**Exam 4 Review**

Anthropology 105

Principles of Biological Anthropology

Exam 4 will take place during class in 6210 Sewell Social Sciences Wednesday December 13. The exam will be 50 minutes long and include only multiple-choice questions which you will answer using a Scantron answer sheet.

If you have extended time testing or other McBurney accommodations for testing, you received an email from Professor Bryer about scheduling your Exam 4 at the UW Testing and Evaluation Center.

Use this review sheet to go over key concepts from Lectures 18-24 that will be covered in multiple choice questions on Exam 4. I have given this to you as a Word document so that you can use your notes to expand on it. The answers to these questions and concept definitions are on the lecture slides that are posted as pdf on Canvas, or were discussed by Professor Bryer during lecture.

LECTURE 18: Hominins: *Australopithecus* and *Paranthropus*

* Two to four million years ago, hominins diversified into many different species, but what characteristics did most of these species have in common?
* What do we know about the cranial and postcranial features of the following hominin species?:
  + *Australopithecus anamensis*
  + *Australopithecus afarensis*
  + *Australopithecus africanus*
  + *Paranthropus* species features (*Paranthropus aethiopicus*, *Paranthropus boisei*, *Paranthropus robustus* – know the species names but only need to learn about features of the genus/what they all have in common)
* What can we learn from the Laetoli footprints and *Australopithecus* *afarensis* foot morphology and bipedalism?
* Describe the evidence for *Paranthropus* bone tool use? How do we know that these tools were likely used to dig for termites?
* Terms to be know/be able define:
  + *Australopithecus anamensis*
  + *Australopithecus afarensis*
  + sexual dimorphism (including canine dimorphism and body size dimorphism)
  + diastema
  + “Lucy”
  + “Dikika child”
  + hyoid bone
  + Laetoli footprints
  + *Australopithecus africanus*
  + “Taung child”
  + *Paranthropus* genus
  + sagittal crest
  + zygomatic arch
  + temporalis muscle

Lecture 19: Hominins: origins of tool use; *Homo erectus*

* As we have seen during other major events in primate evolution, climate change plays a very important role. Starting around 1.8 million years ago, during a period known as the Pleistocene, what was global climate like?
* What’s a key feature that researchers see in early *Homo* fossils that distinguishes them from *Australopithecus* species?
* A nearly complete skeleton of a *Homo erectus* boy provides an excellent picture of their postcranial skeleton: what features of *Homo erectus* are clear from this individual?
* Which hominin species was the first to migrate out of Africa? Where outside of Africa do we first have evidence of hominins?
* What kind of tool use do researchers observe in wild nonhuman primates?
* Who were the first hominin tool makers? What kinds of evidence is there in the fossil record that helps researchers study the origins of tool use?
* Terms to be know/be able define:
  + *Homo erectus*
  + *Homo ergaster* (some researchers categorize African *Homo erectus* fossils as a different species, *Homo ergaster*)
  + Oldowan tools
  + Acheulean tools

Lecture 20: Hominins: meat eating and hunting

* What kind of evidence do researchers find at fossil hominin sites for meat eating?
* How does the phylogeny of a type of tapeworm help researcher examine meat eating in hominins?
* Were hominins likely hunting, scavenging or both for meat?
* How humans differ from other primates in how they acquire their food?
* Hunter-gatherer populations of humans today and in recent history can give us insight into evolution of human diet and behavior but they are NOT living fossils, they are contemporary modern populations just like you and me. What do we know about the features of the hunter-gatherer lifestyle from these human populations?
* Ever since the 1960s, anthropologists have emphasized the idea that men are hunters and women are gatherers during human history; more recent evidence suggests that women likely played a larger role in hunting during human history. What is physiological evidence for “woman the hunter” and what is archeological evidence for “woman the hunter”?
* There was a lot of climate fluctuation/change during the middle Pleistocene. What are the implications of that for hominin evolution?
* What are some characteristics of *Homo heidelbergensis*?
* Terms to be know/be able define:
  + taphonomy
  + hunting versus/and scavenging
  + Pleistocene climate fluctuations
  + *Homo heidelbergensis*
  + Levallois tools

Lecture 21: Hominins: *Homo* species: Neanderthals

* When and where was the first Neanderthal fossil found? Why are they called Neanderthals (or Neandertals)?
* What was the geographic range of Neanderthals based on fossil evidence and genetic analyses?
* What are two theories about the origin of tool cut marks made on Neanderthal bones?
* At a Neanderthal site in Iraq, what is unusual about one humerus of an individual named Shanidar 1? What other cranial and postcranial features does this individual have that may indicate injury or need to be cared for by others?
* What is a common feature of Neanderthal incisors? What does this feature indicate? (hint: related to using a body part as a tool).
* How are Neanderthals very similar to modern humans? Consider cranial morphology, postcranial morphology, and artifacts like tools.
* How are Neanderthals different from modern humans? Consider cranial morphology, postcranial morphology, and artifacts like tools.
* Calcified dental plaque (called calculus) on Neanderthal teeth was analyzed to examine regional variation in Neanderthal diet. What did researchers find?
* How is it possible to get DNA from ancient bones?
* What variables make DNA more or less likely to be preserved over time?
* Do you wear personal protective equipment (PPE) in ancient DNA labs? Why?
* What can we learn from Neanderthal DNA?
* What areas of the world include people who have the most Neanderthal ancestry? The least?
* Terms to be know/be able define:
  + *Homo neanderthalensis*
  + nasal aperture
  + retromolar gap

Lecture 22: Hominins: *Homo* species

* What are some characteristics of *Homo floresiensis* that surprised researchers?
* What are three hypotheses about the origins of/who was *Homo floresiensis*?
* What do researchers know about *Homo luzonensis*?
* Where in the world have *Homo floresiensis* and *Homo luzonensis* fossils been found?
* Where in the world have *Homo naledi* fossils been found?
* What cranial and postcranial characteristics did *Homo naledi* have?
* What evidence do some researchers provide for burials and art by *Homo naledi*? Why do some researchers disagree about burials and art by this species?
* What do we know about Neanderthals from DNA evidence?
* Why is Denisova cave a great environment for presentation of ancient DNA?
* How were the hominin group called the Denisovans discovered?
* What areas of the world include people who have the most Neanderthal ancestry? The least?
* What areas of the world include people who have the most Denisovan ancestry? The least?
* Was there intermixing of these hominin populations that we discussed in this lecture? How do we know that there were instances of Neanderthals and Denisovans having children together?
* All the diversity you see among people of the world today is very slight in terms of genetics. The genetic similarity of modern humans points to a recent common shared heritage. Review the two figures on slides 33 and 34 in Lecture 22. Note in the graph showing populations outside of Africa, you see a dip in effective population size at 50-70,000 years ago that indicates a genetic bottleneck that affected all groups outside of Africa. How are African populations (slide 34) different in this genetic history?
* Terms to be know/be able define:
  + *Homo floresiensis*
  + *Homo luzonensis*
  + *Homo naledi*
  + *Homo neanderthalensis*
  + Denisova cave
  + the Denisovans
  + genetic bottleneck

Lecture 23: Brains and cognitive evolution

* What are some pieces of evidence that we have discussed in this class that complicate the idea that during hominin evolution brains got bigger and cognitive ability/complexity increased with this big brain?
* What is the difference between absolute brain size and relative brain size? Why is the distinction important in comparing brains across species?
* Is the encephalization quotient an example of an absolute brain size calculation or a relative brain size calculation? What does encephalization quotient tell us?
* Are our brains energetically expensive? What kinds of evolutionary tradeoffs might have occurred for us to have a big brain? (hint: guts vs. brains).
* What is the main prediction of Dunbar’s Social Brain Hypothesis? Is there evidence in living primates that does not support this prediction?
* What kinds of predictions do researchers make from the Ecological Brain Hypothesis?
* What is an example of a lemur study that supports the Ecological Brain Hypothesis?
* Are the Social Brain Hypothesis and the Ecological Brain Hypothesis mutually exclusive? (meaning does it have to be one or the other?)
* What is the Behavioral Flexibility Hypothesis and what is an example of evidence supporting it?
* What else have researchers looked at besides brain size when comparing the human brain to other animals, and primate brains to other mammals?
* Review slides 35 and 36 in Lecture 23 that describe results by Dr. Herculano-Houzel. Consider the human brain based on size versus based on number of neurons in the different parts of the brain – is the picture different? How does neuron number compare in different parts of the brain for some birds called corvids and primates?
* Terms to be know/be able define:
  + cerebrum
  + cerebral cortex
  + cerebellum
  + frontal lobe, temporal lobe, occipital lobe, parietal lobe
  + absolute brain size
  + relative brain size
  + encephalization
  + encephalization quotient
  + Expensive Tissue Hypothesis
  + Social Brain Hypothesis
  + Ecological Brain Hypothesis
  + Behavioral Flexibility Hypothesis
  + neurons

Lecture 24: Infectious disease and the epidemiological transition

* Is the COVID-19 pandemic the first major pandemic in human history?
* What is the idea of One Health?
* Why is the rate of new infectious disease recently higher?
* How does climate change affect risk of infectious disease?
* What three epidemiological transitions did Abdel Omran propose?
* Though the start of agriculture definitely increased infectious disease risk, was there infectious disease risk for humans before agriculture started?
* How did the Black Death (bubonic plague in the 14th century) influence the evolution of the human immune system?
* Based on genetic sequencing of malaria parasites, what do we know about the zoonotic origins of the malaria parasite *Plasmodium falciparum*?
* Given an example of a gene region from Neanderthals affecting immune responses in living people who carry them.
* Terms to be know/be able define:
  + infectious disease
  + pathogen
  + vector
  + zoonotic disease and zoonotic disease transmission
  + bubonic plague and “Black Death”
  + One Health
  + Lyme disease
  + malaria
  + epidemiology
  + epidemiological transitions

Lecture 25: Where do we go from here? Recent and future human evolution

* Will not be covered on Exam 4