Part 2.

Population genetics: the forces that shape genetic variation

In Part 2 we turn our attention to ***Population Genetics****: the study of the processes that shape genetic variation. The key forces are mutation (Chapter 1.5), drift, recombination, and natural selection.*

Population genetics is unusual in biology in having a powerful theoretical framework that allows us to understand many different phenomena in terms of specific, formal models. Here we go through the key models, and show how they shed light on aspects of human variation. We start with an overview of neutral models, and then show how these are extended to study natural selection.

Specifically, we will cover the following:

Chapter 2.1: ***Genetic drift*** *and the most fundamental model in population genetics:* ***the Wright-Fisher model****.*

Chapter 2.2: ***The Coalescent****, which models the inheritance of genetic material backwards in time and is a hugely powerful tool for many problems.*

Chapter 2.3: Shared inheritance at linked sites in the genome causes genotype correlations called ***linkage disequilibrium****; linkage is broken down by* ***recombination****.*

Chapter 2.4: Population structure, and models to understand ***why allele frequencies differ across populations****.*

Chapter 2.5–2.7: ***Natural selection****, including* ***models and data for diverse forms of selection****.*