Effects of dietary glycemic index on brain regions related to reward and craving in men\(^1,2,3,4\)

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Abstract

Background: Qualitative aspects of diet influence eating behavior, but the physiologic mechanisms for these calorie-independent effects remain speculative.

Objective: We examined effects of the glycemic index (GI) on brain activity in the late postprandial period after a typical intermeal interval.

Design: With the use of a randomized, blinded, crossover design, 12 overweight or obese men aged 18–35 y consumed high- and low-GI meals controlled for calories, macronutrients, and palatability on 2 occasions. The primary outcome was cerebral blood flow as a measure of resting brain activity, which was assessed by using arterial spin-labeling functional magnetic resonance imaging 4 h after test meals. We hypothesized that brain activity would be greater after the high-GI meal, in prespecified regions involved in eating behavior, reward, and craving.

Results: Incremental venous plasma glucose (2–h area under the curve) was 2.4-fold greater after the high- than the low-GI meal (\(P = 0.006\)). Plasma glucose was lower (mean ± SE: 4.7 ± 0.14 compared with 5.3 ± 0.16 mmol/L; \(P = 0.003\)) and response was greater (\(P = 0.004\) after the high- than the low-GI meal, respectively.)