Dental plaque DNA shows Neanderthals chewed ‘aspirin’

Ancient human mouths had same bacteria that cause caries and gum disease today

Ancient DNA found in the dental plaque of Neanderthals — our nearest extinct relative — has provided remarkable new insights into their behavior, diet and evolutionary history, including their use of plant-based medicine to treat pain and illness.

In research findings published in March in the journal Nature, an international team led by the University of Adelaide’s Australian Centre for Ancient DNA (ACAD) and Dental School, with the University of Liverpool in the United Kingdom, revealed the complexity of Neanderthal behavior, including dietary differences between Neanderthal groups and knowledge of medication. “Dental plaque traps microorganisms that lived in the mouth and pathogens found in the respiratory and gastrointestinal tract, as well as bits of food stuck in the teeth — preserving the DNA for thousands of years,” said lead author Dr. Laura Weyrich, ARC Discovery early career research fellow with ACAD.

“Genetic analysis of that DNA ‘locked-up’ in plaque represents a unique window into Neanderthal lifestyle — revealing new details of what they ate, what their health was like and how the environment impacted their behavior.”

The international team analyzed and compared dental plaque samples from four Neanderthals found at the cave sites of Spy in Belgium and El Sidrón in Spain. These four samples range from 42,000 to around 50,000 years old and are the oldest dental plaque ever to be genetically analyzed.

“We found that the Neanderthals from Spy Cave consumed woolly rhinoceros and European wild sheep, supplemented with wild mushrooms,” said Professor Alan Cooper, director of ACAD. “Those from El Sidrón Cave, on the other hand, showed no evidence for meat consumption, but appeared instead to have a largely vegetarian diet, comprising pine nuts, moss, mushrooms and tree bark — showing quite different lifestyles between the two groups.

“One of the most surprising finds, however, was in a Neanderthal from El Sidrón. DNA analysis revealed that the individual was eating poplar, a source of aspirin, and had also consumed molded vegetation including Penicillium fungus, source of a natural antibiotic. "Dental plaque DNA shows Neanderthals chewed ‘aspirin’"
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Sidrón, who suffered from a dental abscess visible on the jawbone. The plaque showed that he also had an intestinal parasite that causes acute diarrhea, so clearly he was quite sick. He was eating poplar, which contains the pain killer salicylic acid (the active ingredient of aspirin), and we could also detect a natural antibiotic mold (Penicillium) not seen in the other specimens.

"Apparently, Neanderthals possessed a good knowledge of medicinal plants and their various anti-inflammatory and pain-relieving properties and seem to be self-medicating. The use of antibiotics would be very surprising, as this is more than 40,000 years before we developed penicillin. Certainly our findings contrast markedly with the rather simplistic view of our ancient relatives in popular imagination."