

# World War I soldier helps in fight against dysentery

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A bacterial sample from a World War I soldier is helping researchers to tackle dysentery, a disease that kills hundreds of thousands of children under five each year in developing nations.

As scientists were working on reconstructing the complex genome of this bacterium, they felt compelled to piece together the story of the man who had been infected by it while fighting on the front lines in 1915. The research is reported in a special World War I edition of *The Lancet*, to be published on Saturday 8 November.

The sample of *Shigella flexneri*, which was the first to be submitted to Public Health England's National Collection of Type Cultures, has been genetically decoded for the first time, thanks to advances in sequencing technology. The genome of the 1915 sample shows the bacterium's inherent resistance to drugs and has helped scientists to learn more about how it has evolved over the century to evade modern antimicrobial treatments.

"Even before the description and widespread use of penicillin, this bacterium was resistant to it," explains Dr Kate Baker, a first author from the Wellcome Trust Sanger Institute. "While only 2 per cent of the genome from this first sample differs from modern isolates, the changes that *Shigella flexneri* has acquired enable it to evade the antimicrobial treatments we use to fight it."

Dysentery is a life-threatening disease that is becoming increasingly hard

to treat and it continues to spread in unsanitary conditions in today's developing nations and conflict zones. The genetic data from this bacterium, which infected a soldier in the trenches of the Western Front, showed the researchers how the pathogen had changed in the 100 years since World War I and may ultimately help in the search for an effective vaccine for Shigella.

"There are two parts to this story: modern genomics has given us the power to untangle fine-scaled relationships between organisms and tell us how they have changed over time; linking this to a soldier who contracted the infection at the very beginning of World War I allowed us to focus on a very real human story that helps us navigate through what was such a monumental and complex period in our history," says Professor Nick Thomson, senior author from the Sanger Institute and Professor of Bacterial Genomics and Evolution at the London School of Hygiene and Tropical Medicine. "The historical perspectives we gain from samples like this are important because they provide the background information we need to understand infections today."

The provenance of the sample was at the forefront of researchers' minds in this centenary year of World War I and they recognised the opportunity it provided to remember the huge numbers who died of infectious diseases during the conflict. When researchers set out to find the soldier, the sample's strain name, Cable, gave them the clue they needed.

Using Public Health England's records and the National Archives, Dr Alison Mather, a first author from the Sanger Institute, was able to track down the hospital where the sample was likely taken. Trawling through the records of this hospital, a converted hotel in the French coastal town of Wimereux, Dr Mather eventually found an entry for a Private Ernest Cable of the Second Battalion of the East Surrey Regiment; it was the record of his death from dysentery on March 13 1915.

"So many of the samples we work with in bacterial genomics have stories that we'll never know," says Dr Mather. "Finding Ernest and learning his story was a chance to commemorate those who fought in World War I, and to highlight the burden of infectious disease during this time."

Although Dr Mather could find no surviving family for Private Cable, she was heartened to discover that he is still remembered. Through a commemorative website, she made contact with Michael Norman, a retired RAF serviceman and the son of the beneficiary of Private Cable's will. Private Cable was lodger to Mr Norman's grandparents, and their son, who was only a toddler when Private Cable left to join the army, received his memorial plaque after his death. Mr Norman still has the plaque, emblazoned with the motto, "He died for freedom and honour", on display in his home to this day.

"This study helps to highlight the stories behind every sample in the National Collection of Type Cultures," says Julie Russell, Head of Culture Collections at Public Health England. "Historical samples like Ernest's are so valuable in helping us to fight infection today and we now have the capability to learn more from them than the bacteriologists who isolated them could ever have imagined."

Provided by Wellcome Trust Sanger Institute

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