

Population Genetics Notes

I. Evolution Review

a. Natural Selection selects for favorable _____

The more variety there is within a population, the more likely that population will _____

b. Genetic Variation is stored in _____

- A _____ is the combined alleles of all the individuals in a population.
 - The more alleles for a trait, the greater the genetic variation
- _____ is the relative amount of an allele in a population.
 - **How to calculate allele frequency in a population:**
 1. Count the number of times a specific allele occurs in a gene pool
 2. Divide by the total number of alleles
 3. Answer expressed as a percentage (%)

c. Lethal Alleles are recessive _____

*Most people don't know they are carriers

*Don't know they have it till later in life (_____)

*Both parents must carry the recessive allele (only 25% chance of passing on)

d. How is genetic variation created?

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II. Mutations

a. A mutation is a _____

- New mutations are constantly being generated, adding new alleles to the gene pool, thus increasing genetic variation in the population

• Change can be _____

b. Mutations alter genotype

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c. Natural Selection acts on phenotype.

- DNA is NOT changed
- New variations ARE NOT added
- Favorable traits (either from mutations or meiosis) are passed on

III. Distribution of Traits : Natural Selection acts on the distribution of traits within a population

a. Within a population there is a range of phenotypes for each trait.

These ranges often have more of some phenotypes and less of others.

Natural Selection can change the distribution in 3 ways:

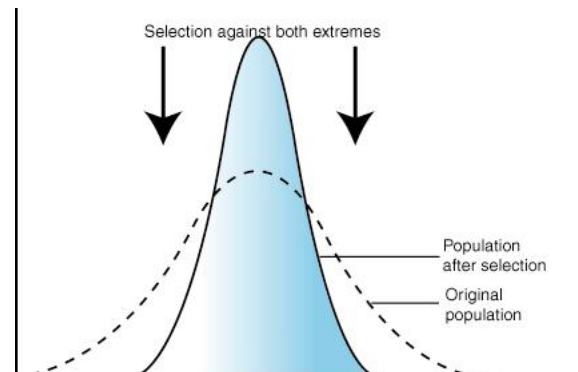
- 1.
- 2.
- 3.

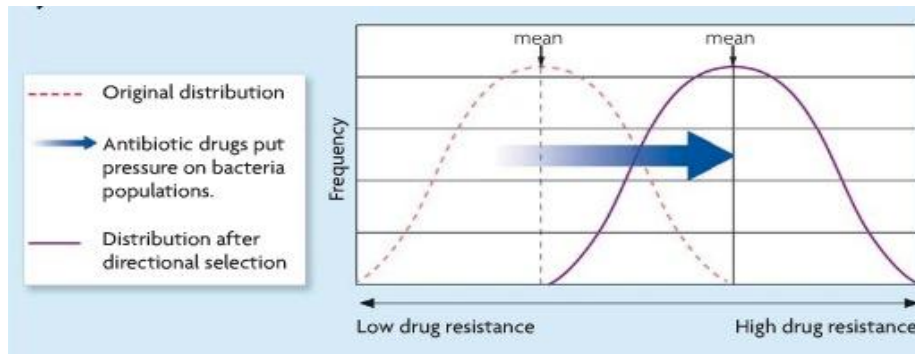
b. Stabilizing Selection

- Extremes from both ends of the frequency distribution are eliminated.
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- Example:

c. Directional Selection

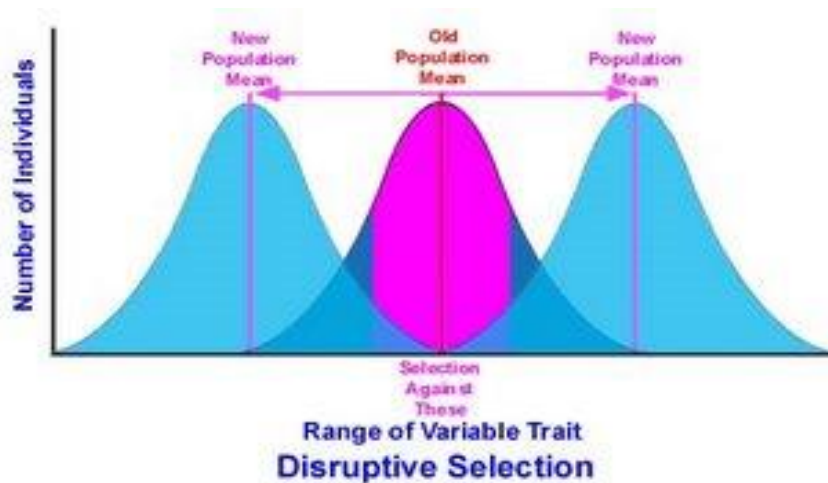
- Favors phenotypes at _____ of a trait's range.
- What we usually think of as natural selection.
- Example:





d. Disruptive Selection

- Both extreme phenotypes are favored at expense of middle phenotype.
- Favoring both extremes can lead to _____
- Example:



IV. Gene Flow

- The movement (migration) of alleles from _____
- Can occur in _____
- increases variation in receiving population
 - *a lack of gene flow between 2 populations increases the chance they will evolve into 2 different species.

V. Genetic Drift: Change in allele frequency _____

- causes a loss of diversity
- greatly affects smaller populations

a. Founder Effect

- A small group of individuals break away and colonize a new area.
- _____ from original group
- Example: Ellis-van Creveld Syndrome - Amish population in Pennsylvania

b. Bottleneck Effect

Occurs after an event greatly reduces the size of a population:

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**New population no longer has many alleles that old population has.

c. Effects of Genetic Drift

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