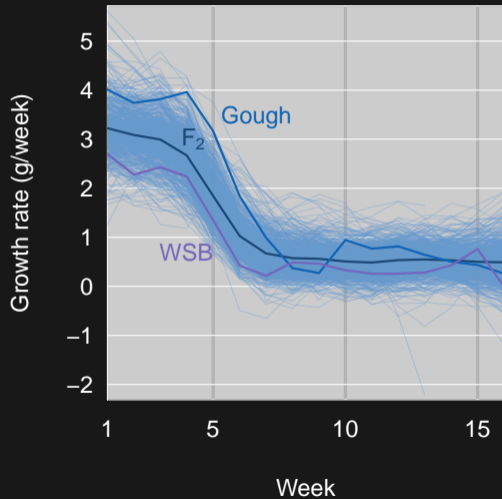


## Females

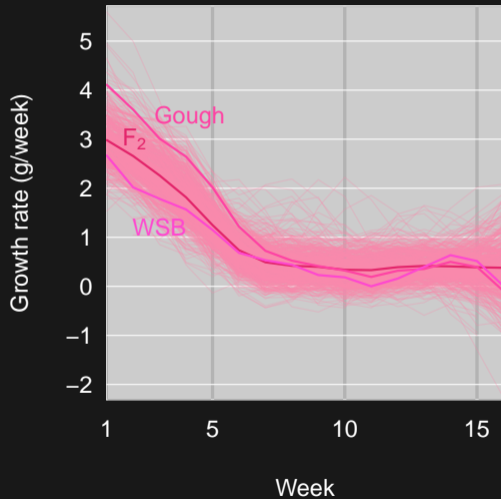


# Growth rate

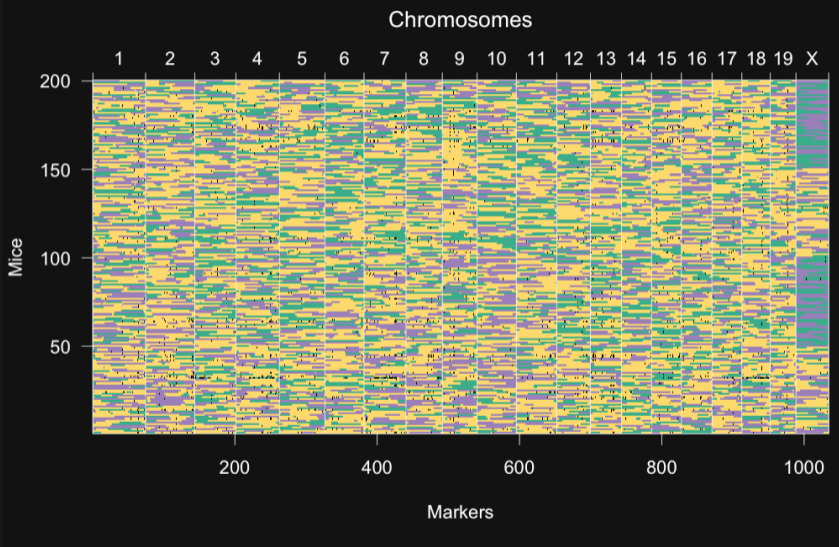
## Males



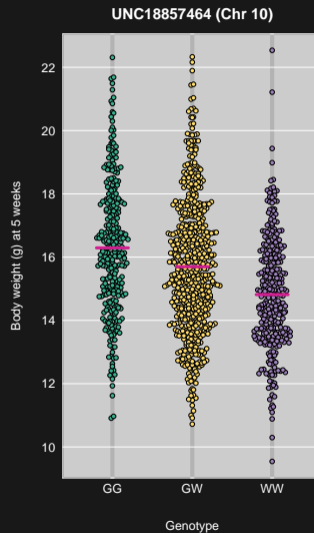
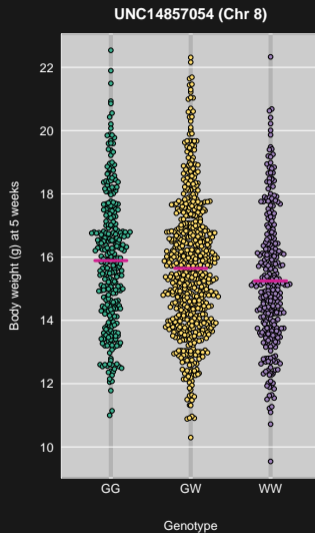
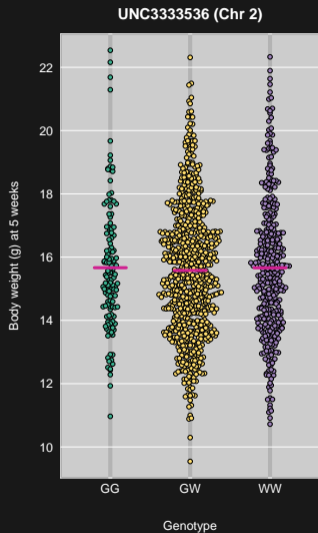
## Females



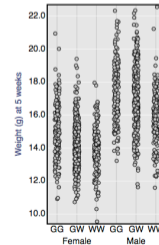
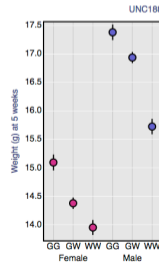
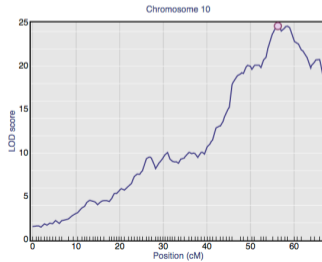
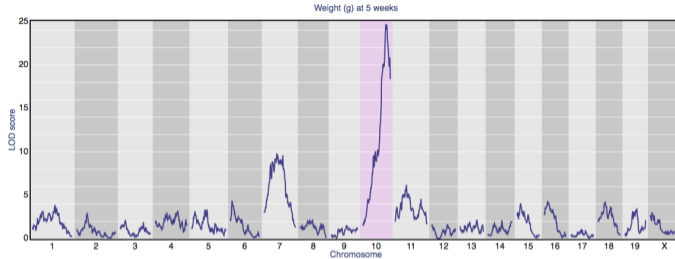
# Genotypes



# Weight at 5 weeks vs genotype



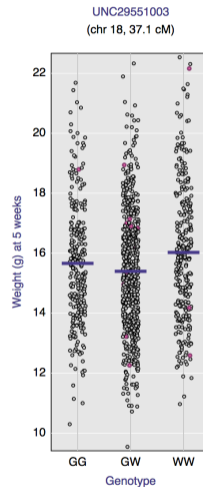
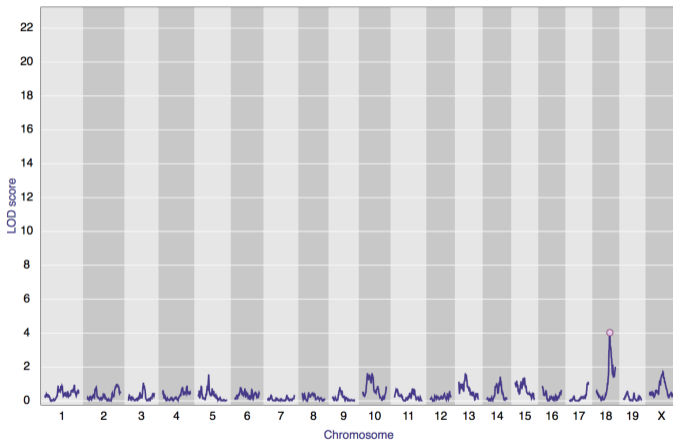
# Genome scan



# Permutation test



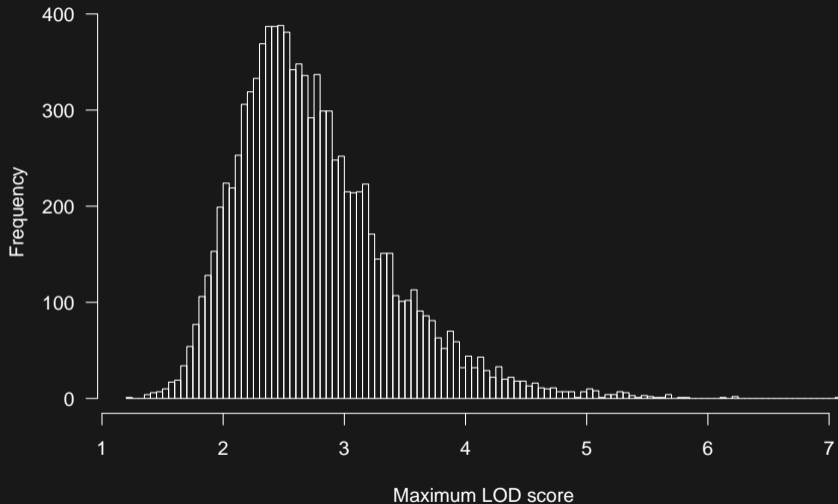
# Permutation test



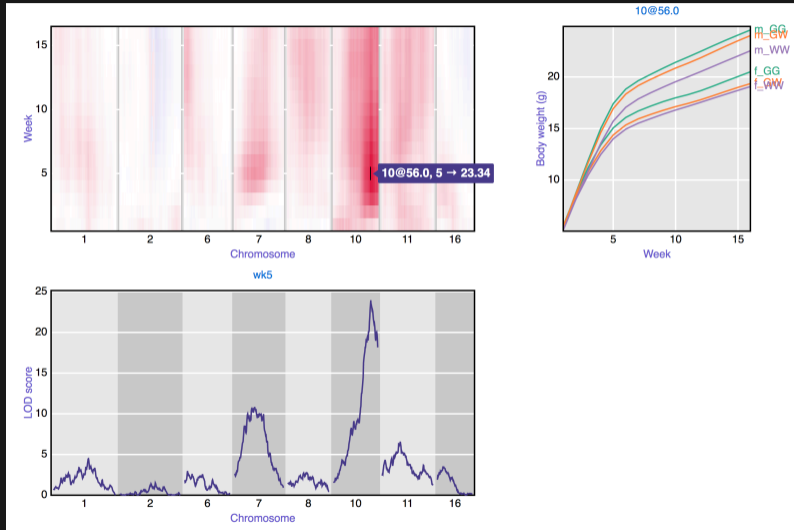
Randomize!

Back

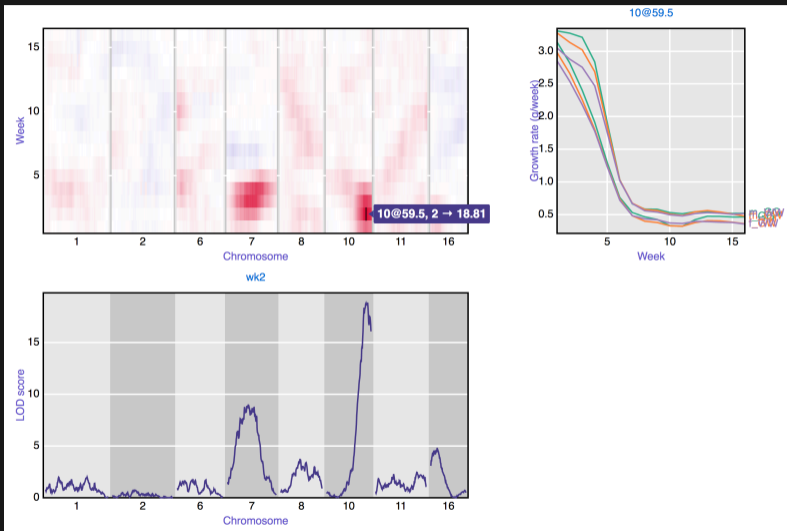
# Histogram of permutation results



# Genome scan for body weight



# Genome scan for growth rate



# 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.
- ▶ Gray et al. (2015) *Genetics* 201:213–228  
[doi:10.1534/genetics.115.177790](https://doi.org/10.1534/genetics.115.177790)

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NIGMS/NIH

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