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Press Release

Genome of the Black Death reveals evidence for an Antique Bubonic Plague pandemic

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In a comparison of more than 300 contemporary strains of *Yersinia pestis*, the bacterium that causes bubonic plague, with ancient bacterial DNA isolated from victims of the Black Death (1347 – 1351), a team led by researchers at University of Tuebingen obtained evidence suggestive of a bubonic plague outbreak in the late antique period (8th to 10th centuries AD). The study published online today in PLoS ONE raises strong suspicion that the plague of Justinian, a massive pandemic that is thought to be in part responsible for the collapse of the East Roman Empire, may have been caused by the same bacterium implicated in the Black Death.

After the initial reconstruction of the complete medieval genome of *Y.pestis* from a Black Death cemetery in London last year, the researchers from the University of Tuebingen used a published genome wide dataset from more than 300 modern *Y.pestis* strains to reconstruct the relationship of ancient and modern plague bacteria. Due to the well-established age of the ancient remains they were able to date major radiation events in the history of this pathogen that are likely linked to major pandemics in the human population.

The comparison of modern and ancient genomes revealed that of the 311 *Y.pestis* strains analyzed, 275 trace their ancestry back to the medieval Black Death pandemic in the mid of the 14th century, confirming a previous analysis of 21 complete plague genomes by the same authors in 2011. In the new larger dataset, however, the authors identified an additional cluster of 11 contemporary bacterial strains that branch in the *Y.pestis* phylogeny between the 7th and 10th centuries, thus suggesting a radiation event of *Y.pestis* bacteria during a major outbreak. This time period roughly coincides with the Justinian plague, which historical sources suggest took place between the 6th and 8th centuries AD.

Historians have long suspected that the plague of Justinian was a pandemic of bubonic plague but until now little empirical evidence

existed. The suggestion that this pandemic was likely also caused by bubonic plague was rather unexpected for the researchers as their previous analysis published in 2011 revealed no evidence for major outbreaks of bubonic plague before the Black Death. “Our new analysis implies that bubonic plague may have been a major killer already in the late Roman Empire.” explains Krause, a Juniorprofessor at the University of Tuebingen specializing in Palaeogenetics. “The plague of Justinian seems like the best candidate for this earlier pandemic”.

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