

Dyslexia, behavior problems: a fatty acid link?

A remarkable number of prison inmates—some studies say more than half—suffer from dyslexia. In addition to causing reading difficulties, left-right confusion, mirror reversals of letters and words, and sequencing and memory problems, dyslexia is often linked to movement impairments and to behavioral problems resembling attention deficit hyperactivity disorder (ADHD). Research by B. Jacqueline Stordy suggests that the cognitive, behavioral, and motor problems of dyslexics may stem in part from deficiencies of long-chain polyunsaturated fatty acids (LCPUFAs), substances critical for brain and eye functioning.

Deficiencies of LCPUFAs, or defects in the body's use of them, are already linked to several mental disorders including depression and schizophrenia (see related article, [Crime Times, 1999, Vol. 5, No. 1, Page 1](#)). Stordy says two studies by her group implicate deficiencies of two types of LCPUFAs, omega-3 and omega-6 fatty acids, in dyslexia as well.

In one study, the researchers measured the function of eye cells called rod cells, which are rich in docosahexaenoic acid (DHA), an omega-3 fatty acid. Comparing rod function in 10 young dyslexics and 10 control subjects, the researchers found that the dyslexics showed impaired adaptation to low light, a sign of poor rod functioning. In a separate study, Stordy et al. supplemented 5 of the dyslexics and 5 control subjects with high-DHA fish oil for one month. The control group showed no change in adapting to low light, while the dyslexics improved significantly.

The researchers also investigated the effects of fatty acid supplementation on the coordination skills of dyslexics. All of the 15 dyslexic children enrolled in the study had significant impairments in motor skills such as manual dexterity, ball-play skills, and balance. After four months of supplementation, these skills improved significantly.

The researchers note that other research links fatty acid deficiencies to behavioral problems in both primates and young human males, and say their data indicate that "there may be some value in providing LCPUFA supplements to older children with specific learning disorders."

Fatty acids' role in hyperactivity studied

Several years ago (see related article, [Crime Times, 1999, Vol. 5, No. 1, Page 1](#)), Laura Stevens and colleagues reported that boys with attention deficit hyperactivity disorder (ADHD) had significantly lower concentrations of key fatty acids in their blood than did other children. Like dyslexia, ADHD is a risk factor for delinquency and later social and career failure—a finding that appears to be true even for ADHD children with no co-existing symptoms of conduct disorder (see related article, [Crime Times, 1997, Vol. 3, No. 3, Page 1](#)).

In a recent article, Stevens and colleagues suggest that a subgroup of hyperactive children—those who show physical signs of LCPUFA deficiency, such as dry hair, frequent urination, and excessive thirst—may have metabolic defects that make it difficult for their bodies to use fatty acids efficiently. Their research shows that children with both ADHD and these physical symptoms have lower plasma proportions of certain fatty acids and a higher ratio of fatty acid precursors to metabolites than control subjects or other ADHD children, suggesting that their bodies are not efficiently processing the precursor substances.

More evidence of a relationship between LCPUFA deficiency and ADHD, the researchers say, comes from studies showing that children with ADHD are less likely to have been breast-fed as infants than are other children. "Breast milk contains adequate LCPUFAs," they note, "and several studies have shown that visual and brain functions mature faster in breast-fed than in bottle-fed infants. Delayed brain maturation is one factor implicated in the development of ADHD, [and] LCPUFAs may have a role to play in this process."

The researchers theorize, "Because omega-3 fatty acids, especially DHA, are present in large quantities in the retina of the eye and in certain regions of the brain, depletion of DHA from these regions may compromise sensory and brain function." Thus, they say, some cases of ADHD may be attributable to a sub-clinical DHA deficiency, due to either dietary insufficiency or metabolic problems.

A recent research review by A. J. Richardson and B. K. Puri also suggests a link between ADHD and fatty acid disorders, and the authors encourage researchers to investigate the use of fatty acids as a treatment for ADHD. "Such a form of treatment," they note, "is relatively safe compared to existing pharmacological interventions."

"Dark adaptation, motor skills, docosahexaenoic acid, and dyslexia," B. Jacqueline Stordy, *American Journal of Clinical Nutrition*, Vol. 71, No. 1, January 2000, pp. 323-326. Address: B. J. Stordy, Stordy Jones Nutrition Consultants, Manor House, Puttenham Heath Road, Puttenham, Guildford GU3 1AP, U.K, Jackie@sjnc.freeseerve.co.uk.

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"Long-chain polyunsaturated fatty acids in children with attention deficit hyperactivity disorder," John R. Burgess, Laura Stevens, Wen Zhang, and Louise Peck, *American Journal of Clinical Nutrition*, Vol. 71, No. 1, January 2000, pp. 327-330. Address: J. R. Burgess, Department of Foods and Nutrition, Purdue University, West Lafayette, IN 47907-1264, burgessj@cfs.purdue.edu.

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"The potential role of fatty acids in attention deficit hyperactivity disorder," A. J. Richardson and B. K. Puri, *Prostaglandins Leukotrienes and Essential Fatty Acids (Edinburgh)*, Vol. 63, No. 1-2, July-August 2000, pp. 79-87. Address: A. J. Richardson, University Laboratory of Physiology, Oxford, U.K.