

Vitamins and minerals assignment



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Vitamins and Minerals Vitamins and minerals are essential nutrients that every cell needs. Vitamins can function like hormones or as antioxidants. Minerals are essential to important bodily functions such as producing energy, growing, and healing. Minerals are required for fluid balance, development, nervous system maintenance . Minerals and vitamins, function as coenzymes and participate in enzymatic reactions in the body. Vitamin and mineral deficiencies can affect the brain many different ways. The brain begins to develop in utero, and malnutrition of the pregnant mother can affect the developing fetus.

Vitamin and mineral deficiencies are caused by poor diet, poor absorption, starvation, infection, and/or damage to the digestive tract. Babies born to mothers who had poor diets may have mental retardation among other problems. The brain develops rapidly for approximately 2 years after birth, and adequate nutrition is vital during this time. The effects of poor nutrition can cause a myriad of problems both immediate and later in life, however not all the problems are permanent; some may be remedied with a change in diet. Poor nutrition can combine with environmental factors and cause problems that may be difficult to detect for scientists.

Because the study of how specific nutrients affect behavior and brain development are relatively new, the affect that specific nutrients have on intelligence and mood are skeptical at best. Ethical restrictions stop scientists from restricting specific nutrients to study the effect on the brain and behavior. Most information comes from studies done over periods of time when there was famine or starvation, and many nutrients were missing. Everyone's body needs a different amount of each nutrient and may respond

differently in the presence or absence of the nutrient. Vitamins fall into two categories, water soluble and fat soluble.

Water soluble vitamins are not stored by the body, while fat soluble vitamins are. Even though they are not stored in the body, it is not safe to ingest an abundance of water soluble vitamins. Too much of certain vitamins may cause irreversible damage. For example, too much B6 can lead to nerve damage, too much niacin may cause flushing, too much vitamin C may cause kidney stones, and too much folic acid can hide a B12 deficiency.

Vitamins A, D, E, and K are the fat-soluble vitamins. Because these vitamins are stored by the body, over time they can accumulate to dangerous levels.

Vitamin A in excess can cause birth defects, too much vitamin K can prevent normal blood clotting, and too much vitamin E may increase the risk for hemorrhaging. Vitamin D is also a hormone and can be tolerated in higher levels in the body. Some diseases have been directly linked to the absence of a specific vitamin. Such as rickets (vitamin D), beriberi (thiamin), pellagra (niacin), iron deficiency anemia (iron), and vitamin K deficiency. Minerals are needed in varying amounts in the body are divided into macrominerals and microminerals based on the amount needed.

Macrominerals include calcium, magnesium, sodium, potassium and phosphorus, and have a recommended daily allowance. Microminerals include boron, chromium, copper, iodine, iron, selenium, sulfur, fluoride and zinc. Like vitamins, minerals can cause illnesses when deficient or abundant. Too much of a good thing: Water soluble Vitamins Consuming an abundance of vitamins and mineral can have negative effects. There is something called

the Tolerable Upper Intake Level for certain nutrients. This is a level that is the highest amount of the nutrient that can be consumed without small chance of causing negative health effects.

These UL limits take into account nutrients that come from the diet through natural and fortified foods, as well as supplements. Exceeding the UL limits can cause nutrients to interfere with normal body functions. Vitamin B6 is needed in the body for more than 100 enzymatic reactions, and for brain development during pregnancy and infancy and it also plays a role in immunity. B6 is found naturally in many foods including poultry, potatoes and fruits other than citrus. B6 is also found in supplements in the form of pyridoxine. Most Americans will get enough B6 through diet, but some groups of people may have trouble.

People whose kidneys do not function properly, or who have an autoimmune disease, or who are alcoholics may need to take additional measures to ensure they receive enough vitamin B6. Too much vitamin B6 supplements can cause nerve damage and loss of bodily control, symptoms will stop when levels are back to normal (the supplement is no longer being taken). B6 deficiency is rare in Americans. Symptoms of a B6 deficiency include rash, scaly skin on lips, depression, and a weak immune system. Niacin (nicotinic acid) is one of the 8 B vitamins, and is used by the body to turn carbohydrates into energy and help keep the nervous system healthy.

Good sources of niacin include red meat, fish, poultry, fortified breads and cereals, and enriched pasta and peanuts. Too much niacin may cause flushing of the skin. Niacin deficiency occurs when a person does not get

enough or cannot absorb niacin or tryptophan. Tryptophan is one of the amino acids that make up proteins. The liver can convert tryptophan from high-protein into niacin. Severe deficiency, called pellagra, has several symptoms including, swollen mouth with bright red tongue, rash on areas of skin exposed to sunlight, depression and memory loss. If not treated, pellagra can lead to death.

Niacin deficiency is more likely to be caused by problems that affect absorption of niacin or tryptophan, with the most common cause being alcoholism. Other possible causes include disorders of the digestive system and prolonged treatment with the drug isoniazid, used to treat tuberculosis. Vitamin C (ascorbic acid) is a nutrient that acts as an antioxidant, protecting cells from the damage caused by radicals. Vitamin C is used by the body to make collagen, a protein which is used to help wounds heal. Vitamin C helps the immune system work properly to protect the body from diseases such as cancer.

Good vitamin C levels can improve iron absorption and help regenerate vitamin E supplies. Food sources of vitamin C include citrus fruits, broccoli and bell peppers. Most American's diets provide enough vitamin C; some groups of people who might struggle to consume enough vitamin c are people who smoke, or people who have cancer or kidney disease. Too much vitamin C can cause kidney stones by acidifying the urine. In people with hemochromatosis, high doses of vitamin C could worsen iron overload and damage body tissues. Vitamin C deficiency is rare in the United States.

People who get little or no vitamin C for many weeks, like pirates, can get scurvy. Scurvy is fatal if it is not treated. Too much of a good thing: Fat soluble Vitamins Vitamin A is involved with vision development and function, cell growth and differentiation, and immunity. Vitamin A is found in foods such as dairy products, fish, and meat. The body stores excess vitamin A in the liver and levels can accumulate over time. When vitamin A levels reach toxicity, it is known as hypervitaminosis A. Toxicity can be reached by eating too much food with vitamin A, but most cases are result of over consumption of supplements.

When people consume too much vitamin A liver damage can occur. Tissue levels take a long time to fall even after consumption is discontinued, and the resulting liver damage is not always reversible. Retinoids, which are chemically similar to vitamin A, are used as topical therapies and can cause birth defects, such as malformations of the eye, skull, lungs, and heart. Women who might be pregnant should avoid high doses of vitamin A supplements. Beta-carotene, a pro-vitamin which can be converted to active vitamin A, is not known to be teratogenic.

A diet which is high in foods containing beta-carotene is not considered to become toxic. The most significant effect of long-term, excess beta-carotene is carotenodermia, a condition in which the skin becomes yellow-orange. This condition can be reversed by discontinuing beta-carotene ingestion. Vitamin E is important in immune function and cell communication. Food sources of vitamin E include vegetable oils, avocados, spinach, broccoli, sunflower seeds, wheat germ, nuts, and whole grains. Current research suggests that Vitamin E cannot be over consumed, even in the form of supplements. Toxic

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levels of vitamin E in the body simply do not occur.... Unlike some other fat-soluble vitamins such as vitamins A and D, it's not possible for toxic levels of vitamin E to accumulate in the liver or other tissues. " (" Taking too much Vitamin E") Vitamin E can increase bleeding slightly because it has an interaction with vitamin K. Vitamin K helps the body make proteins used in bones, tissues and blood clotting. Vitamin K is found in foods such as dark berries and green vegetables; it is also produced in the gut by bacteria. Vitamin K deficiency is most common in infants.

Because they are born with such low levels, infants are usually given a vitamin K shot. Recent evidence suggests vitamin K is an important counterpart to vitamin D, and if there is a deficiency in one, neither works the way it should in your body. Some groups of people are at a higher risk for vitamin K deficiency, they are people who eat a restricted diet, sufferers of Chron's or celiac disease, anyone with a liver disease which interferes with vitamin k storage, or persons taking broad spectrum antibiotics. Vitamin D is a vitamin that is responsible for the absorption of calcium and phosphate.

The body can synthesize vitamin D in the skin, when sun exposure is adequate. By combination of the sunlight induced synthesis and from diet, vitamin D levels are generally safe. Some research suggests that because the body can produce the vitamin, it is regulated by a negative feedback loop. Since the body can make this compound, it rarely builds up to toxic levels. Vitamin D deficiency leads to rickets in children. Children with rickets have soft bones that are weak and bow under the weight of the body, a tell-tale sign of the disease. There is no UL limit for vitamin D, but certain people can be more sensitive to vitamin D.

People who have hyperparathyroidism can develop hypercalcemia when there is a higher level of vitamin D in their body. Pregnant women with hypercalcemia can have babies born with facial deformities and/or mental retardation. Too much of a good thing: Minerals Minerals in the diet are essential for a variety of bodily functions. They are important for building strong bones, nerve function, and for metabolic processes used to make energy. Macrominerals are needed in larger quantities in the body than microminerals. With both, balance is extremely important. Calcium is essential for strong bones and teeth.

Calcium and phosphorus are dependent minerals that should be balanced with each other. Both nutrients occur in a variety of foods such as milk, eggs, and green, leafy vegetables. Calcium absorption depends on vitamin D. Low levels of calcium due to poor diet rarely occur. Calcium deficiency is more often due to vitamin D deficiency. Even if enough calcium is consumed, if Vitamin D levels are low, it cannot be absorbed. Imbalances of calcium with phosphorus and magnesium can produce muscle cramping and digestive problems. Calcium deficiency can also contribute to cognitive problems convulsions, depression, and hyperactivity.

Extremely low levels of calcium can lead to osteoporosis. Magnesium aids in the utilization of calcium and potassium, and functions in enzyme reactions to produce energy. By acting with vitamin B6, magnesium can help prevent or dissolve calcium oxalate kidney stones. Dietary magnesium deficiency is uncommon, but may occur in chronic alcoholics or as a result of prolonged diarrhea. (Culvert et al. paraphrase) Sodium deficiency, hyponatremia, is a

serious deficiency, arising most often after a period of dehydration or during prolonged diarrhea or vomiting.

Sodium and potassium are electrolytes that must be balanced in the body. Since most people get more than enough salt in the diet, potassium may be needed to balance it. Together, these minerals control fluid balance through a mechanism called “ the sodium/potassium pump. ” Prolonged imbalances in sodium and potassium can contribute to heart disease. (Culvert Et al. Paraphrase) Potassium is important for a healthy nervous system and a steady heart rate. Potassium and sodium are critical in maintaining fluid balance. Potassium is an electrolyte and must be balanced with sodium.

Potassium deficiency is usually associated with sodium deficiency and both are associated with dehydration stemming from excessive losses of body fluid. Phosphorus helps form bones and teeth, and regulates kidney function. Phosphorus supports the use of vitamins. Deficiency is rare because phosphate is found in many foods and is easily absorbed. Phosphorus is closely related to calcium and the two minerals should be in balance with each other and with magnesium. Deficiency in one will affect all cause negative effects in the body. Calcium and phosphorus are stored in the bones as crystals of calcium phosphate.

Phosphorus deficiency can produce anxiety.. Calcium and phosphorus usually balance each other out. If phosphorus levels are high, the body will lower calcium stores. Ideally phosphorus levels should be twice as high as calcium. High protein diets such as the Atkins Diet can cause phosphorus levels to build up over time because phosphorus is found in protein rich

foods.. Phosphorus deficiency can produce anxiety. Another mineral required to metabolize minerals is boron. Boron is responsible for metabolizing minerals such as calcium, phosphorus, and magnesium. Deficiencies usually occur in older people. Vitamin D deficiency is associated with boron deficiency. Copper contributes to healing and energy production and is also an antioxidant. Copper deficiency is rare except in osteoporosis. Wilson disease and Menkes' disease are genetic diseases associated with changes in copper metabolism. Iodine is important in helping with healthy physical and mental development in children. Iodine is needed to make thyroid hormone and is required for thyroid gland function and metabolizing fats. In parts of the world that have iodine-deficient soils, iron deficiency is common.

Deficiency in adults can result in an enlarged thyroid gland (goiter) in the neck. Iodine deficiency is problematic around the world, but rarely in American due to fortified salt. A deficiency during pregnancy can cause serious birth defects such as cretinism and/or mental retardation. Critical in the production of hemoglobin, iron is essential to the body. Iron is also needed for many important enzyme reactions, and a healthy immune system. In the blood, iron is found in larger amounts than any other mineral. Iron deficiency is known as anemia. Iron deficiency occurs usually because of poor iron intake and/or poor absorption.

Deficiency may also be caused by excess phosphorus, or in women because of blood loss due to menstruation. Selenium is an important antioxidant that works along with vitamin E to protect the immune system. Selenium deficiency occurs in regions of the world where soils are selenium-poor and low-selenium foods are produced including regions of China, New Zealand

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and Finland. Premature infants are naturally low in selenium with no known serious effects. Premature babies usually have about one-third the amount of selenium as full term babies. Keshan disease results from a selenium deficiency in combination with a virus.

This disease causes deterioration of the heart. Fluoride deficiency may cause increased dental caries and possibly osteoporosis due to a lack of fluoride in the diet. Although most fluoride is obtained through drinking water, the levels vary depending on source of water. Fluorine is not considered to be an essential nutrient, but the importance of fluorides for preventing tooth decay is well-recognized. It was previously thought that fluoride poisoning could only result by ingestion; however it is now known that topical application can contribute to poisoning.

Fluorine's importance is widely disputed, but it is considered essential to teeth by the American Dental Academy. Zinc is a mineral which is required for protein synthesis, immune system function, and wound healing. Zinc is a component of insulin and many major enzymes and helps absorb vitamins A and E. Deficiency is usually caused by diarrhea, kidney disease, alcoholism or diabetes. Overconsumption of fiber can also cause zinc levels to lessen. Food has always been looked at as an energy source, but there is more to it than that.

Food can provide many vitamins and minerals that are essential to cognitive development, immunity and various bodily functions. The abundance or deficiency of key vitamins and minerals can have severely detrimental effects on a person. The quote “ Food is the safest medicine or the slowest

poison” really means a lot to me, and there is so much information available on the effects that certain foods can have on the body. Vitamins such as A, E and C, along with the mineral selenium can really help to boost the immune system, and even if it is a placebo effect, people who eat a diet high in these vitamins report less illness.

The human body is constantly battling bacterial and viral intruders so why not help it out a little and eat better. This topic was interesting to me because I was able to see many ways that a balanced diet is essential in maintaining or achieving physical and mental health. I was shocked to see that with a lot of the minerals, if they were obtained from food they were unlikely to become toxic, but that if they came from a supplement they could easily build up toxic levels.

Maybe the supplements do not take into account the amount of certain vitamins and minerals that are derived from the diet, and can accumulate that way. I will continue to do research on how the certain vitamins can directly affect a person’s immunity before, during and after an illness or disease. Resources Barasi, Mary E. “ Why Do we Need to Eat Minerals? ” Why Do I Need Minerals in My Diet, Dietary Minerals. USDA, 2012. web. 04 Dec. 2013. Culvert, L. Lee, -rom Brody, PhD, and Gale Thompson. “ Mineral Deficiency. ” Medical Information & Trusted Health Advice: Healthline.

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