



29 June 2007

ESSENTIAL ELEMENTS AND MOOD DISORDERS

by Lyndal Brodie BA Dip Nut

Minerals and trace elements play an important role in the biochemistry of the brain and nervous system. Both deficiencies of essential elements and accumulation of toxic elements can alter brain function, inducing mood changes such as anxiety, depression and irritability. For this reason it is useful to test for the impact of element aberrations when these symptoms occur.

It is conservatively estimated up to one third of the western world's population experience some form of mood disorder at least once in their lives. Mood disorders include, but are not limited to, depression, bipolar affective disorder (manic depression), seasonal affective disorder (SAD), and anxiety disorders. Depression is the most common mood disorder in developed nations.

Chemical imbalance is one of the major causes of depression. Neurotransmitters (substances manufactured in the brain) affect brain function, thus playing a role in the pathology of all types of mood disorders. At a neurochemical and physiological level, they are extremely important, carrying impulses between nerve cells.

Precursors to the neurotransmitters in the brain, ie, their enzymes and coenzymes, are derived from nutrients - vitamins, minerals and amino acids obtained from the diet. Neurotransmitter imbalance results when there are deficits of nutrients required for their synthesis. Importantly, essential minerals serve as cofactors for neurotransmitters and also as cofactors for the active forms of vitamins required for neurotransmitter synthesis.

Due to the interrelationships between minerals and trace elements, different minerals aid in the excretion and absorption of other elements, contributing to deficiency and toxicity states. This includes essential nutrient elements as well as toxic heavy metals. A typical example can be seen in zinc deficiency predisposing people to excessive copper levels, with the converse also occurring; excess copper causes metabolic zinc deficiencies.

Standard treatment for depression is usually antidepressant medication and, commonly, in combination with psychological therapies. Though beneficial to some patients, anti-depressant drugs do not adequately address all the biochemical causes of depression. This may result in long term drug reliance, potentially creating further health problems.

Having a mineral analysis test is important to rule out heavy metal toxicity or essential element deficiencies as the cause of depression or other mood alterations. Diet, supplementation, medication and lifestyle factors create changes in the body's levels of minerals and trace elements. By implementing appropriate measures with regular monitoring, it's possible to modify the amounts of minerals in the body and maintain a proper mineral balance.

Following is a guide of various minerals and trace elements and their association with mood disorders.

Magnesium

Magnesium aids in transmission of nerve impulses and the synthesis, storage and release of several neurotransmitters. Magnesium deficiency may cause or be associated with agitation, anxiety, behavioural disturbances, confusion, depression, insomnia, irritability, premenstrual tension, lethargy, decreased attention span, personality changes, and hyper irritability and excitability. Participating as a cofactor in over 300 enzyme reactions in the body, magnesium

has a multitude of different uses. Significantly for mental health, it is an essential cofactor of the enzyme delta-6-desaturase which converts vegetable derived omega-3 fatty acids to the omega-3 fatty acid DHA (docosahexaenoic acid), a critical component of the brain and nervous system. If magnesium levels are low, DHA deficiency very likely exists. DHA deficiency states are positively linked with depression. Individuals with major depression have manifest depletion of omega-3 fatty acids in their red blood cell membranes.

Iodine

Iodine is required for the synthesis of thyroid hormones which regulate metabolism, growth and development. Iodine deficiency causes hypothyroidism from under production of thyroid hormones. Psychological symptoms of hypothyroidism include mood changes, depression with weakness and fatigue, difficulty concentrating and forgetfulness. Thyroid disorders can disturb all body cells and functions, and subtle thyroid problems often go unnoticed. Iodine excess may also inhibit thyroid hormone synthesis.

Selenium

Selenium is another key nutrient required for functioning of thyroid hormones. A selenium dependent enzyme is involved in converting the hormone thyroxine (T4) to the active thyroid hormone (3,3',5'-triiodothyronine T3). Deficiency can also manifest in symptoms of hypothyroidism outlined above. Selenium has been shown to decrease anxiety and elevate mood. This was most noticeable in people who showed a lower dietary intake of selenium.

Chromium

A major component of glucose tolerance factor (GTF), chromium enhances the action of insulin and is essential for regulating carbohydrate metabolism and blood sugar levels. Chromium deficiency may cause hypoglycaemia or hyperglycaemia. Hypoglycaemia can result in anxiety, confusion, inability to concentrate, depression, light-headedness, nervous habits, mental disturbances, insomnia, anger and aggressive behaviour, moodiness, cognitive problems and lethargy.

In people with a common blood-sugar-regulation disorder known as reactive hypoglycaemia, chromium supplementation prevents excessive decline in blood-sugar levels and decreases the associated symptoms of hypoglycaemia. In addition, chromium influences the sensitivity of certain receptors on brain cells that help control a person's mood. Studies have shown chromium supplementation may be of benefit for sufferers of dysthymia.

Zinc

Zinc is commonly found to be deficient in people with depression. A component of over 300 enzymes, zinc is an important cofactor in many biochemical reactions essential for normal neurological function and a cofactor for several neurotransmitters. Mental confusion and mental illness is strongly associated with zinc deficiency. Inadequate zinc may cause or be associated with moodiness, poor concentration, poor memory, mental fatigue, irritability, anger, lethargy and sleep changes. With magnesium, zinc is an essential cofactor of the enzyme delta-6-desaturase for conversion of omega-3 fatty acids to DHA (see above).

Copper

Copper is required for healthy nerves, in particular for formation and maintenance of the myelin sheath which electrically insulates neurons and increases the speed of nerve impulse conduction. Signs of copper deficiency include decreased noradrenaline and dopamine secretion in the brain, which leads to neurological disorders. Depression is a symptom of both copper deficiency and toxicity. Copper toxicity is also associated with anxiety, aggression, agitation, irritability, nervousness, mood swings and post partum psychological problems.

Calcium

Individuals with depression are more likely than others to have disturbances in calcium metabolism. Both deficiency and toxicity of calcium are associated with depression. Essential for maintenance of the nervous system, calcium is essential for proper nerve impulse transmission

and neurotransmitter release. It has a calming effect, alleviates tension and irritability and promotes relaxation. Symptoms associated with calcium deficiency include agitation, delusions, hyperactivity, insomnia, and irritability.

Heavy metals

Heavy metal toxicity is a causative factor in behavioural and mood changes and disorders of the neurological system such as depression. Heavy metals including mercury, cadmium, lead and tin affect chemical synaptic transmission and neurotransmitter function in the brain. They also block the absorption, metabolism, storage and actions of essential nutrients in the body, resulting in nutrient deficiencies. For example, cadmium blocks magnesium, zinc and selenium while arsenic blocks iodine and selenium. Deficiencies of essential minerals results in further accumulation of toxic metals. Being replete in essential nutrients aids in blocking toxic metals.

For references and enquiries on element analysis by Diakyne

Please contact Lyndal Brodie, Nutritionist, at lbrodie@diakyne.com

For other recent articles

Go To: http://www.diakyne.com/health_application.html

Article: *"Pharmaceutical Induced Depletion Of Minerals And Trace Elements"*

Article: *"Inherent Risks In Self Prescription"*

www.diakyne.com

Disclaimer: This article is for information and educational purposes only and is not meant for use as a diagnostic tool.