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Nutrition and Alzheimer's disease: the detrimental role of a high carbohydrate diet

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Abstract

Alzheimer's disease is a devastating disease whose recent increase in incidence rates has broad implications for rising health care costs. Huge amounts of research money are currently being invested in seeking the underlying cause, with corresponding progress in understanding the disease progression. In this paper, we highlight how an excess of dietary carbohydrates, particularly fructose, alongside a relative deficiency in dietary fats and cholesterol, may lead to the development of Alzheimer's disease. A first step in the pathophysiology of the disease is represented by advanced glycation end-products in crucial plasma proteins concerned with fat, cholesterol, and oxygen transport. This leads to cholesterol deficiency in neurons, which significantly impairs their ability to function. Over time, a cascade response leads to impaired glutamate signaling, increased oxidative damage, mitochondrial and lysosomal dysfunction, increased risk to microbial infection, and, ultimately, apoptosis. Other neurodegenerative diseases share many properties with Alzheimer's disease, and may also be due in large part to this same underlying cause.

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