Biomedical update:

New MRI studies: more evidence of brain alterations

Two new MRI (magnetic resonance imaging) studies add to the growing evidence that there are structural defects in the brains of autistic individuals.

Gaffney study: "subtle differences" seen

Comparing the MRI scans of 13 autistic and 33 non-autistic subjects, Gary Gaffney and colleagues found that autistic subjects had enlarged lateral ventricles and anterior horns (both parts of the brain's system of fluid-filled cavities), and a smaller right lenticular nucleus (a portion of the brain's basal ganglia, which help coordinate motor activity).

Enlarged ventricles can indicate that the brain areas surrounding these cavities are abnormal. The enlarged anterior horns seen in his autistic subjects, Gaffney says, could indicate defects in the nearby fornix, an area which affects cognitive skills and behavior. Also near the lenticular nuclei are the septal nuclei; lesions in this area, Gaffney says, "produce complex behavioral consequences, such as hyperreactivity to stimuli and a disinhibitory effect on behavior that is normally suppressed due to nonreward or punishment."

Previous reports by Eric Courchesne et al. of cerebellar abnormalities in autistic individuals may tie in with these new findings, according to Gaffney. Noting that the cerebellum develops at the same time as areas of the limbic system which Gaffney's study indicates are abnormal, Gaffney says that "an embryonic insult, environmental or genetic, affecting [nerve development] at this critical time could simultaneously blunt development of limbic and cerebellar structures."

Hashimoto study: altered left/right assymetry

In a new MRI study of 18 autistic individuals by Japanese researchers T. Hashimoto et al., the lateral ventricles did not appear enlarged. The researchers did find, however, that the normal brain asymmetry tended to be reversed in autistic subjects; the left lateral ventricle was larger than the right, and the volume of the left frontal brain lobe was smaller than that of the right in autistic subjects.

"These findings," Hashimoto et al. say, "are consistent with the hypothesis that some autisms may involve a type of early developmental abnormality." Further, they say, the abnormalities seen in their autistic subjects' MRIs differed from those seen with a group of retarded subjects, "suggest(ing) that autism may involve a type of structural brain impairment different from mental retardation."

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"Forebrain structure in infantile autism," Gary R. Gaffney, Samuel Kuperman, Luke Tsai, and Susan Minchin; *Journal of the American Academy of Child and Adolescent Psychiatry*, Vol. 28, No. 4, 1989, pp. 534-537. Address: Gary Gaffney, Department of Psychiatry, Univ. of Kansas Med. Center, 39th and Rainbow Blvd., Kansas City, KS 66103.

—and—

"Magnetic resonance imaging in autism: preliminary report," T. Hashimoto, M. Tayama, K. Mori, K. Fujino, M. Miyazaki, and Y. Kuroda; *Neuropediatrics 20*, 1989, pp. 142-146. Address: T. Hashimoto, Department of Pediatrics, Univ. of Tokushima School of Med., Kuramoto-cho 3, Tokushima 770, Japan.

Leber's blindness, autism: same cause?

Many blind children also have symptoms of autism, leading researchers to speculate that the two disorders may be related. Now researchers Sally Rogers and Sue Newhart-Larson report that children with one hereditary form of blindness—Leber's congenital amaurosis—are particularly likely to have autism, and that both disorders may be caused by a cerebellar defect.

Rogers and Newhart-Larson compared five boys with Leber's disease to five children with other medical conditions causing blindness from birth. All of the children with Leber's syndrome—but none of the other blind children—met diagnostic criteria for autism on two separate rating scales. The behavior of the children with Leber's amaurosis, the researchers say, "resembled that of sighted children with autism far more than it did blind children without autism."

Noting that "descriptions . . . of cerebellar defects in some Leber individuals and in some autistic individuals provide the intriguing possibility of a neurological connection between the two groups," Rogers and Newhart-Larson say they plan to examine MRI scans of children with Leber's disease to see if they can find the same defect found in autistic individuals by Eric Courchesne et al. (ARRI 1/1, 2/2).

Editor's Note: Autistic symptoms also occur in persons blinded by retrolental fibroplasia (see Rimland,* Infantile Autism *pp. 112-117). It would be interesting to know if the three control subjects with retrolental fibroplasia in this study are the ones who showed some autistic symptoms.

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"Characteristics of infantile autism in five children with Leber's congenital amaurosis," Sally J. Rogers and Sue Newhart-Larson, *Developmental Medicine and Child Neurology*, 1989, 31, pp. 598-608. Address: Sally J. Rogers, Department of Psychiatry, University of Colorado Health Sciences Center, 4200 East Ninth Street Avenue, Denver, CO 80262.

Epilepsy in autism studied

About 20% of autistic children and 40% of "autistic-like" children under the age of 10 have already developed epilepsy, according to a Swedish population study by Ingrid Olsson et al.

While all types of epilepsy were seen, almost 75% of the autistic children with epilepsy had psychomotor seizures (a form of epilepsy whose symptoms can include loss of consciousness, loss of judgment, uncontrolled behavior, and abnormal acts). There was no difference in sex ratio in the classically autistic group, but in the autistic-like group, girls were much more likely to have seizures than boys.

Of the autistic children with epilepsy, half had clear indications of brain damage. However, the researchers report, there were no significant differences in IQ between the epileptic and non-epileptic children in either the autistic or autistic-like group. "It is clear," they comment, "that epilepsy can occur in autism in the absence of mental retardation."

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"Epilepsy in autism and autistic-like conditions: a population-based study," Ingrid Olsson, Suzanne Steffenburg, and Christopher Gillberg; *Archives of Neurology*, Vol. 45, June 1988, pp. 666-668. Address: Christopher Gillberg, Department of Child and Adolescent Psychiatry, University of Goteborg, P.O. Box 7284, S-402 35 Goteborg, Sweden.

Rett Syndrome: second report of cell abnormalities

Reports by Kuwaiti researcher Ahmad Teebi and colleagues of a defect in the mitochondria (energy-producing structures within cells) of girls with Rett syndrome (see ARRI 3/4), are supported by a new U.S. report.

Anne Ruch et al. biopsied muscle tissue from two girls with Rett syndrome and examined the tissue under an electron microscope. Like Teebi et al., they found that the mitochondria were abnormally shaped and showed membrane changes and abnormal vacuoles.

Rett syndrome, believed to affect only girls, causes autistic-like symptoms, severe growth and motor problems, loss of speech and mobility, chronic hand-washing motions, and other symptoms.

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"Mitochondrial alterations in Rett syndrome," Anne Ruch, Thaddeus W. Kurczynski, and Manuel E. Velasco; *Pediatric Neurology*, Vol. 5, No. 5, Sept.-Oct. 1989, pp. 320-323. Address: Thaddeus W. Kurczynski, Department of Pediatrics, Medical College of Ohio, C.S. 10008, Toledo, OH 43699.