Hardy-Weinberg Principle

The Hardy-Weinberg Principle states that allele and genotype frequencies in an ideal population, one without evolutionary forces, will remain constant between generatinons. The evolutionary forces can be grouped into five conditions: no selection, a large population, no migration, random mating, and no net mutations. Any of these five conditions will cause a shift in allele or genotype frequency that will move a population out of Hardy-Weinberg equilibrium.

PLAY PICMONIC

Constant Allele and Genotype frequencies with no evolutionary forces

A-Lily and Genie-Type on Crescent with Frequency unreachable by Evolutionary-Man

The Hardy-Weinberg Principle states that allele and genotype frequencies in an ideal population, one without evolutionary forces, will remain constant between generatinons.

Conditions for Equilibrium

Equal-Leprochan

The evolutionary forces can also be described as 5 conditions that need to be met for a population to be in Hardy-Weinberg equilibrium.

No selection

No Selection Sign at peeking Hairy Wine-Burger

One of the conditions is no selection. This means that there can be no selection against inferior traits or for beneficial traits in the population.This would cause a boon to the beneficial alleles and removal from Hardy-Weinberg equilibrium.

Large population

Large Pop

Small population sizes can result in deviations from Hardy-Weinberg equilibrium due to genetic drift. This occurs because the effects of random sampling are more prominent in a smaller population size. That is why large populations are needed for Hardy-Weinberg equilibrium.

No migration

Migratory-Geese being Blocked

If individuals are allowed to migrate from population to population, that can shift the allelic and genotypic frequencies over time.

Random mating

Blindfolded Kissing

Individuals must mate randomly to preserve Hardy-Weinberg equilibrium. If not, situations like inbreeding can occur which will cause an increase in homozygous phenotypes for all genes.

No net mutations

Net Mutant Not Allowed

Mutations can change the genotype and phenotype of an individual. No net mutations means that there can be some mutations, as long as they cancel each other out. For example, if a mutation causes A to change to B in one individual and another mutation causes B to change to A in a different individual, those two effects cancel out.