

## **Evolution: The Impact of Mutations and Natural Selection on Nutrition**

About 11,000 years ago people started to transition from hunting and gathering to farming and cooking.

As a consequence, our anatomy changed.

10,000 yrs ago people teeth were 10% larger in Europe, Asia, and Africa than today. When people started to eat “cooked” softer foods that required less chewing, the teeth gradually became smaller.

Human genome project showed us that the descendants of farmers had greater secretion of salivary amylase. Most people today have several copies of the gene for this gene, AMY1. However, modern descendants of hunter gathers, like the Datooga in Tanzania, have fewer copies of the AMY1. Ancient farmers had an advantage by getting a jump on starch processing at the point of entry as they changed to starchy grains.

Human lactose tolerance is the best studied example of recent human evolution. Almost everyone in the world is born with the ability to make the enzyme called lactase. This enzyme breaks lactose (sugar in milk) into glucose and galactose. This was also true of early humans over 10,000 yrs ago. However, early humans made the enzyme after birth but after several years they stopped producing the enzyme and then could no longer metabolize lactose.

At least five times in our evolutionary past, human populations experienced mutations which extended the length in which lactase was produced as these people started to discover dairy. Three of these mutations occurred in sub-Saharan Africa, where there was a history of cattle herding. In Arabia mutations regulating lactase also occurred where there was a history of camel and goat herders.

The fifth mutation that keeps the lactase mutation turned on in adulthood is in the human population today which is spread from Ireland to India. The highest frequencies are across northern Europe. This particular mutation occurred 7,500 years ago.

DNA analysis of Otzi the Iceman, a 7,500 old man found frozen in a snow bank in the mountains of Europe did not have the gene mutation for lactase. Northern European DNA analysis from 5,000 yrs ago also did not have the gene mutation. However, today 75% of the population carries this gene.

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