

Did eating starchy foods give humans an evolutionary advantage?

October 18 2018



Credit: CC0 Public Domain

Gene AMY1, which kickstarts digestion of starch in the mouth, is associated with blood glucose levels and digestion of carbohydrates, with implications for understanding human evolutionary biology and the gut

microbiome.

Found in saliva, the protein enzyme encoded by the AMY1 gene begins the digestive process by breaking down starch when you chew your food.

In humans, the number of copies of the gene varies widely: some people have two, others 20, with an average of six to eight. Until now, however, few studies have attempted to determine the physiological role this variation might have in humans.

Published in the *American Journal of Clinical Nutrition*, researchers from the University of Sydney conducted the first large-scale, systematic analysis of the influence of AMY1 copy numbers on 201 healthy participants during four linked experiments.

People with more copies of the AMY1 gene – and corresponding higher concentrations of the amylase enzyme in their saliva – were found to digest starchy carbohydrates faster.

They also displayed a higher [blood glucose](#) response to foods containing starch such as bread and pasta, but not [sugary foods](#). As sugary foods shouldn't be digested by amylase, the lack of an association indicates the difference in starch digestion observed was due to differences in the enzyme and therefore differences in the number of copies of the gene.

Lead author Dr. Fiona Atkinson from the University's Charles Perkins Centre and Faculty of Science, explained the findings were significant for better understanding of [human evolutionary biology](#).

"The wide variation in the number of copies of the AMY1 in humans is not found in other primates," Dr. Atkinson said.

"There has been speculation it could represent an adaptation to the

influence of diet during human evolution – perhaps associated with the shift from the low starch diet of hunter-gatherers to the high starch diets of Neolithic farmers.

"It's also possible individuals with high numbers of copies of the gene had an advantage at certain times during human evolution."

The research also demonstrated a difference in large bowel metabolism, as people with a low number of copies of the gene displayed higher methane levels in their breath; a rise in breath methane is commonly used in clinical practice to assess carbohydrate maldigestion or malabsorption.

Co-author Professor Jennie Brand-Miller, from the University's Charles Perkins Centre and School of Life and Environmental Sciences said this difference did not necessarily imply starch itself was less digestible in people with low numbers of copies of the gene.

"These results suggest people with varying numbers of copies of the AMY1 gene have a different [gut microbiome](#), the diverse community of trillions of microorganisms that live in the digestive tract," she said.

"We currently don't know much about the effects methane-producing gut organisms have in humans, despite being present in around one third of adults.

"However for animals, methane production by microbiota in the large bowel increases the energy produced by the host and is associated with weight gain.

"While our study found no association between the numbers of copies of the AMY1 gene and body mass index, others have. Further research is needed to confirm the connection between the gene, its influence on

methane production and resulting differences in the microbiome."

More information: Fiona S Atkinson et al. The physiologic and phenotypic significance of variation in human amylase gene copy number, *The American Journal of Clinical Nutrition* (2018). [DOI: 10.1093/ajcn/nqy164](https://doi.org/10.1093/ajcn/nqy164)

Provided by University of Sydney

Citation: Did eating starchy foods give humans an evolutionary advantage? (2018, October 18) retrieved 23 June 2024 from <https://phys.org/news/2018-10-starchy-foods-humans-evolutionary-advantage.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.