

Dietary constituents and supplements: can they affect mental energy?

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The expense of products containing dietary constituents or supplements that proclaim to enhance mental energy, are not justified by current evidence. The International Life Sciences Institute (ILSI) reviewed the literature, published in Nutrition Reviews.

The term 'mental energy', now frequently exploited, has only recently been defined as "the ability to perform mental tasks, the intensity of feelings of energy and fatigue, and the motivation to accomplish mental and physical tasks". Therefore mental energy encompasses mood (feelings of energy or tiredness), motivation (determination and enthusiasm) and cognition (sustained attention and vigilance).

ILSI commissioned the review of scientific evidence behind products carrying these claims, to explore the relationships between the intake of foods, dietary constituents, and/or dietary supplements and mental energy. The data were insufficient to conduct what is known as a systematic review, when all data are measured against predefined criteria. The scope was limited to studies of human subjects, adults 18 years and over, excluding those with dementia (a sign of brain disease). As caffeine demonstrates a clear dose-dependent effect on cognitive function, it was not included in the review.

Changes in mental energy were evaluated for 35 different foods, dietary constituents, supplements and factors (such as meal timing). The greatest amount of literature is available for four dietary constituents: Ginkgo biloba, ginseng, glucose and omega-3 polyunsaturated fatty acids (omega-3 PUFAs).

The strongest evidence suggests Ginkgo biloba may improve aspects of mood including alertness and calmness, demonstrated in healthy individuals. Yet, findings are inconsistent and poor study designs restrict definitive conclusions. Ginkgo biloba is a plant-based product derived from the maidenhair tree, mainly used in the treatment of cerebral (brain) dysfunction; this dates back to traditional medicine in China. Previous reviews ascertain Ginkgo biloba does not ameliorate dementia. Further studies suggest its potential to improve attention even after short-term exposure, and improve 'speed processing'.

There is also available evidence to suggest fish/omega-3 PUFA consumption may reduce the risk of age-related cognitive decline. Omega-3 PUFAs are essential fatty acids which are required throughout the body for healthy structure of tissue membranes, including the brain and nerves. Increased incorporation of omega-3 PUFAs into membranes enhances their activity and is therefore essential for learning, memory and other complex cognitive processes. Recommendations on consumption patterns, or timing and duration of supplementation are yet to be confirmed. Life-long habits might need to be adopted, in order to gain these benefits later in life. A note of caution: chronic use of high-dose omega-3 PUFAs (>3 g per day) increases the risk of impaired blood coagulation and immune response.

The evidence underpinning the effects of ginseng, other dietary constituents and supplements on mental energy is inconsistent.



For plant-based substances the inconsistency between studies may be attributable to variations in plant composition, as a result of growing conditions such as climate and rainfall.

The simple sugar glucose is of particular interest because of its important role in supplying energy to the brain. Glucose is required to perform cognitive tasks, but the potential benefit of supplementation beyond normal dietary intake is unclear. The available evidence focuses on memory. Inconsistencies yielded are ascribed to methodology variations in timing and dosing of intake, the age of the population studied, and the testing instruments used. Measures of mental energy components were extremely variable across the literature, a significant barrier to drawing conclusions for many dietary constituents and supplements. It is therefore recommended for testing instruments to be standardised for future research. Studies must also be adequately controlled, and include a large enough number of subjects to detect real effects, and ideally measure biomarkers (e.g. in the blood) of exposure or intake.

No study made an appropriate measure of motivation. The association between dietary constituents/supplements and motivation thus remains an important aspect to be investigated.

In conclusion, present evidence suggests the potential of Ginkgo biloba to improve mood and attention, and of fish consumption/omega-3 PUFAs to reduce age-related cognitive decline. Further studies are required to substantiate these effects. The numerous other dietary constituents and supplements (excluding caffeine) on the market that claim to improve mental energy in any respect, are not currently supported by scientific studies.

There are, of course, more familiar and scientifically proven techniques to revive mental energy – getting a good night's rest, taking a brief afternoon nap or exercise.

For further information, see

Gorby HE, Brownawell AM and Falk MC. (2010). Do specific dietary constituents and supplements affect mental energy? Review of the evidence. *Nutrition Reviews* 68(12): 697-718.