**Boomer 211 - Beyond Mendel, Sex Linkage, Human Genetics**

**Remember:** Mendel studied only simple inheritance

**Non-Mendelian Inheritance Patterns**

Incomplete Dominance:

Homework - perform P, F1, F2 crosses

Multiple Alleles: some genes have

Understand:

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>Genotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type A</td>
<td></td>
</tr>
<tr>
<td>Type B</td>
<td></td>
</tr>
<tr>
<td>Type O</td>
<td></td>
</tr>
<tr>
<td>Type AB</td>
<td></td>
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</tbody>
</table>

Codominance: both alleles

Nature/Nurture: environment

**Morgan, Flies, Sex Linkage - 1910s**

Genes Shown on Chromosomes

By now, scientists could see

**Drosophila melanogaster:**

- Autosomes (flies have 3 pairs):
- Sex Chromosomes (flies have 1 pair):
  - Wild Type:
  - Mutant:

Cross 1: True Parentals

At first, Morgan assumed eye color was autosomal/Mendelian:

But F2 was half unexpected: where all females red,

Morgan formed a new hypothesis:

**Rule Three:** For sex linkage, show alleles on X’s (e.g. X<sup>R</sup>) - none on Y’s. Prediction must include gender. Use Mendelian letters for genes - not Morgan’s (+/-) naming system.

Let’s Show the P X P Cross to F1

P Gametes: red/female X white/male
Explain predictions

Let’s Show the F1 X F1 Cross to F2

F1 Gametes: het/female X red/male
Explain predictions
Some Human Genetics
Pedigree Analysis:
Make sure you define shaded trait OR write phenotype below each person.

The following FYI traits are NOT on exam.

<table>
<thead>
<tr>
<th>Gene</th>
<th>Dom Allele</th>
<th>Rec Allele</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chin Dimple</td>
<td></td>
<td></td>
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<tr>
<td>Free Ear Lobes</td>
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<tr>
<td>Widow’s Peak</td>
<td></td>
<td></td>
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<tr>
<td>Left Thumb Top</td>
<td></td>
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<tr>
<td>Iris Pigmentation</td>
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</tr>
</tbody>
</table>

Sickle Cell Anemia

- African Americans -
- Carriers -
- Defective
- Hom/Rec = ; Het =

Protects against tropical malaria - thus, selected among many equatorial races.

Cystic Fibrosis

- European Caucasions -
- Carriers -
- Defective
- High levels of secreted
- If untreated,

Huntington Disease

- Unstable -

- Gene function unclear
- Degenerative
- No good treatment -

Duchenne Muscular Dystrophy

- Male Bias -
- Defective anchoring protein between…
- Degenerative
- No good treatment -