

## **The role of Amino Acids in the Prevention or Healing of Anxiety.**

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The frequency of anxiety disorders in the population is considerable but remains often under recognized and under treated despite increased morbidity and severe functional impairment.

Conservative estimates of the lifetime prevalence of one form of anxiety: SAD or Social Anxiety Disorder is between 7 to 13 % (the third highest of all psychiatric disorders).

SAD has a considerable impact on society including personal and professional development of the sufferers. Anxiety occurs often in combination with depression (a more frequent psychiatric disorder).

Amino acids belong to the nutrients present in our food, which may influence anxiety.

Other nutrients such as certain minerals/vitamins and fatty acids may influence anxiety too. Furthermore many other physiological active substances such as alcohol/nicotine/caffeine/herbs and hormones may influence anxiety too. Toxic substances such as organophosphates (most commonly used and most toxic pesticides) also influence anxiety.

Amino acids influence anxiety either directly or through metabolites such as the neurotransmitters. Most anxiety reducing pharmaceuticals on the market are considered to function on the same receptors as for the amino acids or their products. Some of these pharmaceuticals are artificial and unnatural amino acids: For example D-cycloserine.

The amino acids directly influencing anxiety are: GABA/Glutamate/taurine and acetylcholine.

The amino acids Phenylalanine /Tyrosine and Tryptophane act indirectly on anxiety because they are the precursors of the neurotransmitters dopamine/nor-epinephrine/epinephrine and serotonin. Tyrosine is also converted to T4 and T3, which are not only hormones but also amino acids. T3 and T4 also influence anxiety. Serotonin, which is made from Tryptophane, is also the precursor of melatonin. Melatonin also influences anxiety. Especially under stress Tryptophane may be also converted to substances such as kynurenine and quinolinic acid, which possess anxiogenic activity.

Other amino acids seem also to influence anxiety but there mechanism is unknown. It is possible these amino acids are rate limiting in the production of peptides/proteins such as neuropeptide Y (anxiolytic)/Galanin and cholecystokinin/corticotropin-releasing hormone/substance P (anxiogenic).

These are for example: lysine and arginine. Also there exist  $\gamma$ -glutamyltaurine in the parathyroid and brain.

Tea contains a special amino acid: L-theanine, which has a certain anxiolytic activity.

The effects of amino acids on anxiety were studied mostly by suppletion or depletion studies. Mostly the amino acids reducing anxiety are the inhibitory neurotransmitters and the ones promoting anxiety are the excitatory neurotransmitters.

In the anti aging laboratory it is possible to analyze the body status of all these amino acids in the plasma/serum and in the 24-hour urine.

The 24-hour urine levels determine the mean of the body status during the 24-hour period. It also measures the function of several vitamins and minerals such as vitamin B6 and Magnesium, which diminish anxiety.

The neurotransmitters such as dopamine/(nor)-epinephrine and serotonin are measured the best in the platelets. Substances such as acetylcholine and GABA are measured in plasma or serum. Based on the analysis it is possible to determine the specific abnormalities in a person with anxiety. Customized diet changes and supplementation with missing or sub-optimal levels of nutrients will physiological help to reduce anxiety and

promote more optimal health and reduce the need for unnatural pharmaceutical products with considerable side effects.