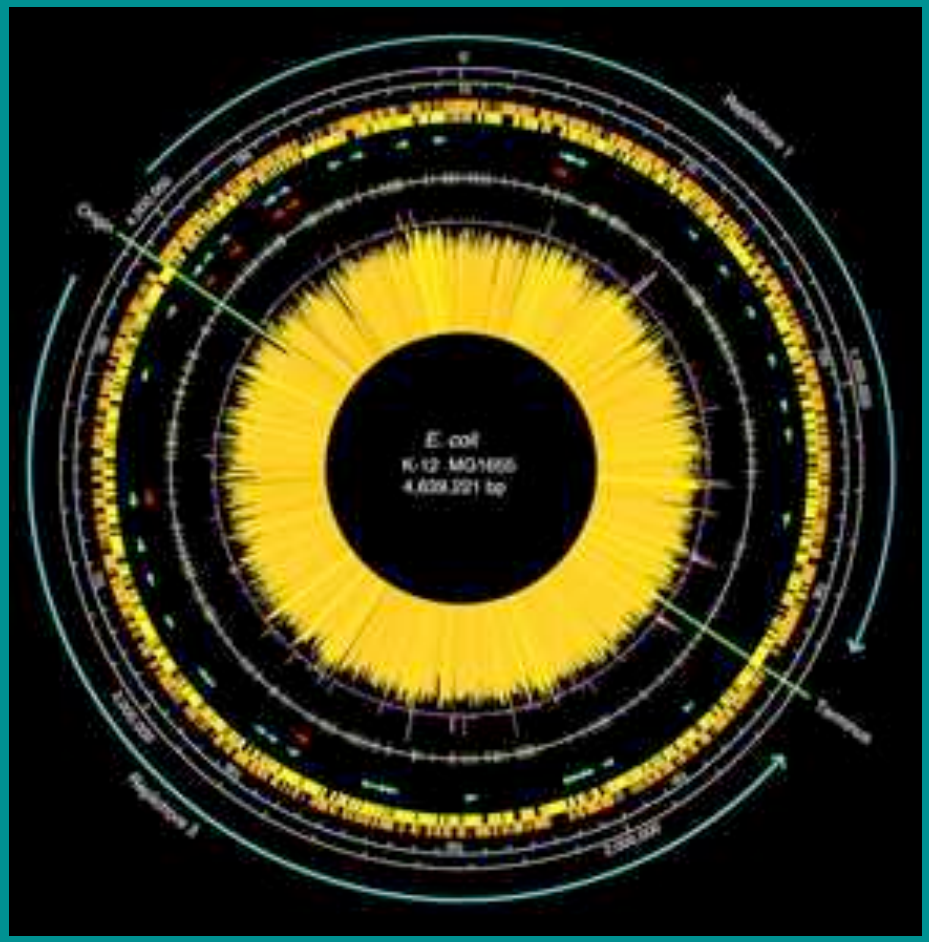
Basics of Genetics

Mechanism of heritability

Prokaryotes

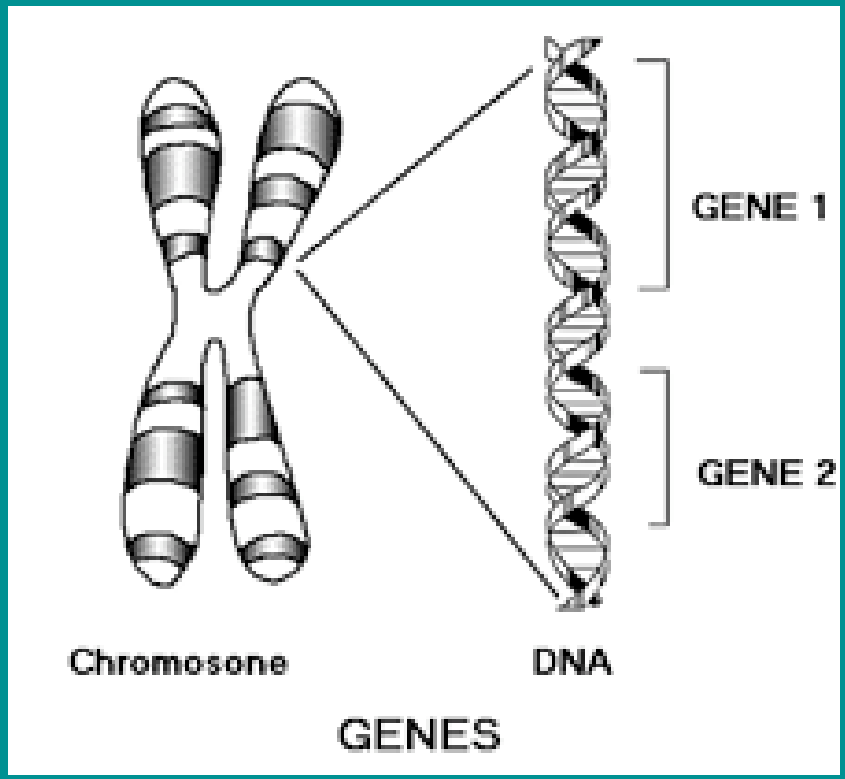


Prokaryotes

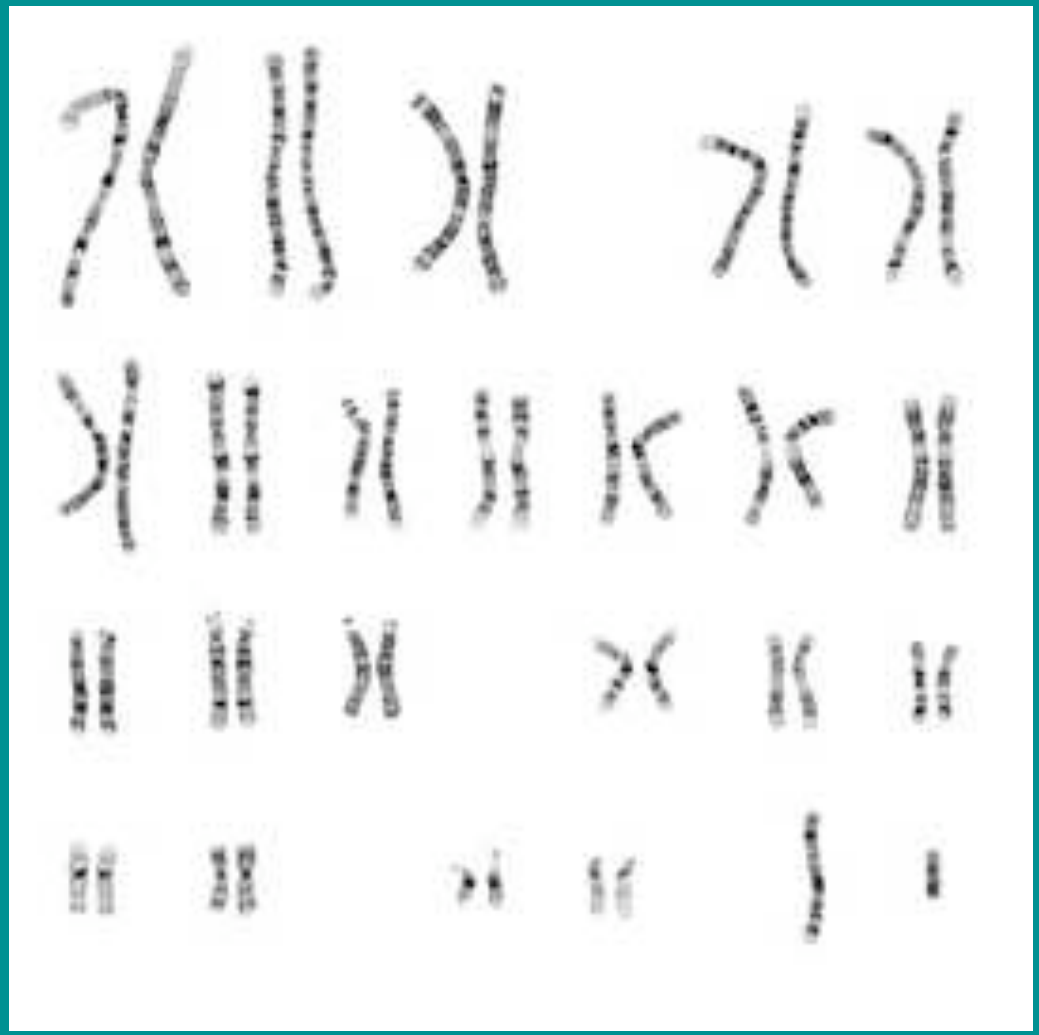
- Relatively simple
- Operons are automatic
- No Sex
- Little recombination
- Little change between generations

Eukaryotes

Genes exist on chromosomes



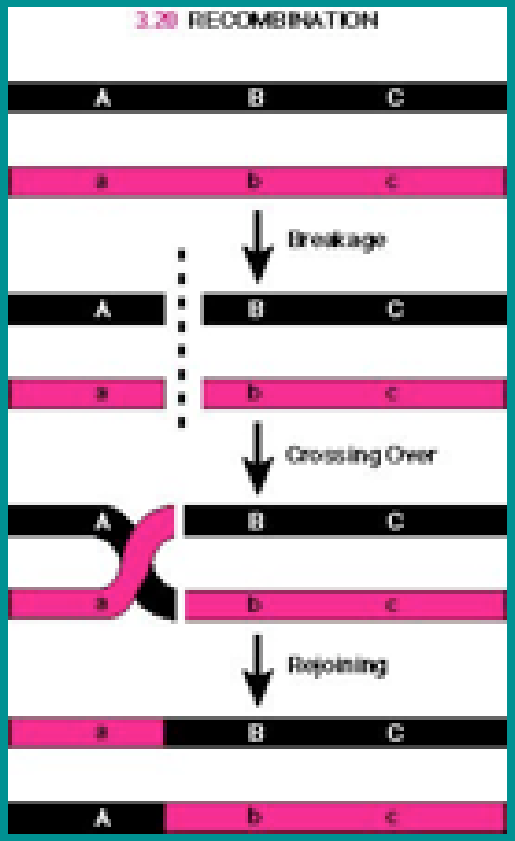
Human Karyotype



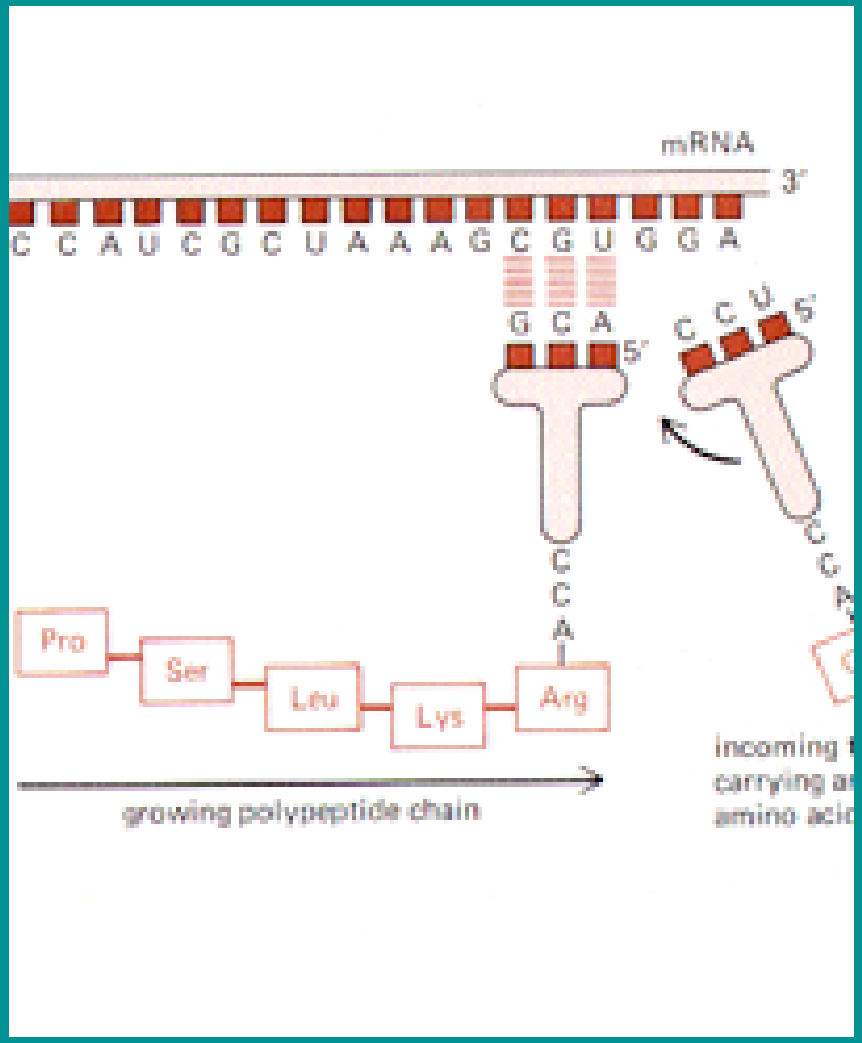
You get one chromosome from each parent

They carry different alleles

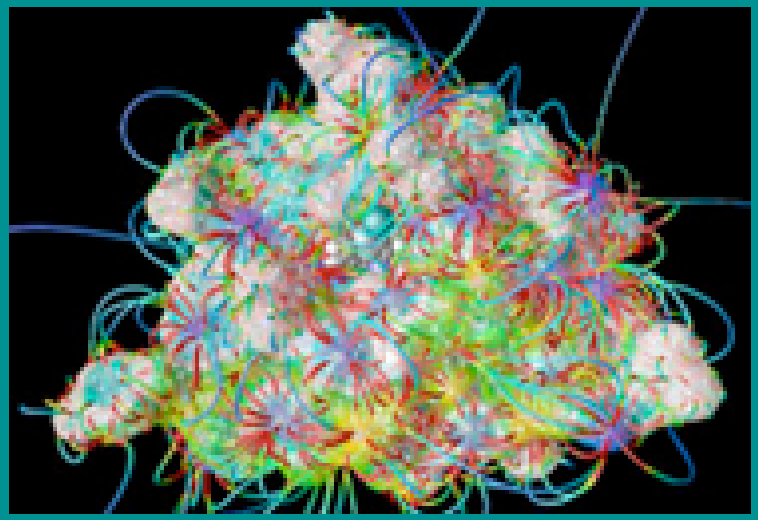
Recombination is the source of most variation



Genes are translated into proteins

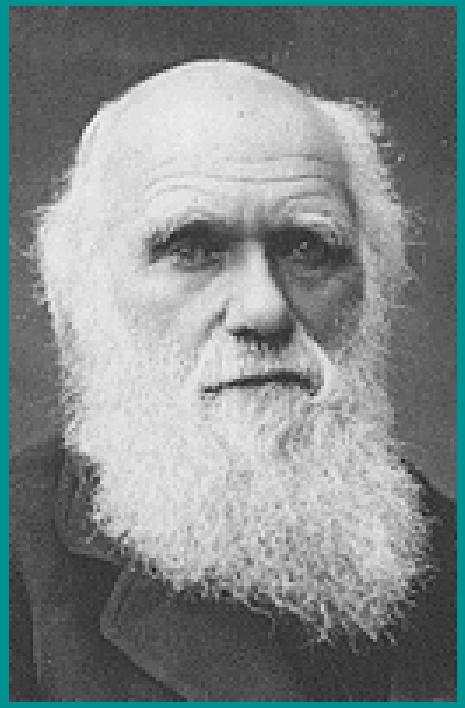


Most proteins are enzymes



And enzymes are catalytic machines

Evolutionary Basics



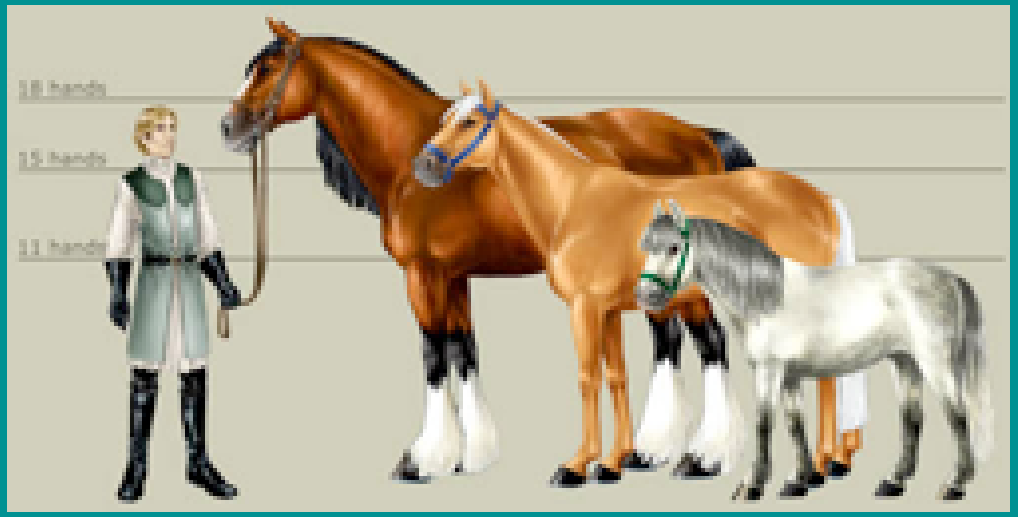
Persistence of the fittest

Evolutionary Change

- Mutation
- Migration
- Genetic Drift
- Selection

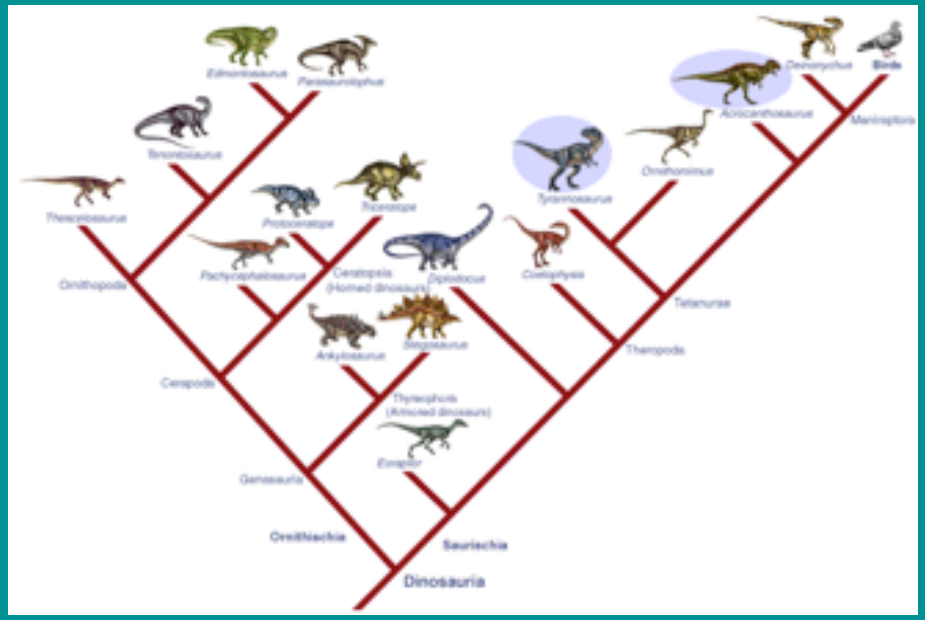
Microevolution

- Relatively Easy to observe
- Mostly gradual change
- Not controversial



Macroevolution

- Speciation
- Almost never observed
- Difficult to understand

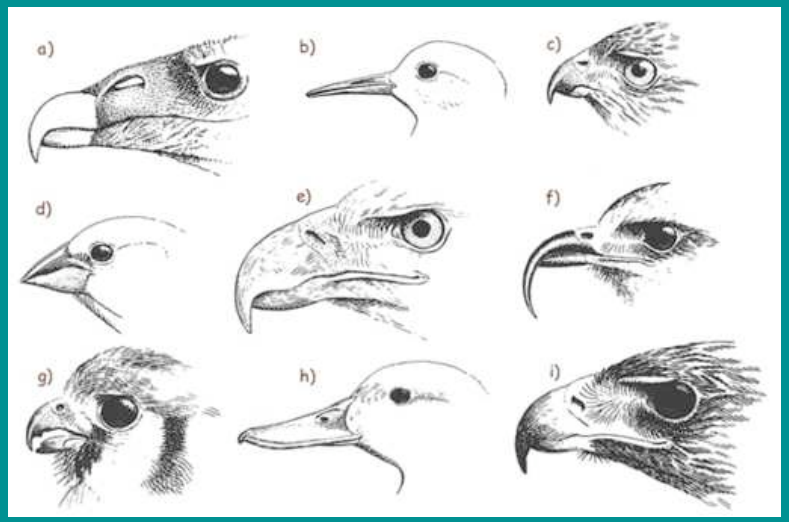


Speciation

- Allopatric
- Sympatric
- Parapatric

Speciation

- Assumed to be slow
- Assumed to be non-adaptive
- Assumed to be primarily allopatric

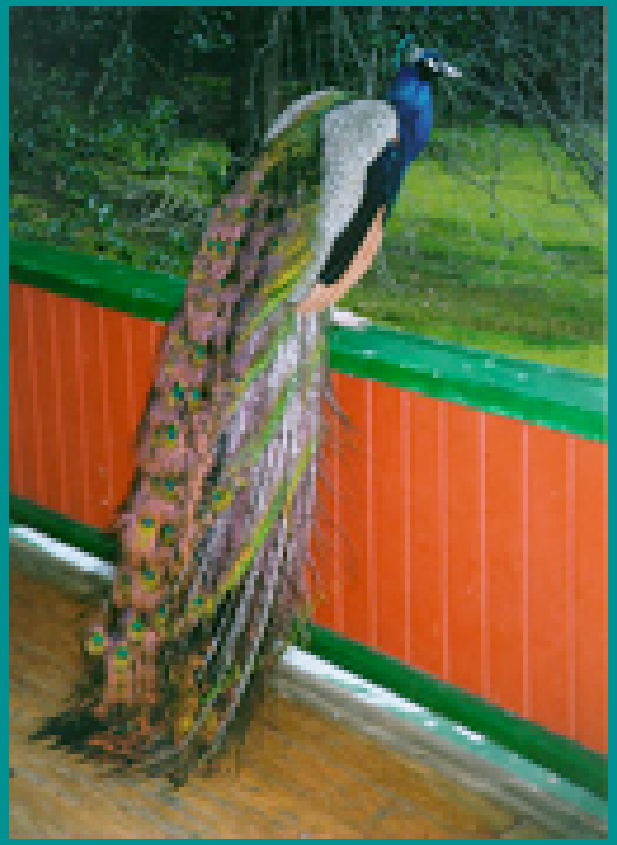


Sexual Selection

- Female choice

Female Choice: Three Theories

- Good Genes (honest indicator/handicap)
- Sexy Sons
- Fisherian Runaway



Male-Male Competition

- Driven by selection on males
- Male response to female spacing
- Males depart from “ecological optimum”

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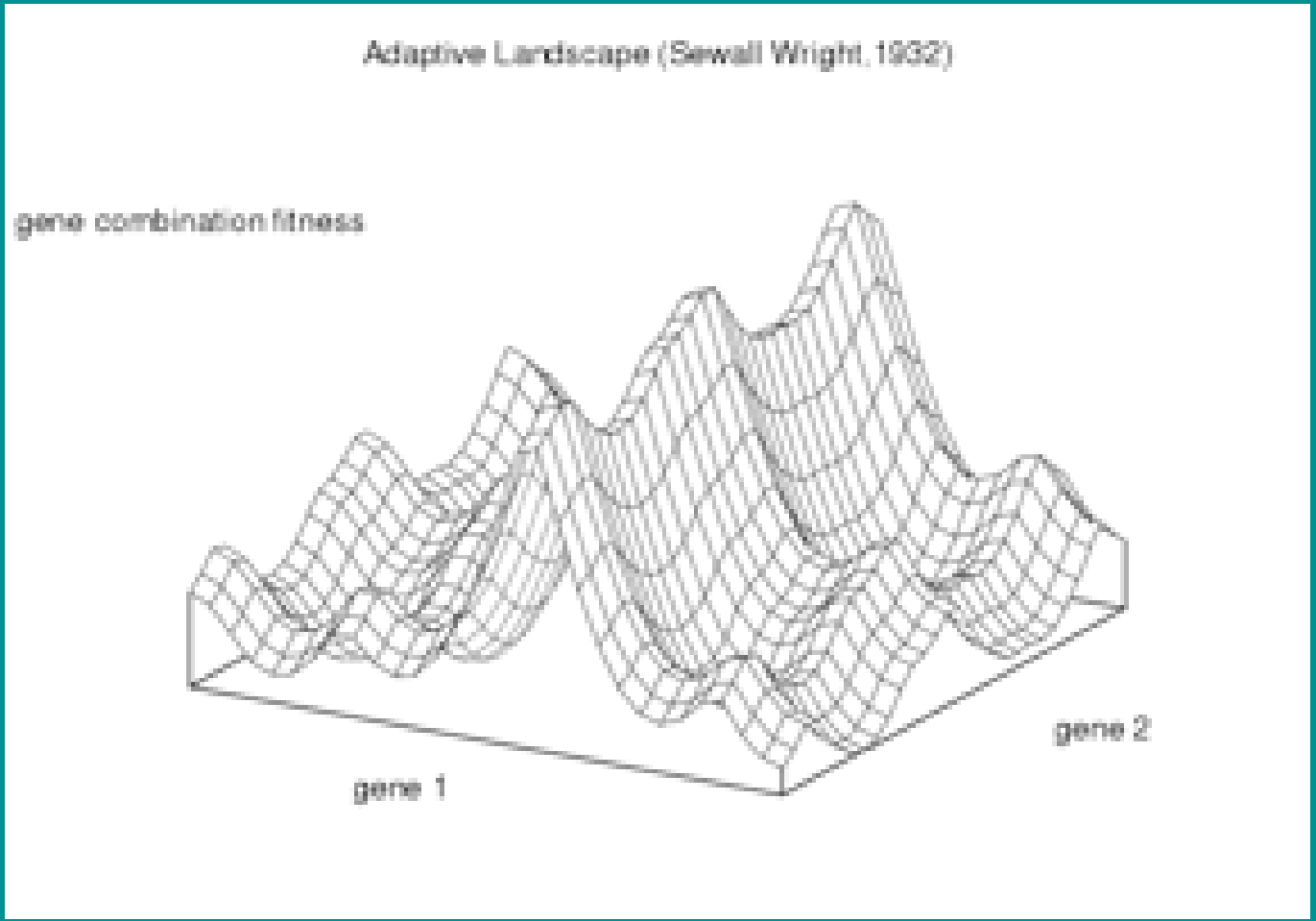
Adaptive Landscapes



Adaptive Landscapes