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# Press Release

## Black Death Bacterium Identified

**Genetic analysis of medieval plague skeletons proves the presence of *yersinia pestis* bacteria. Collaboration between the University of Tübingen and Canadian scientists proves today's plague pathogen has been around at least 600 years.**

Tübingen, 30.08.2011

The Black Death claimed the lives of one-third of Europeans in just five years from 1348 to 1353. Until recently it was not certain whether the bacterium *yersinia pestis* – known to cause the plague today – was responsible for that most deadly outbreak of disease ever. Now, the University of Tübingen's Institute of Scientific Archaeology and McMaster University in Canada have been able to confirm that *yersinia pestis* was behind the great plague.

Previous genetic tests indicating that the bacterium was present in medieval samples had previously been dismissed as contaminated by modern DNA or the DNA of bacteria in the soil. Above all, there was doubt because the modern plague pathogen spreads much more slowly and is less deadly than the medieval plague – even allowing for modern medicine.

The international team of researchers has for the first time been able to decode a circular genome important for explaining the virulence of *y. pestis.* It is called pPCP1 plasmid and comprises about 10,000 positions in the bacterium's DNA. The sample was taken from skeletons from a London plague cemetery. The working group in Tübingen, led by Dr. Johannes Krause used a new technique of "molecular fishing" – enriching plague DNA fragments from tooth enamel and sequencing them using the latest technology. In this way, the fragments were connected up into a long genome sequence – which turned out to be identical to modern-day plague pathogens. "That indicates that at least this part of the genetic information has barely changed in the past 600 years," says Johannes Krause.

The researchers were also able to show that the plague DNA from the London cemetery was indeed medieval. To do that, they examined damage to the DNA which only occurs in old DNA – therefore excluding the

possibility of modern contamination. “Without a doubt, the plague pathogen known today as *y. pestis* was also the cause of the plague in the Middle Ages,” says Krause, who is well known for his DNA sequencing of ancient hominin finds, which help trace relationships between types of prehistoric man and modern humans.

Publication: V. J. Schueneman, K. I. Bos, S.N. DeWitte, J. Jamieson, S. Schmedes, A. Mittnik, S. A. Forrest, B. Coombes, J. W. Wood, D. Earn, W. White, J. Krause and H. N. Poinar (2011). Fishing for ancient pathogens: *Y. pestis* confirmed in victims of the Black Death via high-throughput sequencing of the pPCP1 plasmid. Proc Natl.Acad.Sci.USA. (www.pnas.org/cgi/doi/10.1073/pnas.1105107108)

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