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Breakfast and the brain

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NUTRITION RESEARCH REVIEW

Study one: Memory in the elderly

Subjects: 20 elderly men and women

Method: After an overnight fast, subjects were given 50gm glucose (as glucose, potatoes, or barley) or placebo for 4 successive mornings. Cognitive measurements as well as blood glucose and serum insulin were performed at 15, 60, and 105 minutes after glucose ingestion.

Results: The subjects with worse glucose regulation had poorer cognitive scores at baseline, and responded with the greatest improvements in cognition after glucose ingestion (correlation between β cell function and improvement in delayed paragraph recall: $r > -0.50$, $P < 0.03$). There was no significant difference in the effect for the different food forms of glucose ingested.

Ref: Kaplan RJ et al. Cognitive performance is associated with glucose regulation in healthy elderly persons and can be enhanced with glucose and dietary carbohydrates. *Am J Clin Nutr* 2000;72: 825-836

Study two: Non-memory brain function

Welsh researchers investigated the effect of blood glucose levels on non-memory tasks (performance on the Porteus Maze and greater Verbal Fluency). They found that better performance was associated with having higher levels of glucose at baseline, and with consuming a glucose drink, but that poorer performance was associated with blood glucose levels that remained high well after the drink.

Ref: Donohoe RT, Benton D. Cognitive functioning is susceptible to the level of blood glucose. *Psychopharmacology (Berl)* 1999; 145:378-85

Study three: young adults

The same research team studied the effect of breakfast and glucose intake on young adult women. In the first comparison, those who had fasted overnight had poorer

memory test scores (Brown-Petersen task) compared with those who had eaten breakfast. Consuming glucose in a drink resulted in scores improving to be comparable with scores in those who had eaten breakfast. As in study two above, they found that higher baseline glucose levels were associated with better scores, whilst persistent high glucose levels were associated with worse scores.

Ref: Martin PY, Benton D. The influence of a glucose drink on a demanding working memory task. *Physiol Behav* 1999;67: 69-74

Comments

It has traditionally been thought that the brain is well equipped to maintain adequate glucose levels under most normal circumstances. For this reason, it was not expected that variations in glucose intake (other than in more extreme clinical circumstances) would affect brain function.

However, these latest results show that there is a more subtle relationship between glucose intake and brain function, and suggest that cellular glucose handling has to also be taken into account. People with poor glucose handling do not score well on tests of cognition, despite having higher blood glucose levels.

Although these are small studies, they are consistent with a growing body of evidence in this field of research. They emphasise the importance of good micromanagement of glucose levels in the diabetic patient.

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