Fredrik Lundström

*Projectile Functionality and environmental change on the Western Coast of the Ancylus Lake and the Litorina Sea*


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Zoé Pochon

*DNA and RNA analysis of viruses (and other microbes) present in human remains from various archaeological sites and time periods*

The goal of this PhD project is to analyse viruses present in different time periods and regions. The use of archaeogenetic to study ancient pathogens is very recent and few articles have been published on this subject. Moreover, almost all the pathogens studied so far store their genetic information in the form of DNA: bacteria responsible for the plague, cholera, tuberculosis, leprosy, parasites responsible for syphilis and also the virus responsible for smallpox. Nevertheless, a certain number of viruses keep their genetic material in the form of RNA as it is the case for the ones responsible for influenza, measles and yellow fever (Duchêne et al., 2020). Since RNA is traditionally considered more fragile than DNA, only a handful of recent studies have tackled its analysis (Smith et al., 2019).

In this PhD project, I will analyse not only already sequenced ancient DNA, but also newly sequenced ancient RNA. The objective is, for the former, to extract the maximum information from the sequencing data and, for the latter, to detect the presence of pathogenic RNA viruses, which will be challenging but also very interesting. We will then be able to verify the level of conservation of ancient RNA depending on the archaeological context and the time period. Furthermore, since the analysis pipeline will not only detect
viruses, but also microbes, parasites, dental microbiome or environmental contamination, I will also have the chance to discover other aspects of the individuals’ hologenome.

More specifically, here is a preliminary list of the different subprojects (subject to change):

1. Northern Project: individuals from today Sweden (Sigtuna, Westerhus, Frösön, Sandby borg) from the Iron, Viking and Medieval Ages. Aim: have an overview of common past DNA diseases.

2. Iberian Muslims: individuals from an Islamic medieval cemetery. Aim: look for smallpox DNA maybe brought from the Umayyad expansion.

3. Battles of Öland (Kronan flagship, 1676) and Wagram (1809). Aim: look for preserved RNA and overview of common sicknesses of soldiers in campaign.

4. Helgeandsholmens (medieval Stockholm) and the mass grave of Korsbetningen (Battle of Visby, Gotland 1361): Aim: look for even older RNA.

5. Plague of Athens 430BCE: described symptoms from Thucydides could be caused by smallpox more than the plague. Crappy data may make it not possible.

6. My own idea of project about an ancient epidemic to replace the latter if realisable.

Any idea or suggestion is welcome!