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Intrauterine Growth Restriction (IUGR): a serotonergic neuropathologic picture in experimental animals and human infants

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In our lab, we evaluated if the free plasma fraction of L-Tryptophan (FFT) and the N1/P2 component of the auditory evoked potentials (AEP) were associated with impaired brain serotonin neurotransmission in infant rats and humans with IUGR. FFT, bound and total plasma L-Trp were measured and the AEP's, in a prospective, longitudinal and comparative study, comparing IUGR and control infants. Results showed that the FFT was increased and the amplitude of the N1/P2 component of AEP was significantly decreased in IUGR relative to control infants. FFT and the N1/P2 component had a negative association. We concluded that in newborns with IUGR, the changes in measured FFT and in the amplitude of N1/P2 component of AEP, suggest an inverse association between FFT and the N1/P2 component of AEP and that these changes observed may be causally related with brain serotonergic activity. In IUGR epigenetic factors such as nutritional stress induced disturbances in brain serotonin metabolism and in serotonergic activity, identifiable postnatally through alterations in AEP cortical responses, may have influenced brain cerebral sensory cortex development. These data allowed us to propose the presence of an impaired serotonergic transmission, installed very early in brain development and that might be also casually associated with brain serotonin-related disorders in adulthood.

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The science behind citicoline to protect against neurodegenerative processes and maintaining normal cognitive function

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Statement of the Problem: The human brain is under constant attack by various factors, including environmental pollution, internal toxicity, stress and lack of nutrients due to poor diet. As we age, communication between neurons decreases and affects memory, focus, attention, recall and mental energy. Critical to brain function is citicoline, or CDP choline. The compound is comprised of cytidine and choline, with the former crucial for proper absorption of choline. In the brain, citicoline promotes the production of phosphatidylcholine (phospholipids), which make up ~30% of brain tissue, aid in neural communication and provide essential protection for neurons. The body obtains choline naturally through foods such as eggs and meat. But as we age, the body loses some of its ability to absorb choline.

Methodology & Orientation: Numerous scientific studies have shown that daily supplementation of citicoline may improve brain function for subjects including healthy adolescent males, healthy middle-aged women and the elderly.

Findings: Clinical trials have shown that a branded form of citicoline—Cognizin®—may be effective in combating the effects of certain neurodegenerative processes. Studies also show Cognizin® may aid in maintaining normal cognitive function with aging and point to its ability to act as an antioxidant in preserving normal healthy visual function. This form of citicoline has been shown to protect neural tissue from the ravages of free radical damage and is the only form approved for use within Europe as a dietary supplement ingredient.

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