# Early Europeans unable to stomach milk

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The first direct evidence that early Europeans were unable to digest milk has been found by scientists at UCL (University College London) and Mainz University.

In a study, published in the journal *PNAS*, the team shows that the gene that controls our ability to digest milk was missing from Neolithic skeletons dating to between 5840 and 5000 BC. However, through exposure to milk, lactose tolerance evolved extremely rapidly, in evolutionary terms. Today, it is present in over ninety per cent of the population of northern Europe and is also found in some African and Middle Eastern populations but is missing from the majority of the adult population globally.

Dr Mark Thomas, UCL Biology, said: "The ability to drink milk is the most advantageous trait that's evolved in Europeans in the recent past. Without the enzyme lactase, drinking milk in adulthood causes bloating and diarrhoea. Although the benefits of milk tolerance are not fully understood yet, they probably include: the continuous supply of milk compared to the boom and bust of seasonal crops; its nourishing qualities; and the fact that it's uncontaminated by parasites, unlike stream water, making it a safer drink. All in all, the ability to drink milk gave some early Europeans a big survival advantage."

The team carried out DNA tests on Neolithic skeletons from some of the earliest organised farming communities in Europe. Their aim was to find out whether these early Europeans from various sites in central, northeast and southeast Europe, carried a version of the lactase gene that

controls our ability to produce the essential enzyme lactase into adulthood. The team found that it was absent from their ancient bone DNA. This led the researchers to conclude that the consumption and tolerance of milk would have been very rare or absent at the time.

Scientists have known for decades that at some point in the past all humans were lactose intolerant. What was not known was just how recently lactose tolerance evolved.

Dr Thomas said: "To go from lactose tolerance being rare or absent seven to eight thousand years ago to the commonality we see today in central and northern Europeans just cannot be explained by anything except strong natural selection. Our study confirms that the variant of the lactase gene appeared very recently in evolutionary terms and that it became common because it gave its carriers a massive survival advantage. Scientists have inferred this already through analysis of genes in today's population but we've confirmed it by going back and looking at ancient DNA."

This study challenges the theory that certain groups of Europeans were lactose tolerant and that this inborn ability led the community to pursue dairy farming. Instead, they actually evolved their tolerance of milk within the last 8000 years due to exposure to milk.

Dr Thomas said: "There were two theories out there: one that lactose tolerance led to dairy farming and another that exposure to milk led to the evolution of lactose tolerance. This is a simple chicken or egg question but one that is very important to archaeologists, anthropologists and evolutionary biologists. We found that the lactose tolerance variant of the lactase gene only became common after dairy farming, which started around 9 thousand years ago in Europe.

"This is just one part of the picture researchers are gathering about

lactose tolerance and the origins of Europeans. Next on the list is why there is such disparity in lactose tolerance between populations. It's striking, for example, that today around eighty per cent of southern Europeans cannot tolerate lactose even though the first dairy farmers in Europe probably lived in those areas. Through computer simulations and DNA testing we are beginning to get glimpses of the bigger early European picture."

Source: University College London