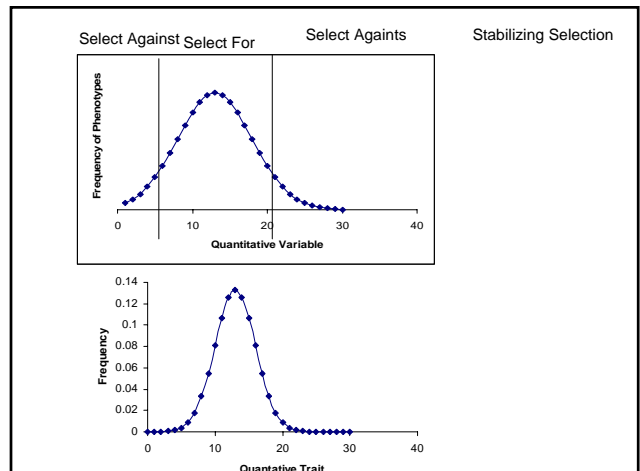
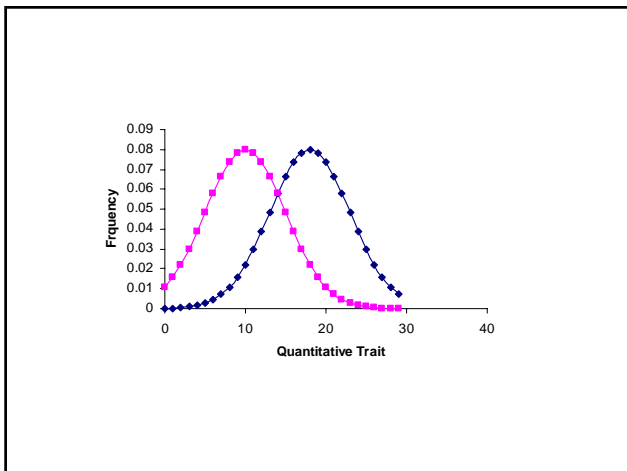
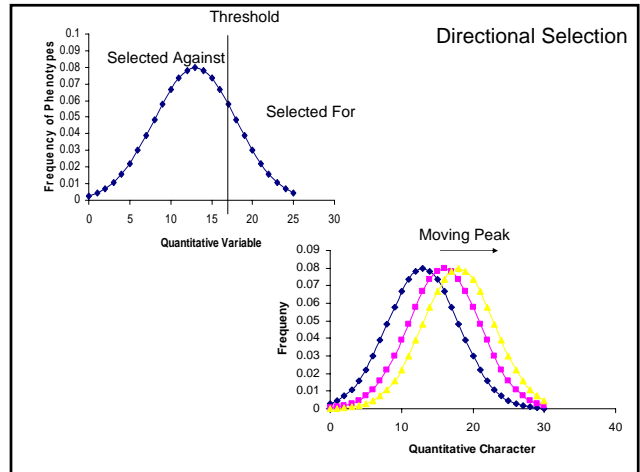


Types of selection

- Directional
- Stabilizing
- Disruptive



Frequency Dependent Selection

- Rare phenotypes may have advantages
- Scale eating fish example

Examples of Directional Selection

- Antibiotic resistance in bacteria
- Galapagos Finch – during drought
- Industrial Melanism

Heterozygote superiority

- Sickle Cell Anemia Example

Genotype	AA	As	ss
Initial allele Frequencies	0.77	0.21	0.02
Death due to SCA	0	+	+++
Death due to Malaria	+++	+	+
Relative Fitness	0.88	1.0	0.14

Micro versus Macro

Microevolution the accumulation of small changes.

Micro = changes in frequency of alleles.

Macroevolution the formation of new species, genera or groups of organisms.

Macro = speciation

MOLECULAR EVOLUTION

Watson & Crick Late 1950s

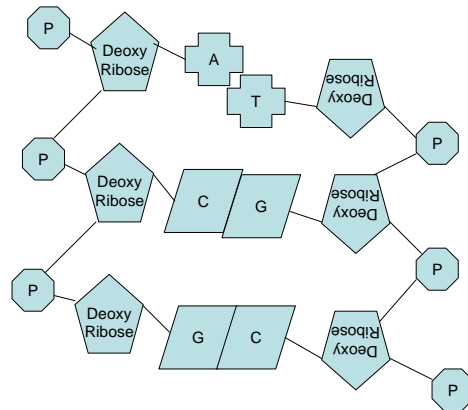
- Genes were known to be located on Chromosomes
- Chromosomes were known to be composed of proteins and Nucleic Acid

UNKNOWNNS

1. Whether Nucleic Acids or proteins were the coding material
2. The structure of DNA

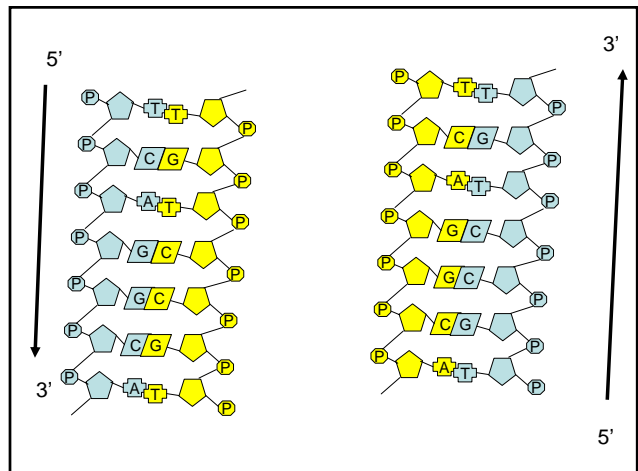
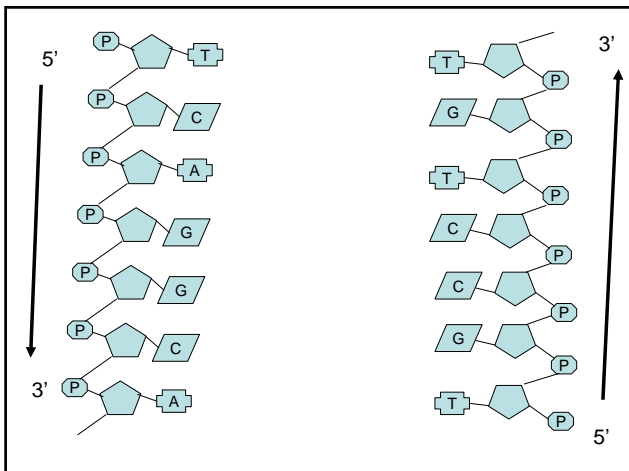
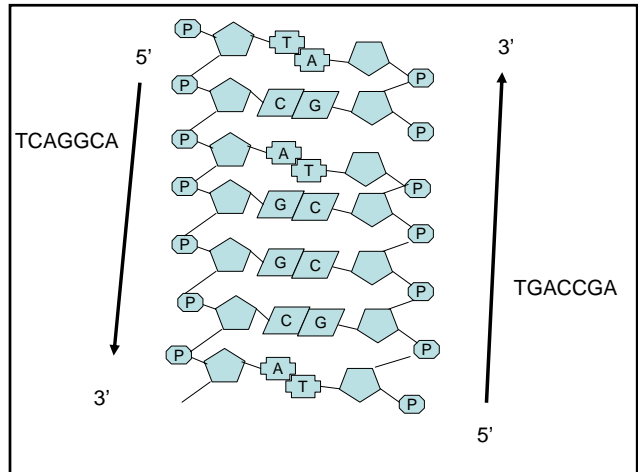
DNA

- DNA
 - Phosphate + Ribose sugar forms chain
 - Nitrogenous bases
 - Connect chains
 - Four Forms
 - Adenine – A, Thymine –T,
 - Guanine – G, Cytosine – C
 - A always binds T
 - C always bind G



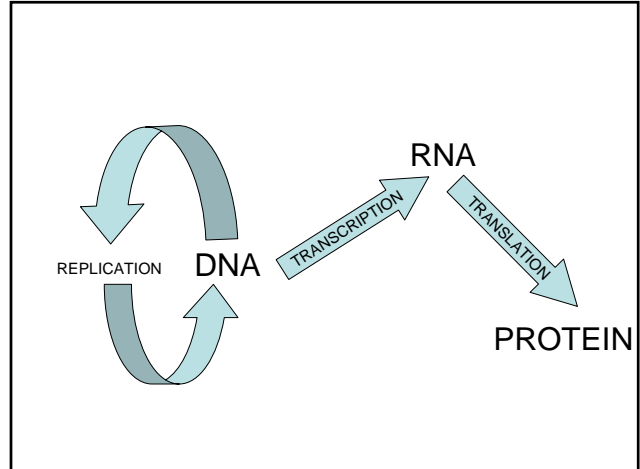
Semiconservative Replication

- Replication of DNA such that each new strand consists of $\frac{1}{2}$ an old strand
- The old strand is used as a template to derive a new strand
- The new strand will be complementary to the old .



CENTRAL DOGMA OF MOLECULAR BIOLOGY

1. One gene codes for one protein
2. DNA is semi-conservatively replicated
DNA → DNA is replication
3. DNA is transcribed to for RNA
DNA → RNA is transcription
4. RNA is translated to from a protein
RNA → Protein is translation
5. Proteins determine the phenotypes
Proteins = Structure or Enzymes



TRANSCRIPTION

RNA vs DNA

RNA is single stranded, DNA is double stranded

In RNA the sugar is "ribose", In DNA the sugar is Deoxyribose

In RNA the four bases are

Uracil
Adenine
Guanine
Cytosine

In DNA the Four bases are

Thymine
Adenine
Guanine
Cytosine

