

Evolutionary Biology 30305 Fall 2017

Topics for the Final Exam:

This list is not meant to be totally inclusive. We have covered other topics and many examples not listed. You are responsible for all the material covered in the lectures and in the assigned readings.

Readings from Z&E

- Chapter 9 – *History in Our Genes* - sections 9.1 & 9.2
- Chapter 12 – *After Conception* – sections 12.5 & 12.6
- Chapter 14 – *Macroevolution* – Box 14.1, sections 14.4, 14.7-14.9
- Chapter 16 – *Brains & Behavior* - sections 16.1, 16.6-16.9
- Chapter 17 – *Human Evolution* - all sections
- Chapter 18 – *Evolutionary Medicine* - section 18.8

Evolution of Senescence

Senescence as a life-history phenomenon
The Y-model for resource acquisition and allocation
Antagonistic Pleiotropy Theory
Mutation-Selection Balance Theory
Demographic projections of aging populations
Molecular-genetic Control of Aging – single locus mutants
Human Aging Disorders, Huntington's Chorea, Progeria, Werner's Syndrome
Mutation accumulation in mitochondrial genomes
Caloric Restriction
Telomerase Research
Names: Medawar, Williams

Human Evolution

Primate Origins and Relationships – When, Who, and distinguishing characteristics
Evidence for Relationships among the Great Apes - When, Who, and distinguishing characteristics
Molecular Clock Estimates of the Timing of Divergence Among Great Ape Lineages
Fossil Record Prior to the Split Between the Chimp and Human Lineages
The African “Ape Gap”
Incomplete Lineage Sorting and the relationship of Humans to Gorillas and Chimps
Dates for the Human-Chimp Split
Early Fossil Record in the Human Lineage
Evidence for the Evolution of Bipedalism
Evidence for Sexual Dimorphism along the Human Lineage
Evidence for Multiple sympatric Lineages (Early)
Evidence for Multiple sympatric Lineages (Late)
Evolution of Mammalian, Primate and Human Brains
What Makes us Different, and How are We Different? Gene and Protein Expression Studies
Origin of Tools
Replacement (out-of-Africa) vs. Multiregional vs. Hybridization and Assimilation Models for the Origins of Modern Humans – evidence for and against each
Dating the Origin of Modern Humans with Molecular data
What Happened to the Neanderthals?
Denisova, Sima de los Huesos, and Hobbits
Molecular and Morphological patterns in Human Evolution
Modern Human Migration – Populating the Globe
Names: Leakey, Paabo

You are responsible for examples shown in class. For the Human Evolution section you should know the *genus* names along the Human lineage. You should know the species names in the genus *Homo*. You should know the timeline of when these fossils occurred and when lineages co-occurred.

Genera:

Ardipithecus

Sahelanthropus

Orrorin

Australopithecus (species names include; *anamensis*, *afarensis* (Lucy), *africanus*, *garhi*, *sediba*)

Paranthropus (species names include; *aethiopicus*, *boisei*, *robustus*)

Kenyanthropus (species names include; *platyops*, *rudolfensis* (later assigned to genus *Homo*))

Homo (species names include; *rudolfensis*, *ergaster*, *nadeli*, *erectus*, *neanderthalensis*, *floresiensis*, *sapiens*)

Origin of Evolutionary Novelty

Allometry and the Allometric Coefficient

Heterochrony

Peramorphosis: Hypermorphosis and Acceleration

Paedomorphosis: Progenesis and Neoteny

Canalization

Genetic Assimilation and Threshold Traits

Experiments: Waddington, Hampe, Suzuki & Nijhout, Rutherford & Lundquist

Macroevolutionary Patterns

Patterns in Diversity & Complexity

Cope's Rule

Insular Dwarfism and Gigantism

Punctuated vs. Gradualistic Evolution

The Puzzle of Evolutionary Stasis

Names: Gould, Eldredge, Cope, Van Valen

Extinction

Persistence Times

Ecological Correlates of Extinction

Darwinian vs. Simpsonian View of Extinction

Faunal Replacement and the Great American Interchange

The "Big Five" Extinctions

The K/T Boundary Extinction

Species Level Selection

Red Queen (For the third and last time)

Kin Selection and Eusociality

Behavioral Evolution

Explanations for Apparent Altruism

Inclusive Fitness

Hamilton's Rule

Kin Selection vs. Group Selection

Eusociality

Haplodiploidy

Names: Hamilton