

Fatty acid abnormalities may play role in autism

Increasing evidence links fatty acid abnormalities to a range of psychiatric disorders including hyperactivity, depression, and schizophrenia (see ARRI 13/1), and new evidence suggests that aberrations in fatty acid metabolism play a role in autistic spectrum disorders as well.

J. G. Bell and colleagues report that examination of red blood cells from a patient with autistic spectrum disorder revealed reduced percentages of highly unsaturated fatty acids (HUFA), compared to control samples. In particular, levels of docosahexaenoic acid

The researchers note that individuals with autistic spectrum disorders often suffer from inflammatory skin and bowel conditions, disturbed sleep cycles, impaired immune system function, and other symptoms that "can arise through aberrations in fatty acid metabolism."

(DHA) and arachidonic acid (ARA) were abnormally low. In addition, the percentage of HUFA in the subject's red blood cells decreased significantly when the sample was stored at a temperature at which other samples were stable. Similar findings, they say, are seen in individuals with schizophrenia.

They conclude, "These data suggest that membrane HUFA in a significant percentage of patients with schizophrenia, and in the patient with autistic spectrum disorder, are unstable compared to those from controls."

Bell and colleagues note that HUFA play a critical role in the functioning of synaptic junctions between neurons, and that abnormalities involving HUFA "could result in alteration in neural structure and function." In addition, they point out that male rats require higher levels of HUFA than female rats, and say that this offers clues about the sex ratio in autism (4:1 boys to girls), "since a deficiency in these essential HUFA would affect males more than females." They also note that DHA and other fatty acids help modulate electrical discharges from neurons, and say, "[A] deficit of these fatty acids could increase susceptibility to epileptic seizure, which occurs in many patients with ASD."

The researchers note that individuals with autistic spectrum disorders often suffer from inflammatory skin and bowel conditions, disturbed sleep cycles, impaired immune system function, unusual body temperature fluctuations, and problems with electrolyte balance. "All of [these] conditions," they say,

"can arise through aberrations in fatty acid metabolism, particularly those related to eicosanoid production." (Eicosanoids are molecules derived from the HUFA arachidonic acid. These molecules regulate a wide range of body processes, and either high or low concentrations can cause mental or physical symptoms.)

HUFA deficiency linked to dyslexia

In related research, B. Jacqueline Stordy reports evidence implicating deficiencies of fatty acids as a cause of dyslexia.

In one study, Stordy et al. measured the function of rod cells in the eye, which are rich in DHA. Comparing rod function in 10 young dyslexics and 10 controls, the researchers found that the dyslexics showed impaired adaptation to low light, a symptom 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.

In a separate study, the researchers evaluated the effects of fatty acid supplementation on the coordination skills of dyslexic children. All 15 study subjects 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."

Editor's note: see letter on this page.

"Red blood cell fatty acid compositions in a patient with autistic spectrum disorder: a characteristic abnormality in neurodevelopmental disorders?" J. G. Bell, J. R. Sargent, D. R. Tocher, and J. R. Dick, *Prostaglandins, Leukotrienes and Essential Fatty Acids*, Vol. 63, No. 1/2, 2000, pp. 21-25. Address: Gordon Bell, Nutrition Group, Institute of Aquaculture, University of Stirling, Stirling FK9 4LA. E-mail: g.j.bell@stir.ac.uk.

—and—

"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.freeserve.co.uk.

ARI maintains a list of physicians who use drugs only as a last resort, and who are interested in the DAN! approach to diagnosis and treatment. If you are a physician who should be on that list, send a self-addressed, stamped envelope with a request for our "Doctor Referral List Questionnaire."

Do amygdala defects play a role in autism?

(continued from page 2)

expressions, or the left amygdala region and left cerebellum when implicitly processing emotional facial expressions." [Editor's note: cerebellar abnormalities are a consistent finding in studies of the autistic brain; see ARRI 1/1, 2/2, 11/1, 14/3.] The researchers conclude, "High-functioning people with autistic disorder have biological differences from controls when consciously and unconsciously processing facial emotions, and these differences are most likely to be neurodevelopmental in origin."

"Convergent neuroanatomical and behavioural evidence of an amygdala hypothesis of autism," M. A. Howard, P. E. Cowell, J. Boucher, P. Brooks, A. Mayes, A. Farrant, and N. Roberts, *NeuroReport*, Vol. 11, No. 13, September 2000, pp. 2931-2935. Address: M. A. Howard, Magnetic Resonance and Image Analysis Research Centre, University of Liverpool, P.O. Box 147, Liverpool, U.K. L69 3BX.

—and—

"The functional neuroanatomy of social behaviour: Changes in cerebral blood flow when people with autistic disorder process facial expressions," H. D. Critchley, E. M. Daly, E. T. Bullmore, S. C. Williams, T. Van Amelsvoort, D. M. Robertson, A. Rowe, M. Phillips, G. McAlonan, P. Howlin, and D. G. Murphy, *Brain*, Vol. 123, Pt. 11, November 2000, pp. 2203-2212. Address: H. D. Critchley, Institute of Psychiatry, Kings College, Department of Psychology, St. George's Hospital Medical School, London, U.K.

LETTERS TO THE EDITOR

To the Editor:

I am the mother of a 14-year-old boy, diagnosed as autistic, but probably closer to Asperger's. I am witnessing a miraculous change in my son. The miracle began about three weeks after he started taking fish oil capsules with a high content of omega-3 fatty acids.

Suddenly my son's behavior patterns are changing rapidly and dramatically. [For instance] he asked me if I was worried about the cat. He has never asked me about anything pertaining to me before. And he was crying and upset last night because he is suddenly aware that even though he is smart, he works much more slowly than the other students in his class. He has never compared himself to others before, or really even noticed them.

Vicki Rodrigue

Editor's Note: See related article on this page. ARI is interested in hearing from readers (both professionals and parents) who have tried omega-3 fatty acid supplements—in fact, we are interested in hearing about anything that helps.

Letters continued on page 7