

Mental Health: Brain Functioning, Nutrition, and the Importance of Vitamin B1 (Thiamine)

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Thiamine which is also known as Vitamin B1 is molecular vitamin that is important to bodily function and overall musculoskeletal development and brain function. Vitamin B1 is known for its functioning and repair of the nervous system and immune system function. Vitamin B1 deficiency can result in decrease function of memory, concentration, and overall alterations of the brain effecting the emotions and empathy. Thiamine plays a major role in the brain functioning and mood improvement studies revealing that reaction time and overall mood improvement neurologically. When Thiamine is compromised within the body many complications can begin happening that effect daily functioning of motor skill development, concentration, and memory these are essential to performance within individual's life and effects on lifespan development-particularly longevity.

Thiamine is an essential nutrient, and all the tissues of the body, including the brain, need thiamine to function properly. The body needs thiamine to make adenosine tri phosphate (ATP), a molecule that transports energy within cells. Thiamine can impact the nervous system though have adverse effects upon the heart if not properly digested within the daily doses of an individual's diet. Thiamine deficiency can lead to two major health issues: Beriberi and Wernicke-Korsakoff syndrome. Beriberi affects breathing, eye movements, heart function, and alertness. Wernicke-Korsakoff syndrome is technically two different disorders. Beriberi affects breathing, eye movements, heart function, and alertness. Either disease has been known to show positive effects when thiamine injections or supplementation is digested. It helps with the functioning of the brain stem which controls the vision and muscular difficulties. However, thiamine can't mend the permanent memory damage cause by the disorders, furthermore creating an urgency in preventative measures to be taken for proper functioning. Thiamine is found in both plants and animals and plays a crucial role in certain metabolic reactions. Your body needs it to form adenosine triphosphate (ATP), which every cell of the body uses for energy. It's rare to be deficient in thiamine, although alcoholics, people with Crohn's disease, anorexia, and those undergoing kidney dialysis may be deficient. Symptoms of thiamine deficiency are fatigue, irritability, depression and abdominal discomfort. Individuals with thiamine deficiency also have trouble digesting carbohydrates. That allows a substance called pyruvic acid to build up in their bloodstream, causing a loss of mental alertness, difficulty breathing, and heart damage, a disease known as beriberi.

In order to understand how Vitamin B might affect mental health and behavior, it is useful to understand how food physically affects the overall function of the brain. That such nutrients as Vitamin B have implications on the physiological state so much that it correlates to the neurological responses which in turn effects individual's behavior. Thiamine has been shown to have positive effect upon alcoholism, in varies studies showing the increase in brain function during times of alcoholics withdrawing. People whom abuse alcohol usually have severe deficiency of Thiamin and suffer from weakness, irritability, poor appetite, and depression. Thiamine is found in fortified breads, cereals, pasta, whole grains (especially wheat germ), lean meats (especially pork), fish, dried beans, peas, and soybeans. Dairy products, fruits, and vegetables are not very high in thiamine, but when consumed in large amounts, they become a significant source.

Vitamin B1 (thiamin) deficiency can result in depression, mood swings, and loss of appetite -- symptoms typical of anorexia nervosa. Researchers from a study conducted in England, analyzed nutrient levels in 37 people treated for anorexia nervosa. The study compared the anorexia nervosa patients with 50 healthier patients. Thirty-eight percent of the patients with anorexia were deficient in vitamin B1, 19 percent severely so, while no one among the healthy subjects was deficient. Vitamin B1 levels were low and not related to fasting, vomiting, or drinking alcohol, which suggests that some anorexics have a larger metabolic requirement for vitamin B1.

Thiamine has been shown to regulate and change serotonin levels. Serotonin is an important neurotransmitter that the brain produces from tryptophan contained in foods such as “clams, oysters, escargots, octopus, squids, banana, pineapple, plum, nuts, milk, turkey”, spinach, and eggs. Functions of serotonin include the regulation of sleep, appetite, and impulse control. Increased serotonin levels are related to mood elevation. Wurtman and Wurtman (1989) developed a theory suggesting that some diet rich in carbohydrates can relieve depression and elevate mood in disorders such as carbohydrate craving obesity, pre-menstrual syndrome, and seasonal affective disorder (SAD). According to one study by Benton and Donohoe (1999), insufficient amounts of thiamine or Vitamin B1 caused “introversion, inactivity, fatigue, decreased self-confidence and generally poorer mood” in participants. Improved thiamine status increased well-being, sociability, and overall energy levels. Thiamine is contained in foods such as cereal grains, pork, yeast, potatoes, cauliflower, oranges, and eggs and can influence mood states.

You need it to form adenosine triphosphate (ATP), which every cell of the body uses for metabolic energy. One of the signs of B1 deficiency is fatigue, but the overall symptoms covers many other deficiencies as well. The first comprehensive study conducted on the direct correlation of thiamine and human body tissues and distribution of thiamine derivatives in human brain, it was a postmortem study.

The most powerful finding within research over the last several decades is the ability for the brain to regenerate or create neurons, a process called neurogenesis. Also, important is the discovery, or at least confirmation, of the brain's neuroplasticity, which is to rewire the brain. This is also phrased within the medical profession as “brain-mapping”. This further concludes that nutritional intake such as thiamine as preventative and intervention measures can have positive effect upon traumas, infection, calcification, excess alcohol and stress (cortisol), and just wear and tear on the brain's capacity. The three primary functions of the brain as it ages are:

1. Enhanced blood flow to the brain
2. Enhanced neurotransmitter support; and
3. Enhanced support for waning anti-oxidant and inflammatory defenses.

Some nutrients trick the brain by triggering an over-release of neurotransmitters and some foods damage the brain by releasing toxins or oxidants that harm healthy brain cells. There are many more nutrients that serve the brain without deception or damage, which can improve mood and mental well-being. Vitamin B1 cannot be produced by the body that is why it is important for populations to know the importance of digestion for neurological capacity.

A study conducted by the Mental Health Foundation found that placebo study supplemented participants' diets with nine separate vitamins, both men and women in the group found to have better performance on a range of cognitive tests amongst the females taking the supplements. The study also concluded higher levels of cognitive functioning for those who digested Thiamine, revealing that those who had low mood, irritability, and fatigue also suffered from hostile behavior and anger. Out of the nine essential vitamins listed, vitamin B1 was shown to have poor concentration and attention, recommendations of whole grains and vegetables in the diet were suggested to combat these behavioral issues.

Several studies conducted were asking the questions if liver and kidney damage are linked to low levels of Thiamine digestion within the human dietary consumption. A history of a low thiamine intake is usually obtained but this may not be the only factor involved in

the reduction of storage of the vitamin. To understand the mechanisms through which thiamine deficiency begins, whether induced by alcoholism or other causes, leads to brain damage, one must first understand the normal role of thiamine in the cell. Investigations of this issue have focused on three enzymes that require thiamine as a cofactor. These enzymes are called transketolase, pyruvate dehydrogenase (PDH) and alpha-ketoglutarate dehydrogenase (α -KGDH); they all participate in the catabolism of sugar molecules (i. e., carbohydrates) in the body, as described in the following paragraphs. Each of these enzymes consists of several components that must be assembled to yield the functional enzyme, and the addition of thiamine is a critical step in this assembly process. As a result, thiamine deficiency causes sub-optimal levels of functional enzymes in the cell, in addition to interfering with the activity of those enzymes. Thiamine deficiency, which is found in a large number of alcoholics, is an important contributor to alcohol-related brain damage of all kinds, not only WKS, as was commonly thought in the past. Thiamine is an essential cofactor for several enzymes involved in brain cell metabolism that are required for the production of precursors for several important cell components as well as for the generation of the energy-supplying molecule ATP. Thiamine deficiency leads to significant reductions in the activities of these enzymes, and to deleterious effects on the viability of brain cells.

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