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Enzyme in saliva helps regulate blood glucose

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Scientists from the Monell Center report that blood glucose levels following starch ingestion are influenced by genetically-determined differences in salivary amylase, an enzyme that breaks down dietary starches. Specifically, higher salivary amylase activity is related to lower blood glucose.

The findings are the first to demonstrate a significant metabolic role for salivary amylase in starch digestion, suggesting that this oral enzyme may contribute significantly to overall metabolic status. Other implications relate to calculating the glycemic index of starch-rich foods and ultimately the risk of developing diabetes.

"Two individuals may have very different glycemic responses to the same starchy food, depending on their amylase levels," said lead author Abigail Mandel, Ph.D., a nutritional scientist at Monell. "Individuals with high amylase levels are better adapted to eat starches, as they rapidly digest the starch while maintaining balanced blood glucose levels. The opposite is true for those with low amylase levels. As such, people may want to take their amylase levels into account if they are paying attention to the glycemic index of the foods they are eating."

Starch from wheat, potatoes, corn, rice, and other grains is a major component of the United States diet, comprising up to 60 percent of our calories. Amylase enzymes secreted in saliva help break down starches into simpler sugar molecules that can be absorbed into the bloodstream. In this way, amylase activity influences blood glucose levels, which need to be maintained within an optimal range for good health.

A previous study had demonstrated that individuals with high salivary amylase activity are able to break down oral starch very rapidly. This finding led the researchers to ask how this 'pre-digestion' contributes to overall starch digestion and glucose metabolism.

In the current study, published online in *The* Journal of Nutrition, amylase activity was measured in saliva samples obtained from 48 healthy adults. Based on extremes of salivary amylase activity, two groups of seven were formed: high amylase (HA) and low amylase (LA).

Each subject drank a simplified corn starch solution and blood samples were obtained over a two hour period afterwards. The samples were analyzed to determine blood glucose levels and insulin concentrations.

After ingesting the starch, individuals in the HA group had lower blood glucose levels relative to those in the LA group. This appears to be related to an early release of insulin by the HA individuals.

"Not all people are the same in their ability to handle starch," said senior author Paul Breslin, Ph.D., a sensory geneticist at Monell. "People with higher levels of salivary amylase are able to maintain more stable blood glucose levels when consuming starch. This might ultimately lessen their risk for insulin resistance and non-insulin dependent diabetes."

Additional studies will confirm the current findings using more complex starchy foods, such as bread and pasta. Another focus will involve identifying the neuroendocrine mechanisms that connect starch breakdown in the mouth with insulin release.

Provided by Monell Chemical Senses Center