Anthro 101:
Human Biological Evolution

Lecture 1: Intro & Scientific Method

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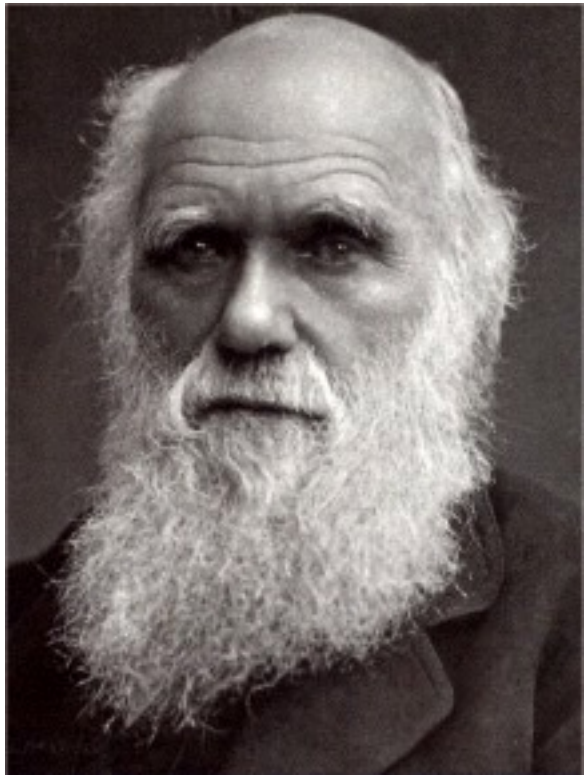
Anthropology = the study of humankind
Four subfields of Anthropology

- Cultural Anthropology
- Linguistic Anthropology
- Archeology
- Biological Anthropology
- Applied Anthropology

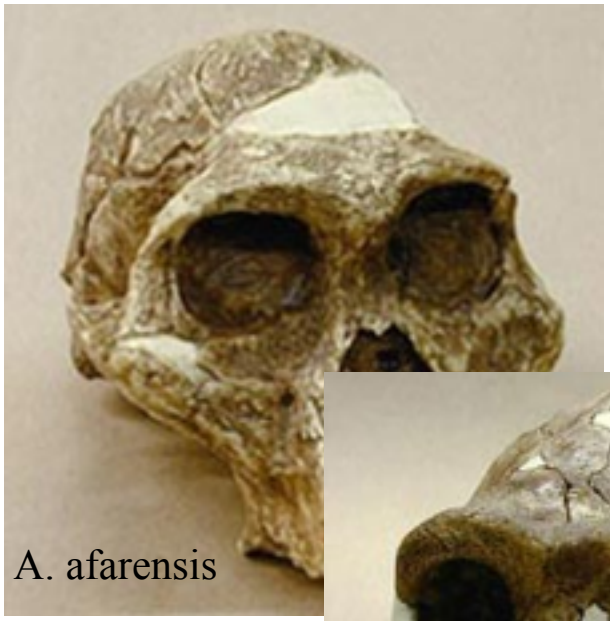
Anthropology: Study of Humans

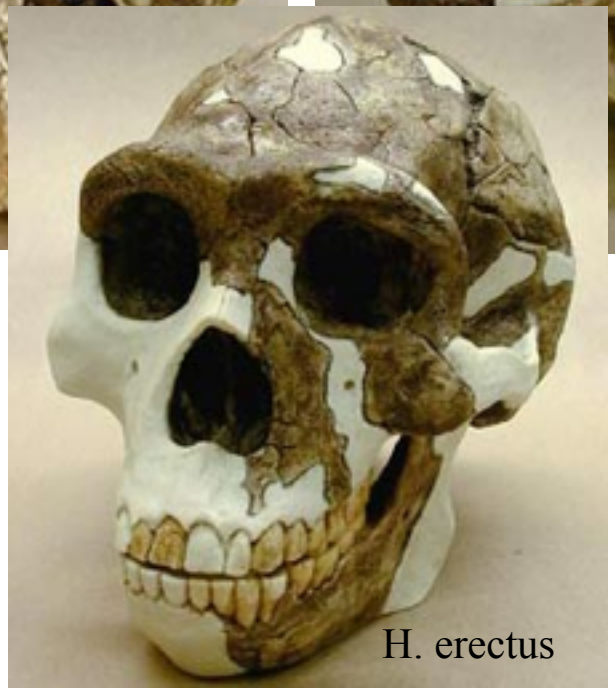
+ How Evolution Works

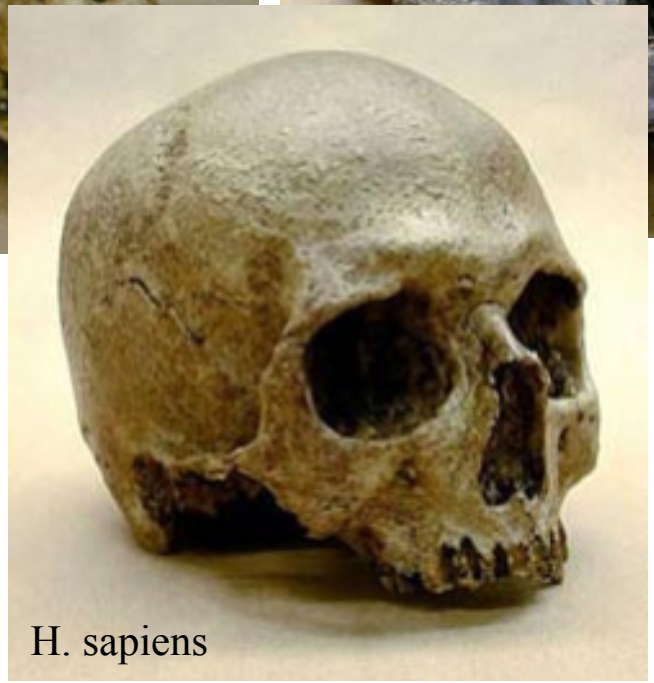


How Does Evolution Works in Other Primates?

What is the History of the Human Lineage?


A. afarensis

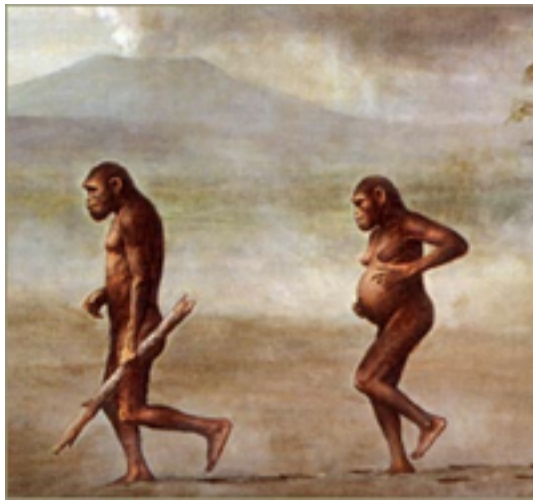

H. erectus


H. sapiens

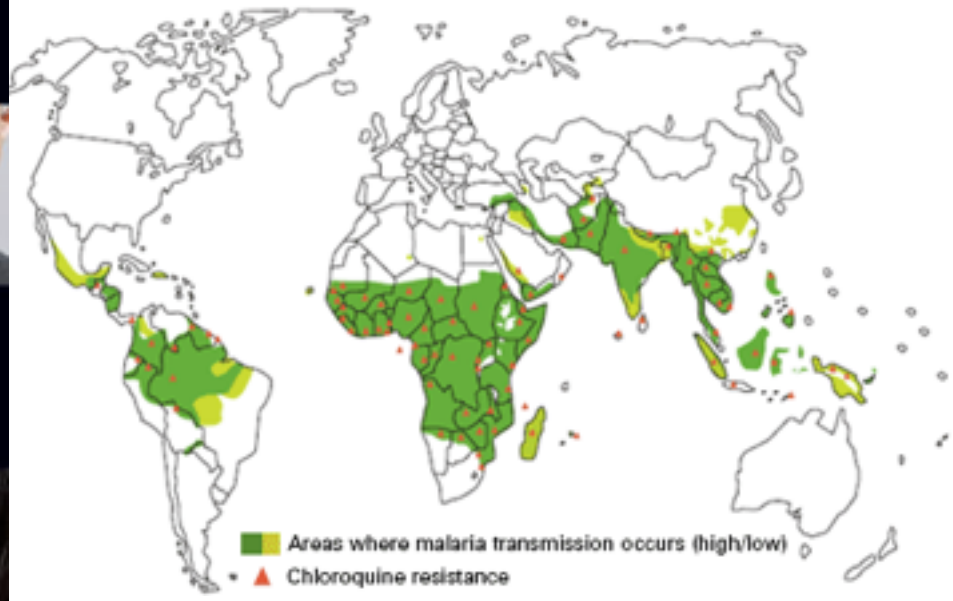
How did Evolution shape hominin adaptations?

- Bipedality
- Tool use

- Behavior
- Culture

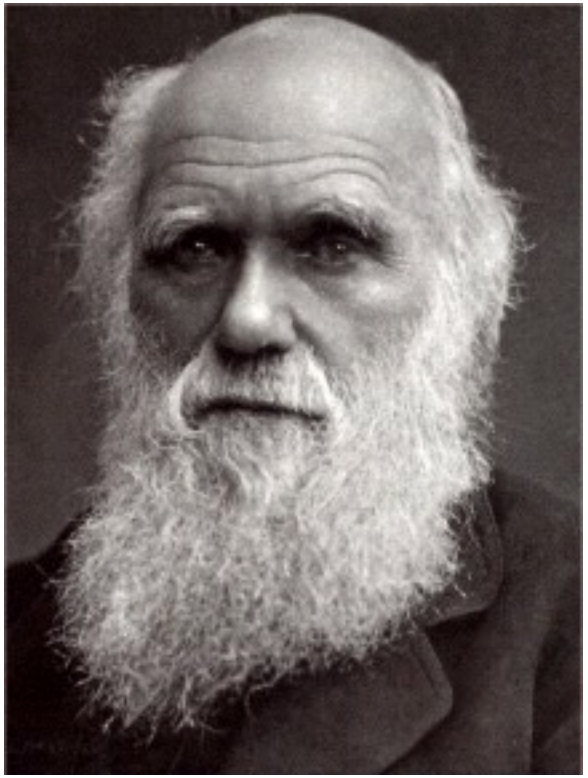


How does Evolution shape human minds, bodies, & behavior in modern humans?



To understand why we are the way we are, we need to know

- How the scientific method operates



What is Science?

- Process of explaining natural phenomena through observation and experimentation
  - Measure observed phenomena
  - Test hypotheses
  - Follow the Scientific Method

J.J. "Mad Scientist". common.wikimedia.org 02/25/08. 03/31/06 http://commons.wikimedia.org/wiki/Image:Mad_scientist.svg

What is a hypothesis?

- provisional explanations requiring verification or falsification through testing
  - proposes a causal relationship between two variables
  - Predict how X will affect Y

- **(X) Independent** variable(s) – things that are
  - Water, sunlight, soil
- **(Y) Dependent** variable(s) – things that are affected
  - Height of plant
  - Thickness of roots
  - Number of leaves

The Scientific Method

- Question
- Read
- Hypothesis
- Methods
- Collect data
  - Rigorous & replicable
  - Quantitative
  - Statistics
  - Falsifiable
- Relate back to your hypothesis

Repeat!

The process of science generates a theory

- broad statement of scientific relationships
- underlying principles
- substantially verified through the testing of hypotheses
- A broad explanatory statement of scientific fact

- It guides the formation of hypotheses to explain things observed in the world
- It has been supported by repeated and varied testing of related hypotheses

- **Hypothesis** - narrow focus explaining the relationship between a few specific phenomena

A theory

IS

- A theory is backed by lots of evidence
- A theory is a statement of scientific fact
- A theory is open to evaluation and testing
- A theory has the potential to be falsified/revised

IS NOT

- A theory is NOT a hunch or a guess
- A theory is not an absolute
- A theory is not unknowable or immeasurable

Any proposition that is stated as absolute or doesn't allow for the possibility of falsification is not a scientific hypothesis.

Why we use the scientific method

- Testable (falsifiable) hypotheses
- Replicable methods
- Competition and collaboration among scientists

- New theories gain acceptance
  - Explain odd findings that older theories can't explain
  - Lead to new TESTABLE predictions
  - Lead to new discoveries

- All results and theories open to debate & refinement

Creationism & Intelligent Design

- Biblical explanation for the origin of the universe, species, humans
  - relies on faith in bible not evidence
  - Not open to testing = absolutes
- Argue that evolution is an unproven theory
- Intelligent Design = creationism
  - No testable predictions regarding the designer or creator
  - Try to disprove or discredit evidence for evolution
  - Personal incredulity
  - Irreducible Complexity

Your Assignment

- Break up into groups of 3 - 4
- Read handout
- Answer; Why is science important when people make claims that cannot be supported?
- Think of one example of how your group can use the scientific method to explain a claim that has been made, this claim can be anything that you heard in school, outside of school, online or in the media.
- Is the Claim true or untrue? Explain to the class