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Iron deficiency, sleep disturbances, essential fatty acids and ADHD

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The hallmarks of ID include decreased mental performance and reversal of several circadian cycles, such as thermoregulation and motor activity. ID reduces the rate of dopamine production, and reduces affinity to dopamine D2 receptors. Not least, the disruption in normal functioning of sleep is a prominent consequence.

While the neurochemical basis of sleep mechanisms is controversial the phenomenon itself is known to be mediated by more than a single molecule.

Sleep disturbances accompany a number of brain related disorders such as ADHD and anxiety. Sleep disturbance is a commonly noted in iron deficient rats and humans, and is a significant contributor to cognitive deficits, although treatment with a specific mixture of fatty acids improved both the cognitive level and hematological values.

For example, REM deprivation results in increased corticosterone and anxiety levels. In addition, the immune system is also affected, and an increase in proinflammatory and anxiogenic interleukins (e.g., IL-1, IL-6, IL-17) have been found. Pretreatment with the mixture of fatty acids protects rats from the anxiogenic and the immunological effects of REM deprivation.

The relationship between essential fatty acids (EFA) deficiency and ADHD has been demonstrated before. EFA supplementation in deficient ADHD children treated with a mixture of essential fatty acids (ratio 1:4) for 6 weeks showed improvement in subjective and objective measurements of ADHD. Among non deficient children, no difference in treatment effects between the EFA treatment and placebo control groups were noted.

In a study with ADHD children suffering from severe sleep disturbances, most of these children were also iron deficient. The EFA treated group showed improvement in subjective and objective measurements (including hemoglobin level), except for the placebo group.

Biography

Shlomo Yehuda received his Ph.D. degree in Psychology and Brain Sciences from M.I.T. He is a Professor at the Department of Psychology and he is the Director of the Psycho pharmacology Laboratory at Bar Ilan University. He was the President of Shaari Mishpat College. He has published over 180 scientific papers and 7 books in the following fields: Brain Biochemistry, Effects of nutrients on Brain and behavior (mainly brain iron and essential fatty acids), ADHD children and aging of the brain, and was consultant to several pharmaceutical and nutritional companies.