# Pace of Evolution

## Evolution

A change in the allelic frequency of a gene in a population and/or the introduction of a new gene into a population.

## Evolution via Natural Selection

When selective pressures in the environment stimulate individuals with certain versions of traits to live longer and reproduce more to pass on their traits so they are more prevalent in the next generation.

## Gradualism

Selection will stimulate slow evolutionary changes over time and will use intermediate phenotypes as a result leading to a new species.

## Evolution via Genetic Drift

When random and chance events stimulate point mutations and evolution.

## Punctuated Equilibrium

Genetic drift can result in geologically fast evolutionary change. You will see 'equilibrium' or no change for long periods of time followed by fast 'punctuated' change resulting in a new species.

## Gradualism Example

Speciation of horses: we find gradual transition from a small, forest-dwelling animal to the large, grassland-adapted horse we see today. Each step involved adaptations that accumulated over millions of years, such as changes in teeth and hooves/toes.

## Punctuated Equilibrium Example

African cichlid fish species in East African Great Lakes: we find 500+ cichlid species that display a wide range of physical forms, with adaptations for various feeding methods, such as algae scraping, plankton feeding, and hunting other aquatic prey. After this rapid speciation, they have remained relatively unchanged for thousands of years.