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## **Y and mitochondrial chromosomes in the heterogeneous stock rat population**

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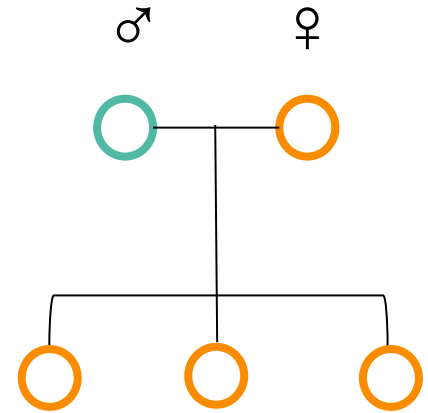
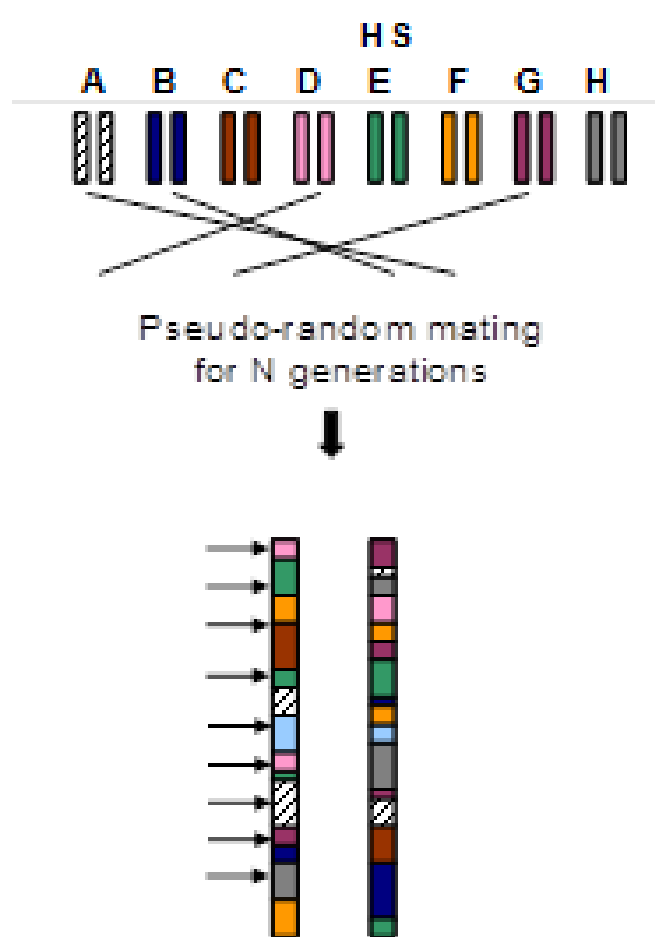
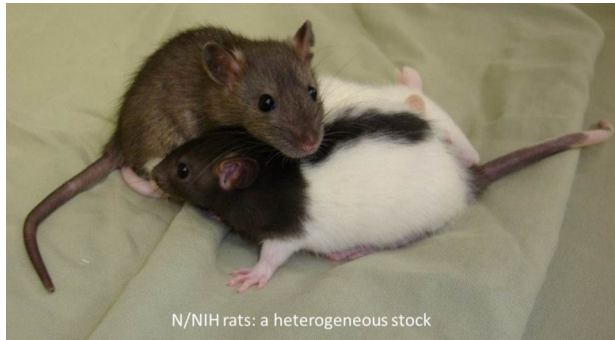
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# Roadmap

1. Question
  2. Data
  3. Step 1: call haplotypes
    - a. Founder strains
    - b. Modern HS rats
  4. Step 2: haplotype association
    - a. PheWAS
    - b. Differential expression
  5. Conclusion
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# Question

Do the Y and mitochondrial chromosomes affect traits studied in HS rats?



# Data

- Founder strain genotypes
- 10 years of modern HS rats
  - Genotypes
  - Phenotypes



40x



0.25x

Behavior

Microbiome

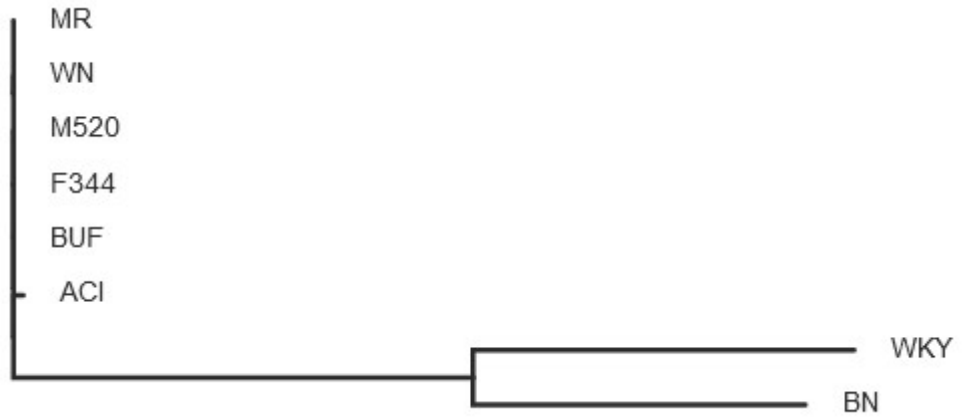
Gene  
expression

Physiology

Metabolome

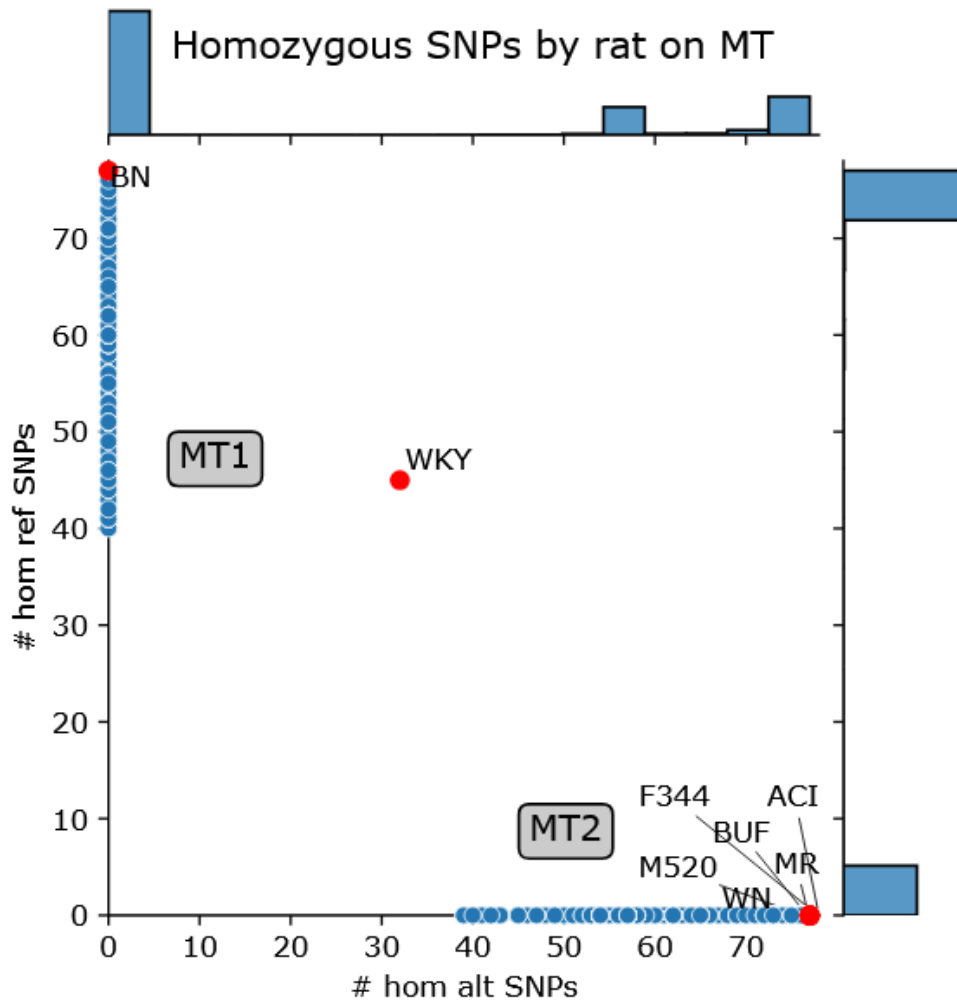
## Step 1a: HS founder strain haplotypes

Which haplotypes existed among *founder* strains?



## Step 1b: modern HS rat haplotypes

Which haplotypes exist among *modern* HS rats?



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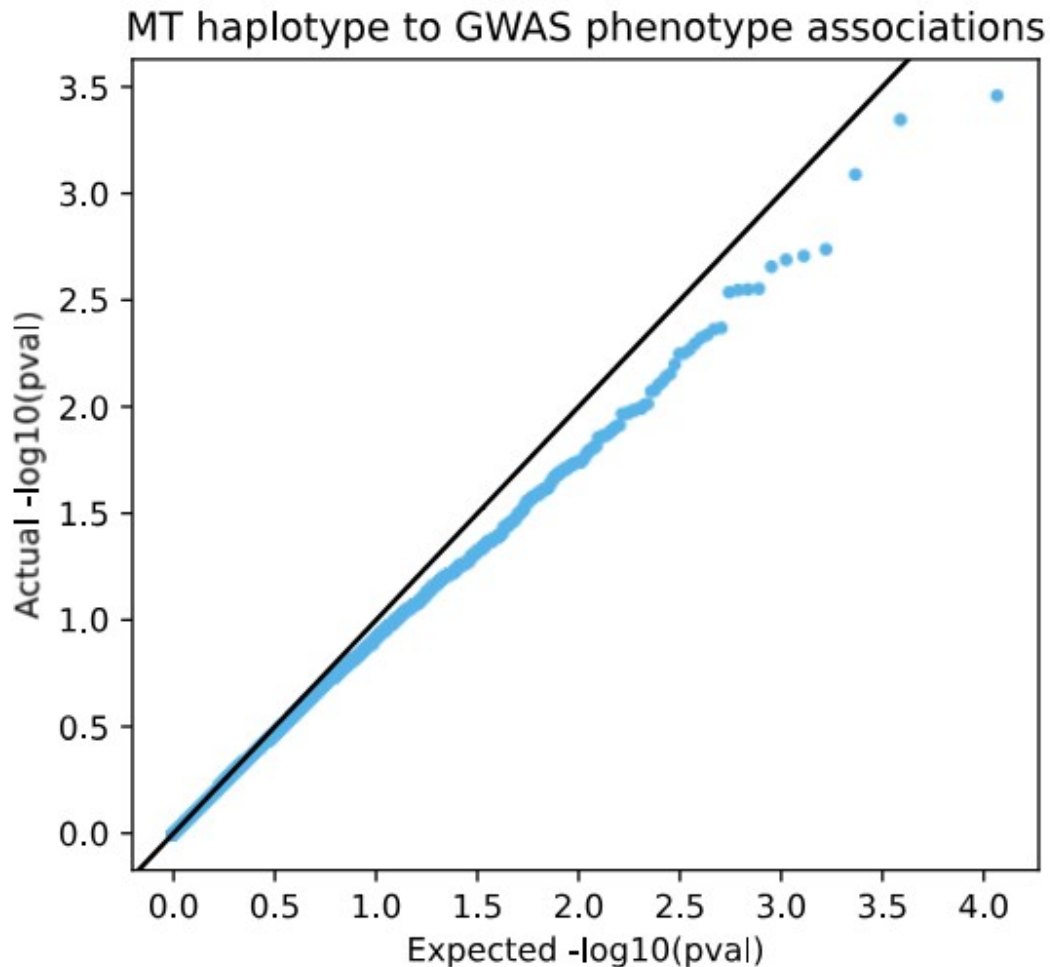
## Step 2a: PheWAS

Does haplotype have a significant effect on traits used in GWAS?



VS

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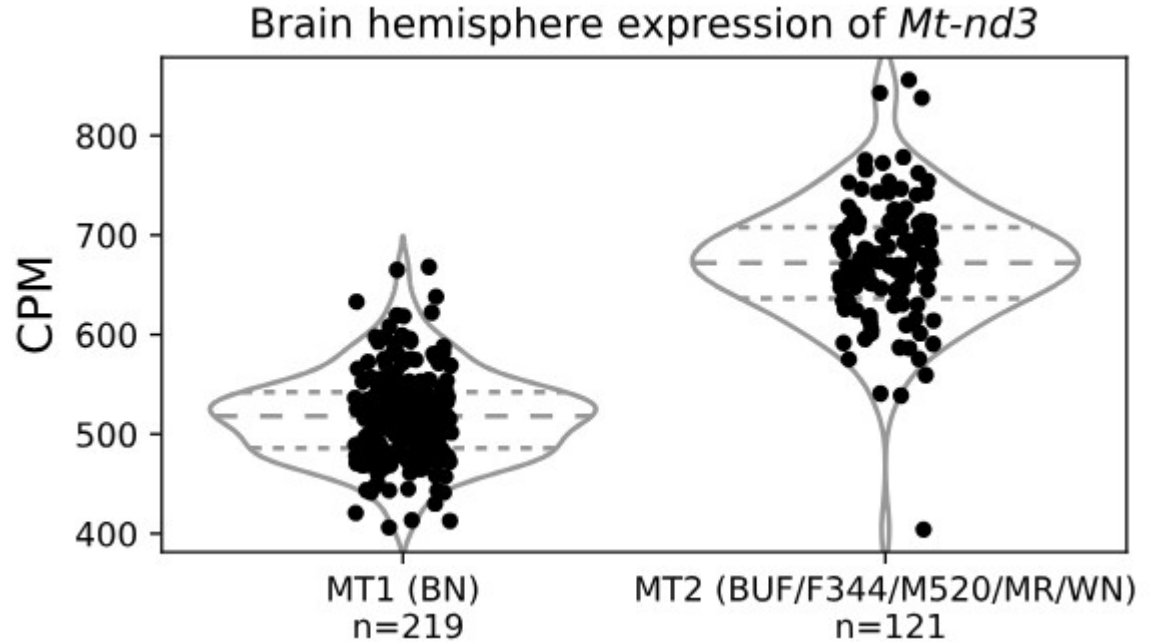


## Step 2b: differential expression

Does haplotype has a significant effect on gene expression?



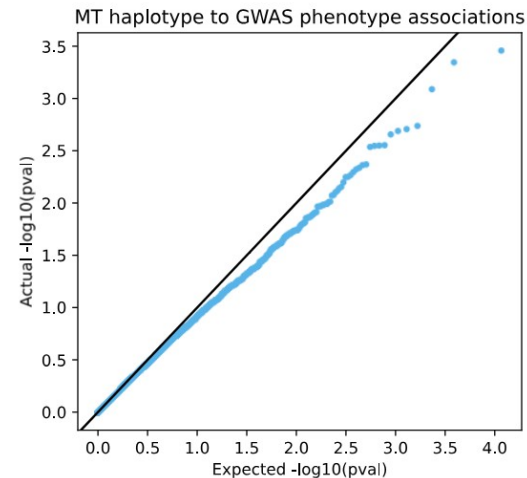
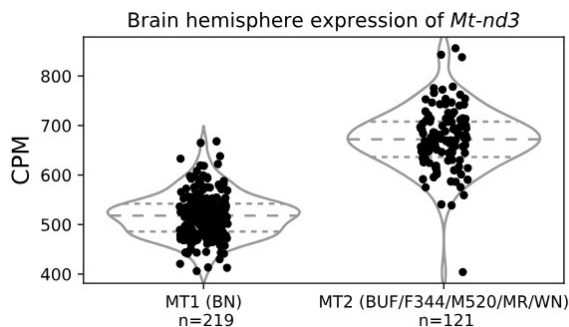
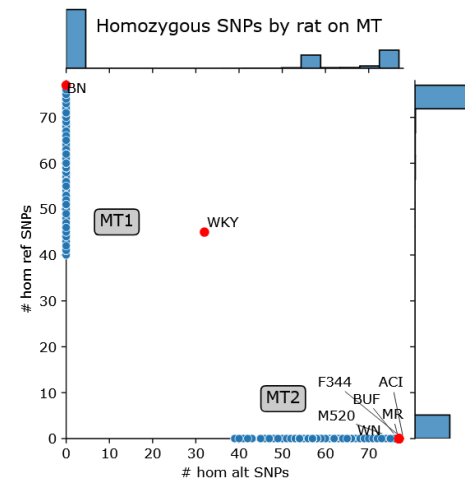
VS





# Conclusion

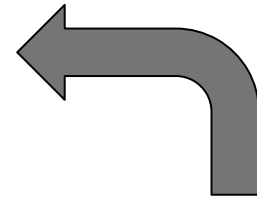
- Limited Y/MT diversity exists in modern HS rats
- Extant Y/MT haplotypes can be easily called from existing sequencing data
- Extant Y/MT haplotypes have little effect on traits studied in HS rats
- Limitations



# Acknowledgements



Genes and Addiction  
NIDA Center for GWAS in Outbred Rats



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