Archaeology Admissions Assessment

Time allowed: one hour

Rubric

The Archaeology Admissions Assessment will involve reading one passage of text of around 500 words (selected from two options) and answering two related questions (chosen from a list of four questions).

Answers should be typed, in a format readable in MS Word, and the use of word-processing apps is permitted. There is no word limit but markers will reward quality over quantity.

While no restriction is placed upon you as to the resources you may use, it is important to note that we are not looking for prior or acquired knowledge in your answer. The task is designed to assess comprehension and the ability to read closely, deploy arguments effectively, and write clearly – all skills which archaeologists will need to use continuously throughout their undergraduate studies. You should remember that the more time you spend using other resources will mean less time for planning and writing your answer.

We will be looking in answers for

- the ability to think analytically
- the ability to produce a coherent argument
- the ability to select and use evidence appropriately
- the ability to address the question directly and clearly
- precision, clarity and facility of writing under time pressure

Not all answers will demonstrate these qualities equally, but the best answers will show signs of all, or nearly all, of them.

The assessment does not presume that you have encountered this material or these topics before; it is simply a self-contained exercise in reading comprehension, thinking and writing.

The answer you provide must be your own. Papers may be checked using anti-plagiarism software, and you should not discuss your answers or the paper with anyone else.

Adapted from Laland, K. 2017. *Darwin's Unfinished Symphony*. Princeton University Press.

The most compelling illustration of the sheer multiplicity of feedbacks that can arise from cultural activities is provided by the agricultural practices of Kwa-speaking populations in West Africa. For hundreds, perhaps thousands, of years, these people have cleared forests through slash and burn techniques to create fields in which to plant their crops, which are typically yams. This agricultural practice greatly increased the amount of standing water. These puddles were perfect breeding grounds for malaria-carrying mosquitoes, such as *Anopheles gambiae*, which need sunlit pools to breed in and thrived in the new conditions. The mosquitoes are vectors for the protozoan parasite *Plasmodium falciparum*, which causes malaria. Mosquito bites transfer the parasite into the human bloodstream, from where it travels to the liver and invades red blood cells; these rupture within 72 hours and release more new parasites into the blood. Today, there are several hundred million clinical cases of malaria worldwide and roughly 800,000 deaths each year, the majority of them in sub-Saharan Africa.

As an aside, lest you think that people in modern postindustrial societies could not be so foolish as to construct an environment rife with disease in this manner, let me point out that modern car tire manufacturing is also promoting disease vectors today. Mosquitoes infest pools of rainwater that collect in tires, which are typically stored outside; in this way, tire export contributes to the spread of malaria and dengue around the world. In fact, the transition to urban living and associated increases in population density, as well as the spread of pathogens through long-distance trade, and pathogen exposure through animal husbandry and irrigation, have long been thought to have promoted the spread of infectious diseases.

By inadvertently promoting malaria, the Kwa generated conditions in which alleles [gene variants] that confer resistance to the disease would increase in frequency through natural selection. One such allele is the hemoglobin *S* allele (*HbS*), generally known as the sickle-cell allele because it causes red blood cells to become stiff and take on a sickle shape. Those humans who carry two copies of the sickle-cell allele suffer from sickle-cell anemia, itself a life-threatening disease. Most children with sickle-cell disease die before the age of five. However, individuals with just one copy of the allele ("heterozygotes") experience comparatively mild sickling; this actually provides some protection against malaria, because sickled cells are recognized by the spleen as they flow through and are removed, flushing the parasite out with them. The result, as many of us learned at school, is a classic case of "heterozygote advantage", where individuals with one copy of *HbS* survive better than those with either two copies or none. Long periods of crop cultivation have intensified natural selection on the *HbS* allele, causing it to increase in frequency. The fact that neighboring Kwa-speakers, with different food-procurement practices, do not show the same increase in *HbS* supports the conclusion that a cultural practice (clearing fields to grow yams) has triggered genetic evolution.

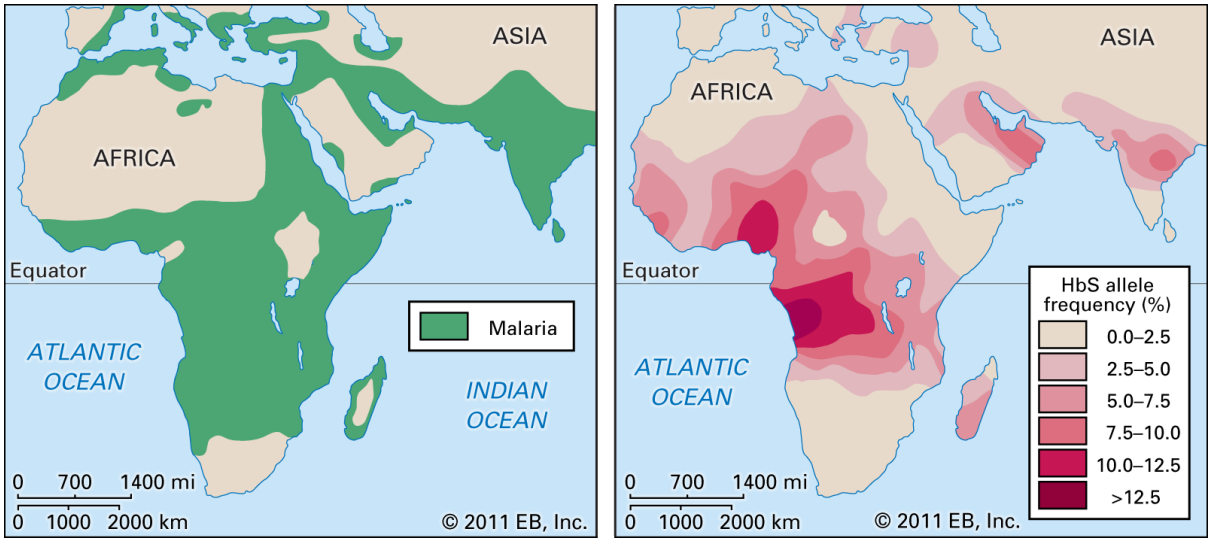

Image from Encyclopædia Britannica (https://www.britannica.com/science/sickle-cell-anemia#/media/1/542875/160694)

Answer TWO questions

1. What insights on human adaptation can the study of past and present disease provide?

2. How do you think archaeological data can help researchers to understand the evolution of disease?

3. Many paleo-epidemiologists associate the transition from hunting-gathering to farming as a pivotal moment for the evolution of human disease. Why do you think this is the case?

4. In what ways do you think modern culture and technology might influence our genes and biology in the future?

Cessford, C. et al. (2021). Beyond Plague Pits: Using Genetics to Identify Responses to Plague in Medieval Cambridgeshire. *European Journal of Archaeology,* 1-23.

During the second pandemic, bodies of individuals who died of plague were interred in a variety of ways. Mass burials appear to be rather exceptional, whereas a significant proportion of burials were carried out in a highly normative way. The work of the 'After the Plague' project has revealed *Y. pestis* positive individuals from five burial grounds in or near Cambridge, nearly doubling the number of locations from the British Isles. Perhaps some 2300–3500 people died of plague in a few months in 1349 in Cambridge and were buried at seventeen parish churches, a nunnery, two priories, and four friaries, as both individual interments and mass burials. By the time of the last outbreak in 1665/1666, many tens of thousands of inhabitants of Cambridge had died of plague. *Y. pestis* aDNA [ancient DNA from the plague bacterium] has been identified in eight Cambridge inhabitants, of whom six are likely to have died in 1349. While at one level this is a negligible number, it represents a revolution in our understanding.

Archaeologists have long recognized that many plague victims were buried individually in pre-existing cemeteries and churches, in a manner typical of the period. Such burials would 'probably be archaeologically indistinguishable from other … interments' (Hawkins, 1990: 641; see also Grainger et al., 2008: 29). Without biomolecular evidence, it had previously been impossible to move beyond a general recognition of this phenomenon. […]

While research into 'normal' plague burials is still incipient, it is striking how even our limited results provide suggestive vignettes of very different responses to the plague. Emergency cemeteries and mass burials are but one side of the story. Within one townscape, it is possible to find:

- Individuals buried within a normal parish church cemetery with rites indistinguishable from any others (All Saints), even within a parish severely affected by plague.
- A mass burial of at least five individuals within a parish cemetery (St Bene't's). This signals a community overwhelmed and unable to cope through normal burial process, but still treating bodies with as much respect as possible. Presumably, this was traumatic enough that the location was incorporated into a place of memory for a subsequent religious establishment, Corpus Christi College, founded explicitly in response to the Black Death.
- Within a large, high-status religious institution (the Augustinian Friary), clerics who had died of plague were buried in the normal manner. Both clerics and members of the laity killed in later fifteenth–sixteenth-century waves of plague were sometimes interred in the architectural heart of the community. This shows a concern to mark their status, requiring considerably more than the minimum effort, plague victim or not.

Answer TWO questions

1. In what ways might the discovery of the eight inhabitants of Cambridge with Y. pestis aDNA cause “a revolution in our understanding”? Draw on ideas from the text and your own thoughts on this question.

2. Why might it matter for our understanding of medieval society that “emergency cemeteries and mass burials are but one side of the story”?

3. What can differences within or between societies in burial practices tell us about past societies?

4. What might the three types of burial described in the text be able to tell us about past attitudes to the plague? Draw on ideas from the text and your own thoughts on this question.