

Abstract

Prostaglandins Leukot Essent Fatty Acids. 2006 Oct-Nov;75(4-5):329-49.

Role of omega-3 fatty acids in brain development and function: potential implications for the pathogenesis and prevention of psychopathology.

McNamara RK, Carlson SE.

Department of Psychiatry, University of Cincinnati College of Medicine, Cincinnati, OH 45267-0559, USA.

BACKGROUND: The principle omega-3 fatty acid in brain, docosahexaenoic acid (DHA), accumulates in the brain during perinatal cortical expansion and maturation. Animal studies have demonstrated that reductions in perinatal brain DHA accrual are associated with deficits in neuronal arborization, multiple indices of synaptic pathology including deficits in serotonin and mesocorticolimbic dopamine neurotransmission, neurocognitive deficits, and elevated behavioral indices of anxiety, aggression, and depression.

DISCUSSION: In primates and humans, preterm delivery is associated with deficits in fetal cortical DHA accrual, and children/adolescents born preterm exhibit deficits in cortical gray matter maturation, neurocognitive deficits particularly in the realm of attention, and increased risk for attention-deficit/hyperactivity disorder (ADHD) and schizophrenia. Individuals diagnosed with ADHD or schizophrenia exhibit deficits in cortical gray matter maturation, and medications found to be efficacious in the treatment of these disorders increase cortical and striatal dopamine neurotransmission.

CONCLUSIONS: These associations in conjunction with intervention trials showing enhanced cortical visual acuity and cognitive outcomes in preterm and term infants fed DHA, suggest that perinatal deficits in brain DHA accrual may represent a preventable neurodevelopmental risk factor for the subsequent emergence of psychopathology.

PMID: 16949263