



Scientists discover why a low GI meal makes you feel full

Eating a meal with a low GI (glycaemic index) increases gut hormone production which leads to suppression of appetite and the feeling of fullness. This is the finding of new research being presented at the annual Society for Endocrinology BES meeting in Harrogate. Researchers from King's College London studied the effects of a low versus high GI meal on levels of gut hormones. This is the first study to provide clues as to how a low GI meal produces satiety.

GI is a ranking assigned to carbohydrates according to their effect on the body's blood sugar levels. A low GI meal takes longer to digest and releases sugar into the bloodstream more slowly than a high GI meal. High GI foods include white bread, croissants and cornflakes, whereas granary bread, milk and most fruit and vegetables are all classed as low GI foods.

A low GI diet is known to cause reduced appetite⁽¹⁾ but the mechanisms behind this have so far remained unknown. To address this, Dr Reza Norouzy and colleagues at King's College London looked at the effects of a single low versus high GI meal on gut hormone levels in twelve healthy volunteers. Each participant ate an identical medium GI meal for dinner, fasted overnight, and was given either a low (46) or high (66) GI meal for breakfast. Blood samples were then taken every 30 minutes for 150 minutes, and levels of the gut hormone glucagon-like peptide 1 (GLP-1) and insulin measured. GLP-1 is a hormone produced by the gut that has been shown to cause a feeling of fullness and suppression of appetite⁽²⁾.

Volunteers who ate a low GI breakfast had 20% higher blood plasma levels of GLP-1 (area under curve = 4839 ± 1831) and 38% lower levels of insulin (10088 ± 4757), compared to those who had consumed a high GI breakfast (3865 ± 1630 and 16245 ± 7600 respectively). These results show for the first time that eating a low GI meal increases GLP-1 production and suggest a physiological mechanism as to why a low GI meal makes you feel fuller than a high GI meal.

Researcher Dr Reza Norouzy said:

"Our results show for the first time the direct effect of a single GI meal on gut hormone levels. We already know that the hormone GLP-1 and a low GI meal independently lead to suppression of appetite. This study builds on these findings by providing a physiological mechanism to explain how a low GI meal makes you feel fuller than a high GI meal. GLP-1 is one of the most potent hormones for suppressing appetite. Our results suggest that low GI meals lead to a feeling of fullness because of increased levels of GLP-1 in the bloodstream."

This is an exciting result which provides further clues about how our appetite is regulated, and offers an insight into how a low GI diet produces satiety. This is a preliminary study that only involved a small number of people. We now need expand these findings and look at the effects of low versus high GI meals in a larger cohort of people.”

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Notes for editors

- 1 Pal S, Lim S. The effect of a low glycaemic index breakfast on blood glucose, insulin, lipid profiles, blood pressure, body weight, body composition and satiety in obese and overweight individuals: a pilot study. *J Am Coll Nutr.* 2008; 27(3):387-93.
- 2 Naslund E, Barkeling B. Energy intake and appetite are suppressed by glucagon-like peptide-1 (GLP-1) in obese men. *Int J Obes Relat Metab Disord.* 1999; 23(3):304-11.

The paper will be presented at the Society for Endocrinology BES meeting at 08.15 on Tuesday 17 March 2009. The abstract for this work is reproduced below: see <http://www.endocrine-abstracts.org/ea/0019/ea0019oc17.htm>

The Society for Endocrinology BES 2009 is Britain's biggest scientific meeting on hormones, and is taking place at the Harrogate International Centre, Harrogate, from 16-19 March 2009. For the full programme, please see <http://www.endocrinology.org/meetings/2009/sfebes2009/prog/prog.aspx>

Please mention the Society for Endocrinology BES meeting in any story

The Society for Endocrinology is Britain's national organisation promoting endocrinology and hormone awareness. For general information, please visit our website: <http://www.endocrinology.org>

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ABSTRACT

Effect of Single High vs Low Glycemic Index (GI) Meal on Gut Hormones

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Low glycaemic index (GI) diet and gut hormones such as glucagon-like peptide 1 (GLP-1) and peptide YY (PYY) have been shown independently to reduce appetite. However, the direct relationship between a single meal of low or high GI and the levels of these hormones has not been studied. In this study we looked at the short term effects of a single low or high GI meal on plasma levels of GLP-1, PYY and insulin. King's College London's research ethics committee approval was obtained for this study. Twelve healthy individuals with BMIs of 18-25 kg/m² took part in a randomized cross-over study. The subjects had an identical medium GI dinner in the evening prior to the study and fasted overnight. On the morning of study each subject consumed a single meal of low (46) or high (66) GI and subsequently had blood samples taken every 30 minutes for a total of 150 minutes. The entire process was repeated with the other test meal after a minimum two weeks wash-out. Plasma levels of GLP-1, PYY and insulin were measured on each blood sample. The table below shows the post-prandial area under the curve (0-150 minute) for GLP-1, PYY and insulin. Our results demonstrate that there was a significantly higher post-prandial plasma level GLP-1 and lower level of insulin after the low GI breakfast compared to high GI (paired t-test, p value <0.005).

	GLP-1	PYY	Insulin
Low GI	4839±1831	3461±563	10088±4757
High GI	3865±1630	3448±631	16245±7600

Our data demonstrate that consumption of a single low GI meal results in higher levels of GLP-1. Previous studies showed the beneficial effect of low GI diet on suppressing appetite. GLP-1 is one of the most potent hormones in inducing satiety feeling. The present study may offer an insight into the physiological mechanism by which an low GI diet produces satiety.