Discovery advances control of starch digestion

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(PhysOrg.com) -- Controlling diet-induced degenerative disorders such as Type II Diabetes and obesity could be as easy as sprinkling a dietary supplement on your food in the future.

A national research team, including two Simon Fraser University scientists, has chemically mapped the molecular structure of the second of four enzymes in our intestinal lining that are responsible for converting starch into glucose.

SFU chemists Mario Pinto and Sankar Mohan, University of Waterloo biologist David Rose and University of Toronto biochemist Lyann Sim are among six scientists who have just structurally characterized the human enzyme sucrase-isomaltase (SI).

They've also compared it to maltase-glucoamylase (MGAM), the first starch-digesting enzyme mapped by them about five months ago.

The Journal of Biological Chemistry of the American Society for Biochemistry and Molecular Biology published their latest findings in its June 4 online issue.

Glucose is absorbed into our bloodstream and either converted to energy or fat, depending on the rate of conversion, which is tied to genetics, diet, lifestyle and the microbial flora in our guts.

Too much glucose upsets a critical balance and increases our body's fat

storage rate, a condition that has led to 180 million people developing diabetes worldwide—a number that is expected to double by 2030.

Pinto, SFU's vp-research, belongs to an international consortium that is analyzing how the activities of starch digesting enzymes, known as intestinal glucosidases, occur in concert and might be altered to control diet-induced degenerative disorders.

"We have two more enzyme activities to characterize," says Pinto, who credits Mohan, one of his doctoral students, with synthesizing enzyme inhibitors, which were used to characterize the glucosidases.

"We've created three dimensional structural models of the glucosidases that have led to the design of new molecules that can selectively turn the glucosidases on and off. One day, these inhibitors could be sprinkled on to food in a powder form to control starch digestion."

Mohan—who along with SFU postdoctoral fellow Jayakanthan Kumarasamy identified structures in a Sri Lankan plant that inhibit glucosidases—is testing the effectiveness of various iterations of the structures in regulating glucosidases.

Pinto and Mohan will discuss their latest research with colleagues in the international starch digestion consortium at a workshop in Vancouver on June 12 and 13, funded by the Canadian Institutes of Health Research.

Provided by Simon Fraser University