

Indians and Europeans share a milky past

September 9 2011



(PhysOrg.com) -- Cambridge University researchers have discovered that lactose tolerant milk-drinkers in India and Europe could be related to the same person who lived at some point in the last 10,000 years.

The Cambridge team, in association with fellow researchers at CCMB Hyderabad, UCL, University of Tartu, Harvard and University of Chennai, were studying [genetic changes](#) that allow some 32 per cent of the world's population to be lactase persistent – able to digest lactose, the sugar in milk. To their surprise they found the same mutation, with the same origin, at high frequency in [Europe](#) and [India](#).

The team's study may also help scientists' understanding of evolutionary processes such as biological adaptation and how culture and economic developments affect human biology. Its authors say the study has shown that with a little kick from natural selection, genes can spread far, wide

and fast.

Lactase persistence is common in Europe, the Middle East and some parts of Africa and India – areas where domesticated cattle are widespread – but either rare or absent in most other parts of the world.

When someone who is not lactase persistent drinks milk they will often suffer symptoms such as abdominal pain, bloating, nausea and diarrhoea – otherwise known as lactose intolerance.

While all babies produce the gut enzyme lactase, essential for the digestion of lactose in milk, the production of the enzyme is usually shut down some time before adulthood.

Although once thought of as normal, lactase persistence was found in the 1960s to be an unusual trait in humans and seems to be completely absent from other mammals whose lactase production diminishes significantly after being weaned and is never resumed.

The focus of the Cambridge-led study was India – the world's largest producers and consumers of milk. The team looked at nearly 2,300 DNA samples from across the Indian subcontinent from all major language groups and geographic regions – the first study of its kind.

Previous studies had shown that lactase persistence had evolved at least four times in the last 10,000 years, independently in Europe, the Middle East and Africa. However, little was known about its genetic causes in India, until now.

Cambridge's Dr Irene Gallego Romero, the lead author, said: "India was an unknown quantity. But since lactase persistence had evolved independently in the [Middle East](#) and Africa, and because cattle had been domesticated independently in India around seven or eight

thousand years ago, we were expecting to see uniquely Indian genetic causes.”

The vast majority of lactase persistent Europeans carry a mutation -13910T, that has been shown to have been strongly favoured by natural selection among people with supplies of milk to hand. It seems to have originated somewhere in Europe around 7,500 years ago. The mutation seems to be absent from samples of early central European farmer’s skeletons who lived around the time that domestic cattle, sheep and goats arrived there.

“To our surprise we found that the -13910T mutation was also common in India – especially in those populations with a tradition of milk drinking,” said Dr Toomas Kivisild of Cambridge University, senior author of the study.

“Not only that, but by looking at nearby genetic regions we could show that the Indian -13910T has the same origin as that found in Europeans; that it could lead back to the same few people who may have migrated between Europe and India.

However, that raises the question of why there are few instances of lactase tolerance in between.

Professor Mark Thomas of UCL, a co-author, said: “Genetic data doesn’t support some sort of large migration of people from Europe to India in the last 10,000 years. What’s more likely is that just a few migrants carried this mutation to India, and then it spread quickly.”

The study also revealed large differences in the distribution of -13910T in India with many southern and eastern populations – especially those who do not practice pastoralism – having near zero frequencies.

The study team speculate that the spread of the lactase persistent gene variant was highly dependent on the mobility of cattle keepers and the extent to which they reproduced with people who did not keep cattle.

In India, reproductive isolation between castes, tribes and religions can be strong. The study group suggest such isolation may have also been common historically when lactase persistence was spreading.

Provided by University of Cambridge

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