Health & Medicine

Researchers Find Synaptic Link to Autism

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Columbia neurobiologists led by David Sulzer have made a discovery that may help explain why people with autism are prone to epilepsy and often oversensitive to noise and social experiences.

The scientists have found that autistic young people have an overabundance of synapses in some parts of their brains, and that this excess is the result of the brain having failed to weed out unnecessary synapses through a process called “pruning.” Scientists have long known that synapses — the connections that neurons use to send and receive signals — grow at a furious pace in childhood and must be periodically thinned out, but the Columbia study is the first to show that unchecked synaptic growth is associated with autism.

“From early childhood to adolescence, synapses are pruned,” says Sulzer, who is a professor of psychiatry, neurology, and pharmacology. “In other words, you start out, say, at age three, with about twice the density of synapses than you have at the age of fifteen. But this doesn’t occur with people with autism.”

Sulzer and his colleagues discovered this by examining brain tissues of people who had died between the ages of two and twenty, about half of whom had autism. In comparing the brains of young people with and without the disorder, the researchers found little difference in the density of synapses at a very young age but a pronounced difference by adolescence — indicating, they say, that the problem in the autistic brain is not one of overproduction but rather of inadequate pruning.

The scientists are hopeful that their research could aid in the development of new treatments for autism. They’ve already shown that a powerful immunosuppressive drug can restore normal function to the brains of mice that have been genetically engineered to stop pruning. The treatment also alleviated autistic-like social behaviors that the mice temporarily displayed. Although the drug, rapamycin, has

serious side effects that may preclude its use in people, “the fact that we can see changes in behavior suggests that autism may still be treatable after a child is diagnosed, if we can find a better drug,” says Sulzer.



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