Last Time

• What forces have been responsible for shaping modern human variation?
• What have humans adapted to?
• What are the different ways of adapting to an environmental stressor?
Last time

• How have humans adapted to?
  • solar radiation
  • disease
  • heat/cold
  • altitude

• What other examples can you think of of something that resulted through adaptation?
What have humans adapted to?

- Can you name at least one environmental stressor, how it can impact fitness, and how humans adapt, culturally, behaviorally, physiologically, and genetically to that challenge?
Human Variation

• How has all this adaptation resulted in human evolution?

• How do biology and culture impact each other in human adaptation?

• How does this variation add up to what we think of as racial differences among people?
What is Race?

- What is a RACE?
- How do we define it biologically?
  - Do humans fit the biological definition of race?
- How do we define it culturally?
What does it mean to say that humans vary more within populations than between?

What is Fst?

How are populations real but races not?

What are the historical and political impacts to defining race?

How do racial definitions differ from culture to culture?
Changing Gears

• What we see in the world around us is the result of millions of years of evolution.

• Branching and splitting of populations into different species as they adapt to the environment.

• It’s a slice of time.

• Where do we fit in?
How are Humans Classified?

- Class: Mammalia
- Order: Primates
- Suborder: Hominoidea
- Family: Hominidae
- Genus: Homo
- Species: Homo sapiens
We are Mammals

• We share a set of characteristics with the mammals based on shared ancestry

• A set of Homologous Traits

• A set of shared-derived traits

We are Primates

• We share a set of characteristics with the primates based on shared ancestry

• A set of Homologous Traits

• A set of shared-derived traits
Similarity due to...

- Common ancestor has a trait they share
- They have both changed from a common ancestor in a similar way
- They are unrelated but have been subject to similar evolutionary forces
How do you determine similarity in organisms?

- Homologous and analogous traits
- Primitive and derived traits
Homology and Analogy

• IN both cases, similarity in traits
• Similarities can be due to
  • shared evolutionary past
  • common function
Homologous structures
Analogous Structures
Convergent Evolution

Placentals
- Flying phalanger (Petaurus)
- Flying squirrel (Glaucomys)
- Ground hog (Marmota)
- Anteater (Myrmecophaga)
- Anteater (Myrmecobius)
- Mole (Talpa)
- Mouse (Mus)

Marsupials
- Wombat (Phascolomys)
- Anteater (Myrmecobius)
- Mole (Notoryctes)
- Mouse (Dasyxerus)

Falcon
Bat
Pterodactyl

Ancestral bird
Ancestral mammal
Ancestral reptile
Parallel Evolution
The most informative similarities are...

- Shared homologies
- Shared due to:
  - a change since the ancestor (DERIVED)
Cladogenesis

(Minkoff 1983)
• PRIMITIVE - the state seen in the ancestor
• DERIVED - something that has changed since the ancestor
• SHARED DERIVED - specific character states shared in common between 2 forms and most useful in making evolutionary interpretations
Shared-Derived traits suggest a shared evolutionary past

Shared-Derived traits indicated a shared adaptive pattern
Mammalian trends

- k-selected
- longer infancy/learning/lifespan
- higher energy/bigger brains
We share traits with the Mammals

- Homiothermy (the ability to generate and regulate your internal temperature)
- Upper jaw
- Lower jaw
- Heterodontism (having different types of teeth)
- Unique brain structures
- Specific reproductive patterns (lactation and internal gestation)