Midterm 1

Introduction

"Anthrop" - greek for human being

Holistic 4 Field Approach:

1. Cultural - ethnography, cross cultural studies
2. Linguistics - phylogenies aid in informing about phylogenic biological changes
3. Archaeology - recovery, analysis, and interpretation of artifacts
4. Physical - human biology within the framework of evolution with an emphasis on biology and culture
    - Paleoanthropology - study of evolution
    - Primatology - study of primate fossils
    - Nutritional - study of dietary components and health and disease
    - Molecular - study genetics and differences in DNA
    - Osteology - study of skeleton, disease, and trauma

Scientific Method: hypothetico-deductive method (Popperian)

- must propose a testable hypotheses
- a theory is a well tested hypothesis

The Development of Evolutionary Theory

Pre Darwinian Thought on Evolution:

600's BC Anaximander and Xenophanes
- animals originated in the sea and adapted to live on land

800's El Jahiz
- recognized evolution

1700's Linnaeus
- established binomial nomenclature (KPCOFTGS)

1700's Buffon
- "not evolutionist, but father of evolutionism"

1700's Erasmus Darwin
- life originated in sea, common ancestor, vast time, competition for resources, environmental factors

17/1800's Lamarck

- inheritance of acquired characteristics, founded "biology"

17/1800's Malthus

- more offspring are produced than can survive because of limited resources

1800's Wallace

- published on natural selection

Darwin: "It at once struck me that under these circumstances favorable variations would tend to be preserved, and unfavorable ones to be destroyed. The result of this would be the formation of a new species."

Keys to Darwinian Evolutionary Theory:

- species change
- time depth
- common dissent
- natural selection

Evolutionary Explanation:

1. species are capable of reproducing at a faster rate than food supplies increase
2. biological variation exists in all species
3. more offspring are produced than survive and because of limited resources competition exists
4. individuals with favorable traits have higher fitness increasing their likelihood of survival and reproduction
5. external environment determines how beneficial a trait is
6. favorable traits are inherited and passed on (reproductive success)
7. over time successful variations accumulate and new species can appear
8. geographical isolation contributes to the formation of new species

Natural Selection Fundamentals:

1. trait must be inherited for natural selection to act on it
2. natural selection can not occur without population variation in inherited characteristics
3. fitness changes with the environment
4 .natural selection can only act on traits that affect reproduction

Ways to test human evolution:

- fossil evidence
- comparative anatomy
- comparative genetics

The Biological Basis of Life

Nucleus - storehouse for genetic information (DNA)

DNA - double stranded molecule that codes for particular proteins

Nucleotide - building blocks of DNA that are composed of a phosphate, a sugar, and a base (purines: A & G pyrimidines: T & C)

Chromosomes - organized strands of DNA and proteins that occur in homologous pairs (mother and father)

- humans have 23 pairs, 22 are autosomes and 1 is a sex chromosome pair
- males have X & Y, females have X & X

Locus - location on homologous chromosome, 2 exist on each chromosome

Gene - basic unit of inheritance that codes for specific proteins and is found on the locus

Alleles - variations of a specific gene

Main Functions of DNA:

1. Storing Information (holding genes in the cell)

2. Copying Information (self-replication)

a. enzymes break H-bonds between bases resulting in 2 strands
b. exposed nitrogenous bases attract free floating nucleotides
c. free floating nucleotides attach to original strands creating 2 copies of DNA

- serves as basis for cell division

Meiosis: cell division that leads to the production of sex cells (gametes)

- parent cell
- DNA replication
- homologous chromosomes line up in middle
- meiotic cell division
- 2 daughter cells
- unpaired chromosomes line up in middle
- meiotic cell division
- 4 daughter gamete cells