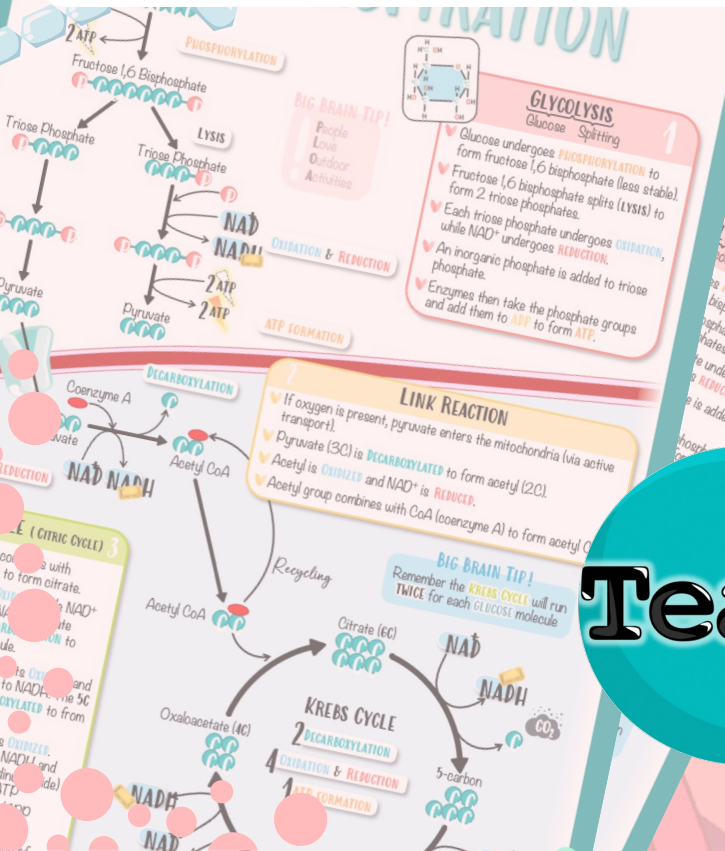
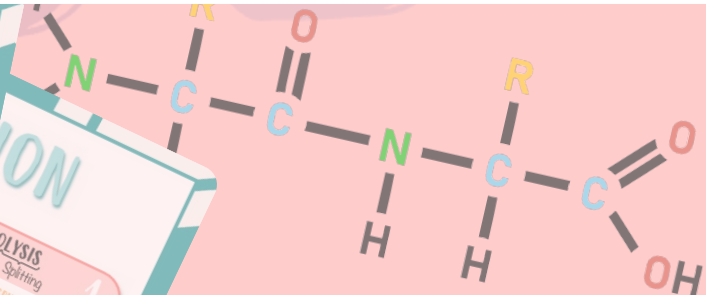
TeachMe

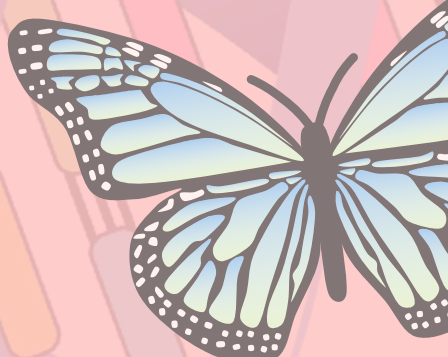
STUDY NOTES

Chapter 19 - Genetic Technology

Gene Editing







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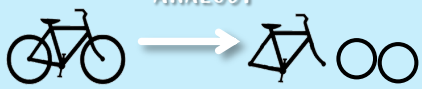
Gene Editing

Gene Knockout

Rendering a gene unusable to see the effect it has on an organism, and hence its function.

Analogy

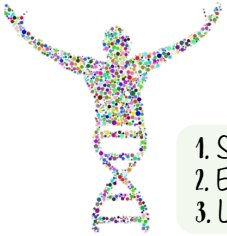


By removing the wheels, we can see what their function was by analyzing the leftover "frame".

Human Genome Project

A project that aimed to find the base sequence (order) of our genome.

→ Gene knockout is used to help understand the purpose of each gene.



Test on humans

1. Expensive
2. Unethical
3. Dangerous

Knockout organisms

1. Share many of the same genes
2. Easy to maintain and control
3. Life cycle is much shorter

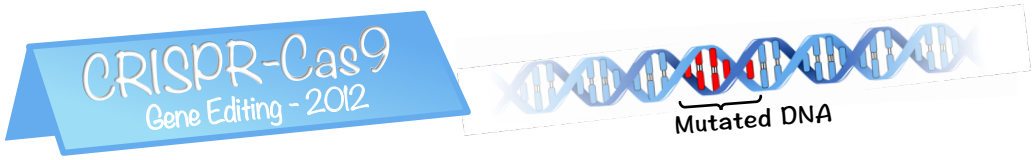
Test on Mice OR model organism*

* One that is used in place of another organism for ethical and practical purposes.

Purposes of gene knockout:

1. **Studying gene function**
   By knocking out genes, we can figure out what their purpose is, helping us understand how we function
2. **Modeling human disease**
   By replicating disease in knockout mice, it helps researchers understand disease mechanism and test potential treatments.
3. **Developmental biology**
   Knocking out genes involved in embryonic development can help scientists understand birth defect and developmental disorders.

A technique called **CRISPR-Cas9** was developed which allows for genes to be edited; whereby mutated genes can be removed and/or replaced with an unmutated/new gene:



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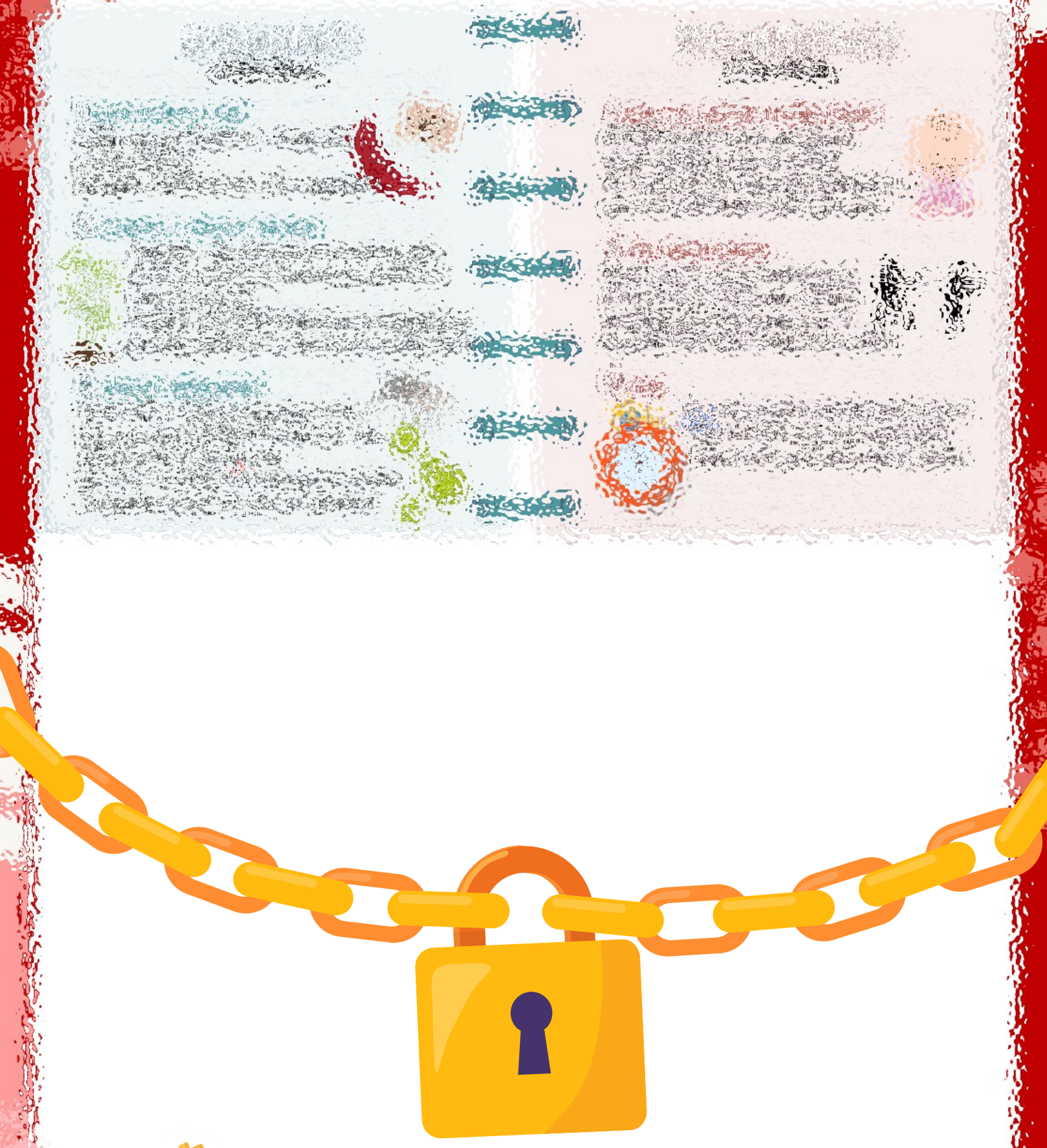

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