

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?

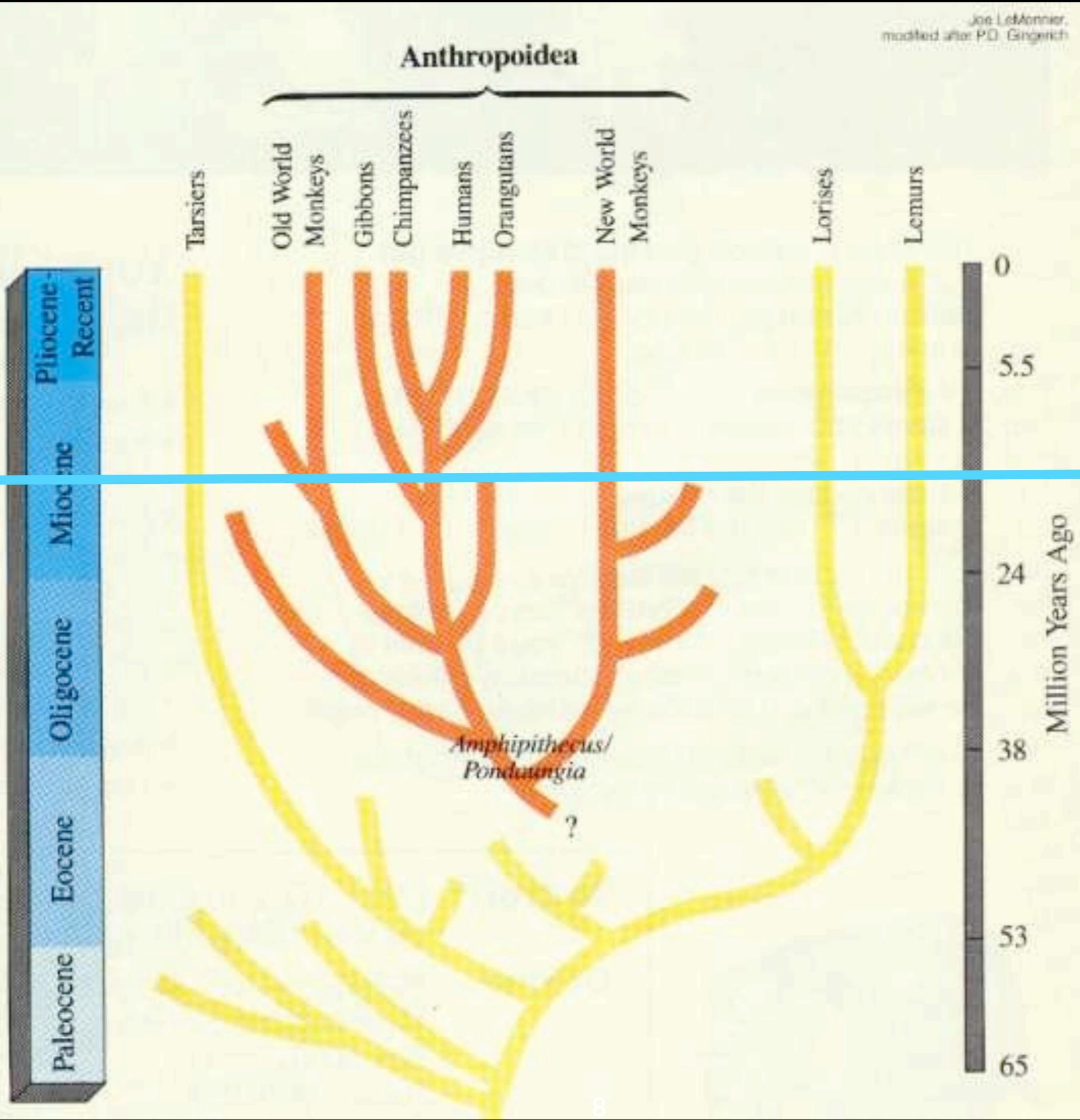
FAHV

- What does it mean to say that humans vary more within populations than between?
- What is F_{st} ?
- 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?

Joe LeMay
modified after P.D. Gingerich



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

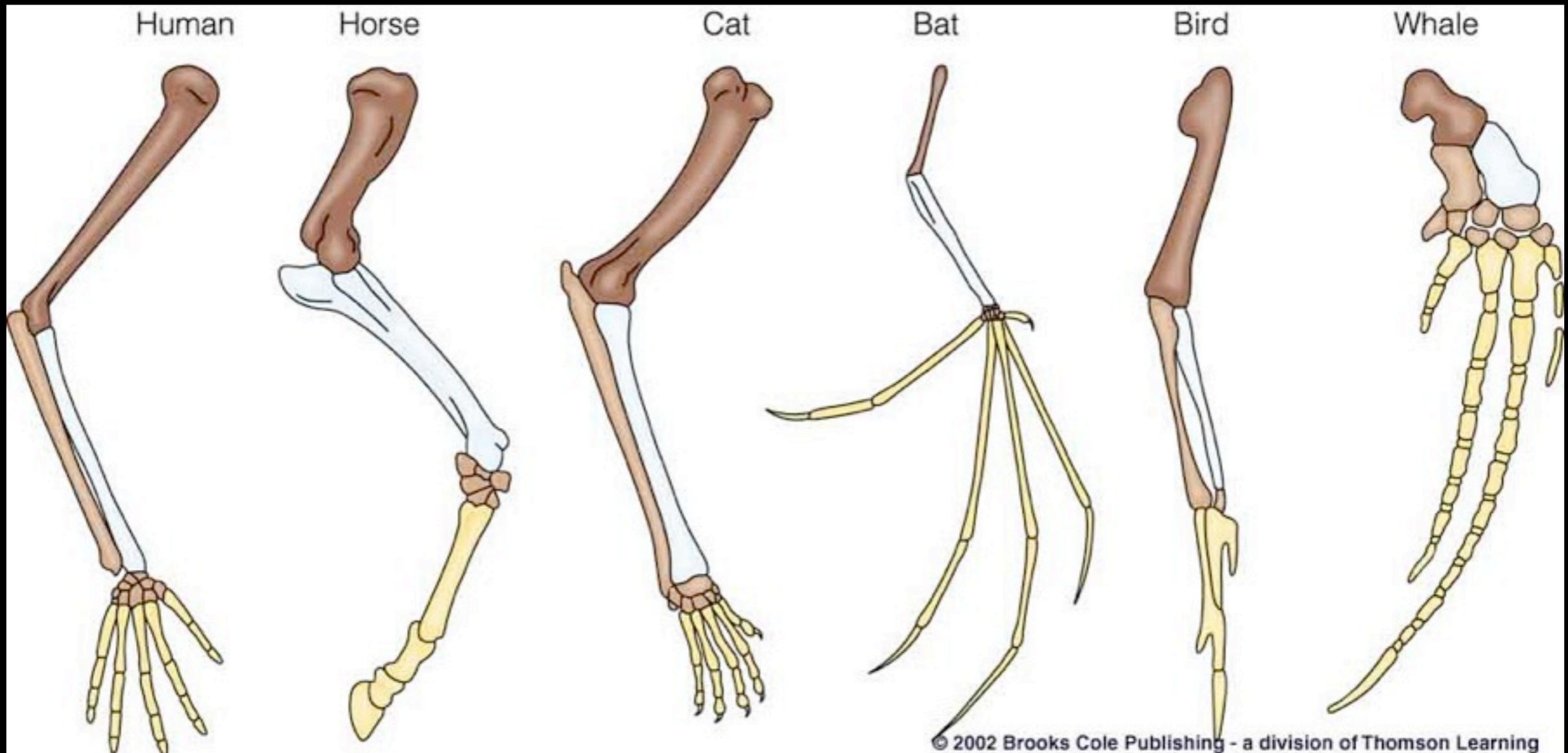
How do you determine similarity in organisms?

- Homologous and analogous traits
- Primitive and derived traits

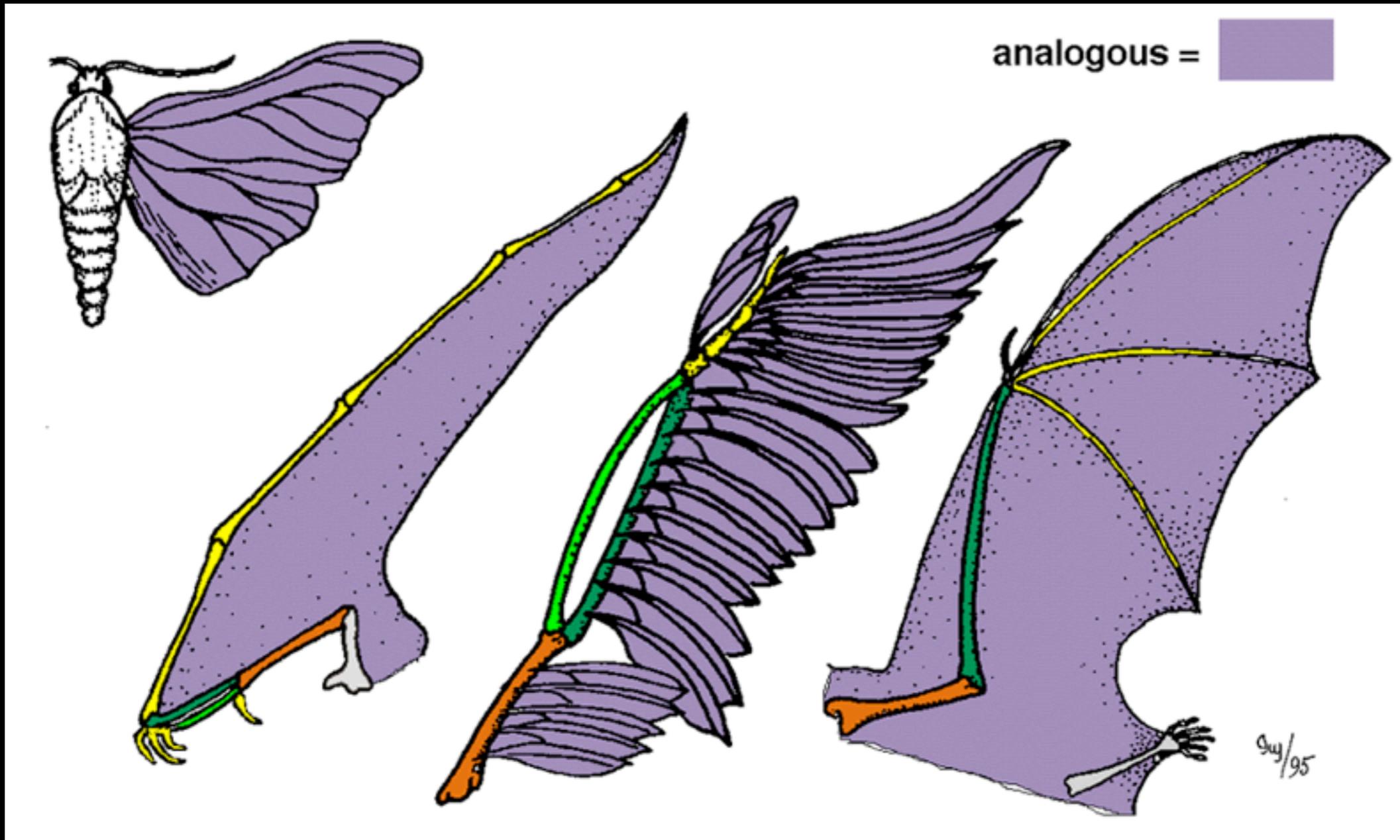
Homology and Analogy

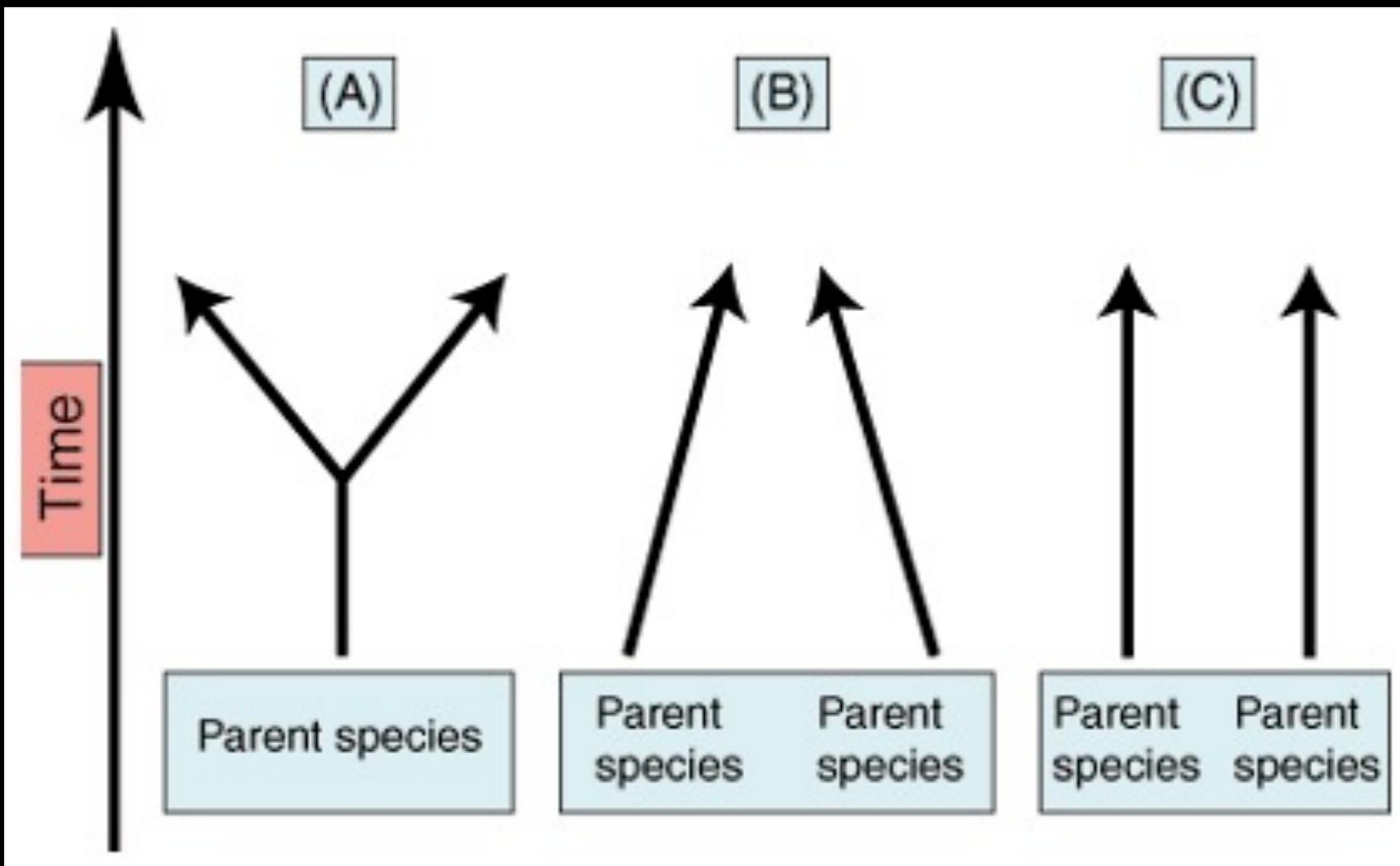
- IN both cases, similarity in traits
- Similarities can be due to
 - shared evolutionary past
 - common function

Homologous structures

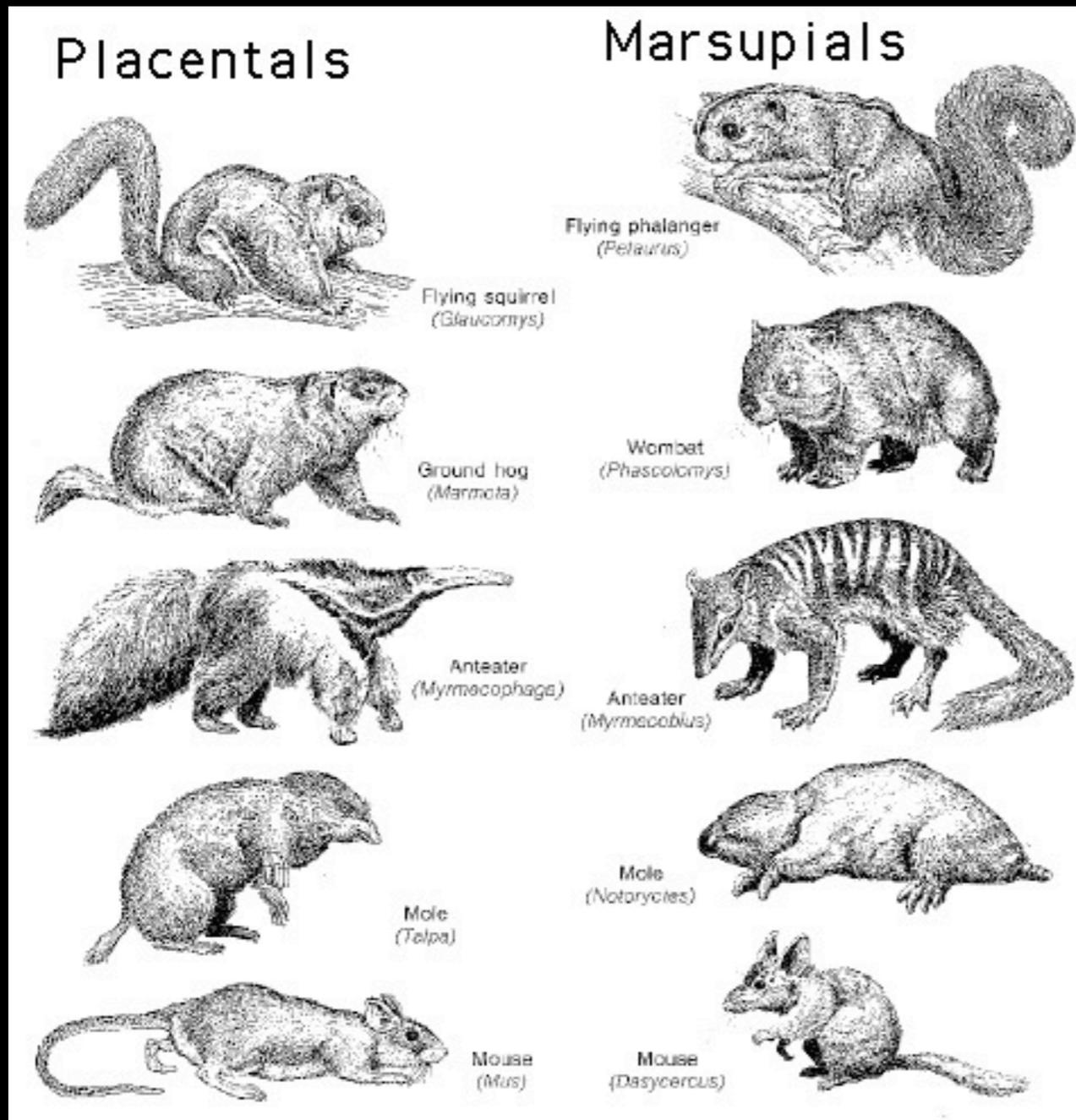


Analogous Structures





Convergent Evolution



Falcon



Bat



Pterodactyl

Ancestral
bird

Ancestral
mammal

Ancestral
reptile

Parallel Evolution



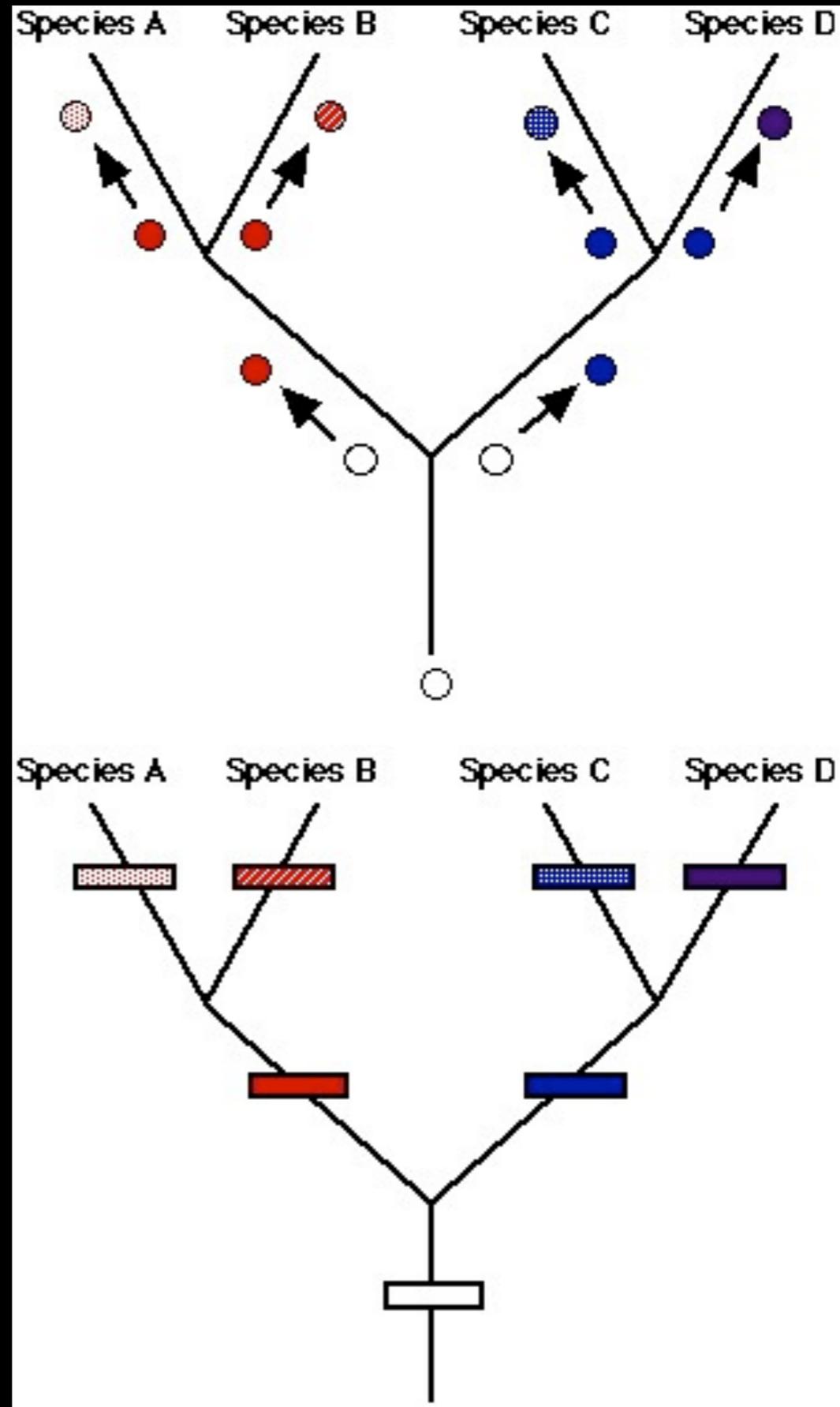
The most informative similarities are...

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

- **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



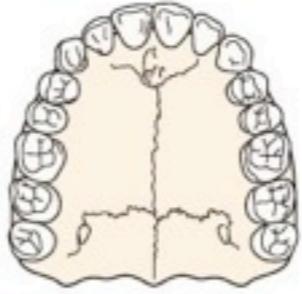
Mammalian trends

- 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)

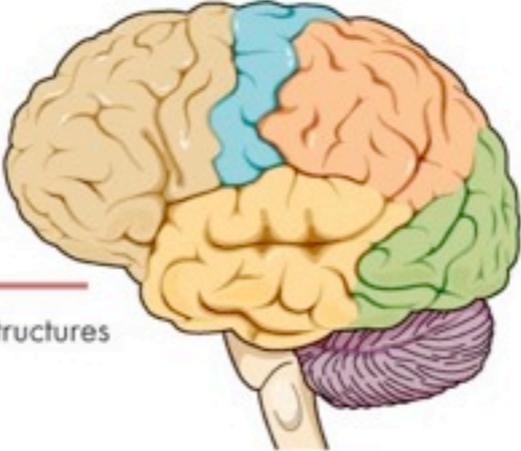


○ **Heterodontism** (having different types of teeth)

Upper jaw Lower jaw



● **Unique brain structures**



● **Specific reproductive patterns** (lactation and internal gestation)