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Discovery of 'sugar sensor' in intestine could benefit diabetes

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Diabetes patients could benefit from new research at the University of Liverpool that has identified a molecule in the intestine that can ‘taste’ the sugar content of the diet.

Researchers found that the sweet taste receptor that senses sugar and artificial sweeteners is not only present in the tongue, but also in the intestine. The discovery will open new avenues for the treatment of diabetes and obesity, as well as suggest reasons for why artificially sweetened foods and beverages sometimes fail to result in weight loss.

Scientists have previously shown that the absorption of dietary sugars in the intestine is mediated by a protein – a sugar transporter – that varies in response to the sugar content of foods. The intestine uses a glucose sensing system to monitor these variations, but until now the nature of this system was unknown.

Professor Soraya Shirazi-Beechey, from the Faculty of Veterinary Science, said: “We found that the sweet taste receptor and the taste protein, gustducin, are present in the taste cells of the gut. These sweet sensing proteins allow humans and animals to detect glucose within the intestine. We discovered that mice missing the gene for either of these proteins were unable to process the production of the intestinal sugar and were therefore unable to regulate the intestinal capacity to absorb dietary sugars.

“Surprisingly we also found that the receptor was able to detect artificial

sweeteners in foods and drinks resulting in increased capacity of the intestine to absorb dietary sugars, which would explain why these sweeteners are unsuccessful at helping people lose weight.

“We are now researching mechanisms in which these receptors can be adjusted to benefit those with diet-related disorders. Diabetes for example, is where the body’s blood sugar level is higher than normal; if we could use the taste receptor like a dimmer switch we could set it so that the appropriate amount of sugar is absorbed in the body.

“From a veterinary perspective, the discovery could also have implications for race horses. Horses need high levels of glucose to sustain them in long races; activating the receptor through dietary supplements, before and during the race, will increase intestinal absorption of glucose.”

Source: University of Liverpool