Does impaired perception of biological motion contribute to autistic symptoms?

The social deficits of autistic children may stem in part from abnormalities in brain areas that perceive human movement, according to a new study.

Randolph Blake and colleagues studied the responses of 12 autistic children and nine non-disabled children to two tasks:

• For one task, the researchers created a computerized series of dot patterns representing the joints of a person moving, and a second series of dot patterns in which the dots were "scrambled" so they did not resemble the motions of a live being. As they viewed the series of biological and non-biological dot sequences, the children were asked to tell the researchers whether each sequence represented "a person" or "not a person."

• In a separate "global form" task, the children were asked to visually identify an inanimate object embedded in a cluttered background. The shape became increasingly more difficult to identify, as the angles of the embedded object changed.

Autistic children performed as well as non-disabled children in detecting an inanimate object. However, they were markedly impaired in differentiating between biological and non-biological motion in the dot-sequence task.

The autistic children's deficits in perceiving biological motion were not due to reduced motivation, Blake et al. say, since the children performed well on the "global form" task which is more difficult and possibly even less engaging. Also, they say, the differences were not due to the children's developmental levels, because children acquire the ability to perform biological motion tasks earlier than they learn to perform tasks such as the "global form" test.

Thus, Blake et al. conclude, "[T]his deficit may implicate abnormalities in brain areas mediating perception of human movement." Such abnormalities, they say, may help explain the difficulties that autistic individuals have in recognizing facial expressions, and in following the gaze of another person.

Autistic children's deficits in recognizing biological motion, the researchers say, may involve abnormal functioning of brain regions in and near the superior temporal sulcus (STS), which contain neurons that are selectively activated by visualization of facial, head, eye, and body movements. Their data, Blake and colleagues say, could indicate either a deficit originating in the STS region or a deficit elsewhere (for instance, in the limbic system) that adversely affects the development of the STS.

"Whatever the neural bases of the deficits we and other researchers have documented," Blake et al. say, "our results serve as a reminder that impairment in social function, which can lead to withdrawal, may have at least some of its roots in perceptual disorders."

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"Visual recognition of biological motion is impaired in children with autism," Randolph Blake, Lauren M. Turner, Moria J. Smoski, Stacie L. Pozdol, and Wendy L. Stone, *Psychological Science*, Vol. 14, No. 2, March 2003, 151-7. Address: Randolph Blake, Department of Psychology, Vanderbilt University, Nashville, TN 37201, randolph.blake@vanderbilt.edu.

Elevated measles antibodies seen in autism

Adding to the debate over the measles-mumps-rubella (MMR) vaccine, a new report by Vijendra Singh et al. reveals elevated levels of measles antibodies, but not mumps or rubella antibodies, in autistic children as compared their siblings or to other non-disabled children.

The researchers analyzed samples from 52 autistic children, 30 non-disabled children, and 15 non-disabled siblings of autistic children. All of the children had received the MMR vaccine, and none had a history of natural measles infection.

The researchers report that 43 of the 52 autistic children exhibited antibodies to the measles vaccine virus, which were not seen in any of the children in the control groups. This indicates, say Singh et al., that "autistic children have a hyper-immune response to measles virus, which in the absence of a wild-type measles infection might be a sign of an abnormal immune reaction to the vaccine strain or virus reactivation." *(See related story p. 1.)*

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"Elevated levels of measles antibodies in children with autism," Vijendra K. Singh and Ryan L. Jensen, *Pediatric Neurology*, Vol. 28, No. 4, 2003, 292-4. Address: Vijendra K. Singh, Dept. of Biology, Utah State University, Logan, UT.

Common plastic causes 'stunning' embryo defects

Even brief exposure to the common plastic component bisphenol A (BPA), used in microwave cookware and dental sealants, may cause genetic damage to embryos, according to recent research.

Patricia Hunt and colleagues were conducting experiments on mice when they noticed an unexplained upsurge in aneuploidy in the oocytes (female reproductive cells) of their laboratory mice. Aneuploidy is the condition of having the wrong number of chromosomes—as occurs, for instance, in Down syndrome (trisomy 21), or in Turner syndrome (in which girls lack a second X chromosome).

Investigating the high rate of aneuploidy in the mice, Hunt and colleagues found that a lab worker had used a very harsh detergent to wash the mice's water bottles and cages. As a result, BPA was leaching from the cages and water bottles, contaminating the mice's water and environment.

To see if the BPA had caused the eightfold increase in aneuploidy they had observed, Hunt and colleagues examined the oocytes of mice raised in BPA-containing cages washed with two different dilutions of detergent, comparing them to oocytes of females raised in cages not containing BPA. They found that mice raised in the BPA-containing cages exposed to high levels of the abrasive detergent showed the highest incidence of chromosomal errors related to aneuploidy. Similar findings were seen when the researchers used BPA-containing water bottles.

The researchers then exposed female mice to varying oral doses of pure BPA, and found that chromosomal errors occurred even at the lowest doses tested, but increased with higher exposure. Longer exposures also increased risk.

The researchers note that chromosome errors occurred in BPA-exposed mice at exposure levels equivalent to or even below those considered safe. The damage done to oocytes, says reproductive toxicologist Frederick vom Saal, "looks like someone shot the chromosomes with a shotgun. They are totally disorganized. If you disorganize the chromosomes, it is a death sentence for an embryo. This is a stunning form of damage."

Says Hunt, "Of course we have no way of knowing that the effect of BPA is exactly the same in humans. But given the striking effects in mice, I'm not sure we can wait to know if mice and humans are exactly the same."

BPA appears to be an endocrine disruptor, one of a wide range of chemicals that alter the effects of estrogen or other endocrine hormones. According to the *Los Angeles Times*, more than two billion pounds of the chemical are used annually.

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"Bisphenol A exposure causes meiotic aneuploidy in the female mouse," Patricia A. Hunt, Kara E. Koehler, Martha Susiarjo, Craig A. Hodges, Arlene Ilagan, Robert C. Voigt, Sally Thomas, Brian F. Thomas, and Terry J. Hassold, *Current Biology*, Vol. 13, April 2003, 546-53. Address: Patricia A. Hunt, Department of Genetics, Case Western Reserve University, Cleveland, OH 44106-4955, pah13@po.cwru.edu.

—and—

"Study links plastics to embryo ills," Marla Cone, *Los Angeles Times*, April 1, 2003.

—and—

Review of Hunt et al. research, "Our Stolen Future" website, http://www.ourstolenfuture.org.