'Iceman Oetzi' lived for a while after arrow wound

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The mummy of an iceman named Oetzi, discovered on 1991 in the Italian Schnal Valley glacier, displayed at the Archeological Museum of Bolzano in 2011. Oetzi, the 5,300-year-old "Iceman" mummy of the Alps, lived for some time after being shot in the back by an arrow, scientists said on Tuesday after using forensic technology to analyse his preserved blood.

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Contrary to a leading theory, Oetzi did not expire immediately from his wounds, they reported in the Journal of the Royal Society Interface, published by Britain's academy of sciences.

Scientists led by Albert Zink of the Ludwig Maximilian University in Munich, southern Germany used nano-scale methods to probe the oldest blood known to modern science, preserved by thousands of years of alpine chill.

Using a so-called atomic force microscope able to resolve images just a few nanometers (billionths of a metre) across, they identified corpuscles with the classic doughtnut shape of healthy blood cells.

"To be absolutely sure that we were not dealing with pollen, bacteria or even a negative imprint of a blood cell, but indeed with actual blood cells, we used a second analytical method," Zink said.

They deployed Raman spectroscopy, in which refracted light from a laser beam gives chemical clues about a sample.

This showed the presence of haemoglobin and fibrin, which are key components in blood clotting, at the arrow wound on Oetzi's back.

"Because fibrin is present in fresh wounds and then degrades, the theory that Ötzi died some days after he had been injured by the arrow, as had once been mooted, can no longer be upheld," Zink said.

Oetzi's remains were discovered by two German hikers in September 1991 in the Oetztal Alps in South Tyrol, northern Italy, 3,210 metres (10,500 feet) above sea level.

Scientists have used high-tech, non-invasive diagnostics and genomic sequencing to penetrate his mysterious past.

These efforts have determined Oetzi died around the age of 45, was about 1.60 metres (five foot, three inches) tall and weighed 50 kilos (110 pounds).

He suffered a violent death, with an arrow severing a major blood vessel between the rib cage and the left scapula, as well as a laceration on the hand.

According to DNA analysis presented in February, Oetzi had brown eyes and hair and was allergic to milk products.

This supports the theory that despite the increasing spread of agriculture and dairying at the time, lactose intolerance was still common.

According to a theory aired in 2010 by an Italian archaeologist, based on seasonal pollen found in his stomach contents and at the burial site, Oetzi did not die at the spot where his remains were found. Instead, he was only ceremonially interred there.