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Reviewing medical and educational research in the field of autism and related disorders

Findings are similar

MRI, autopsy studies show cerebellar defects

A new magnetic resonance imaging (MRI) study has shown significant underdevelopment of the cerebellum in a non-retarded autistic man.

The finding, by Eric Courchesne et al. of Children's Hospital Research Center in San Diego, is important because while many brain abnormalities have been found in retarded autistic people, researchers were not sure whether the defects were linked to autism or might instead be related to retardation. This study subject was not retarded, did not have seizures, and had no history of pre- or post-natal trauma, strongly suggesting that the brain defect is directly linked to the man's autism.

(Added in press: Courchesne et al. have just completed an expanded study of MRIs of 18 autistic subjects. This new research will be summarized in upcoming issues of the ARRI.)

Magnetic resonance imaging is a technique which uses powerful electromagnets and radio pulses instead of x-rays to obtain detailed images of various organs. Hydrogen atoms in the body are pulled into alignment by the magnets, knocked out of alignment by the radio pulses, and then realigned; in the process they emit faint radio signals which a computer can translate into clear images of body structures.

Underdevelopment seen

This MRI study of a 21-year-old autistic man revealed that the cerebellum—an intricate neural coordinating center in the brain, located at the base of the skull—was extremely underdeveloped in some areas, while other areas appeared normal. The cerebellum coordinates motor activity and is also involved— either directly or through links to other areas of the brain—in speech, learning, attention, and possibly emotions and behavior.

The researchers say their finding of underdevelopment of the cerebellum is consistent with recent autopsies which have shown cerebellar damage in four boys who were both autistic and retarded. The autopsies, performed by UCLA researchers (Ritvo et al.), showed that the subjects—who ranged in age from 10 to 22—had a smaller number of Purkinje cells in their cerebella than non-autistic people.

Bauman and Kemper also found abnormalities in the limbic system.

The Purkinje cells are thought to release neurotransmitters which inhibit the firing of other neurons, a process which could be disrupted if too few of these cells are present in the autistic's cerebellum. Also, because the cerebellum regulates incoming sensations, defects in its neurons may cause the sensory problems symptomatic of autism.

A Boston research team, headed by Margaret Bauman and Thomas L. Kemper, had earlier reported reduced Purkinje cell counts (as well as fewer granule cells) and cerebellar atrophy in the brains of two autistic subjects.

In addition, they discovered that the cells in one subject's limbic system—an area of the brain which plays an important role in emotion and behavior—were unusually small and closely packed together in several areas. Defective areas included the hippocampus, entorhinal cortex, amygdala, mammillary body and septal nuclei.

Apparently prenatal

Bauman and Kemper say the brain defects seen in this subject apparently occurred before birth. Normally, the newborn's brain cells spread apart to make room for glial cells ("glue" cells that support and nourish other brain cells) and dendrites (cell branches which receive incoming messages); this process apparently was halted in the autistic subject's brain. In addition a clear zone in the enterorhinal cortex— an area which should disappear in early childhood—was still present. Also, there was no cell loss in the olivary body, which usually is destroyed when injuries to the cerebellum occur after birth.

Bauman and Kemper note that the hippocampus, one area of the limbic system in

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In this issue:

Introducing the ARRI

This is the introductory issue of the *Autism Research Review International* (ARRI). ARRI will appear four times each year, every issue bringing up-to-date information from the biomedical and educational literature on autism. Volume I, consisting of this issue and the next three issues, is being sent at no cost to parents and professionals throughout the world who are concerned with the care of autistic children.

A computer search of the world literature on autism for 1986 disclosed almost 500 articles published in 160 different journals. These 500 articles were selected by computer from a larger base of more than one million new articles in the life sciences each year. The task of ARRI is to comb this massive literature base to identify and publish summaries of the items of greatest interest and value to its readers.

The reviews in ARRI will be written so they may be understood by the lay-person, while yet containing the essential information sought by the professional. Tell us how well we succeed in that attempt. Comments and suggestions will always be welcome.

Funds for our first year of publication have been provided by a grant from the Hasbro Children's Foundation. We hope to make the ARRI so valuable to its readers that we will be able to continue on a subscription basis for the second year and beyond.