

Fact Sheet

Attention Deficit Hyperactivity Disorder (ADHD)

Attention deficit/hyperactivity disorder (ADHD) is one of the most common childhood disorders and can continue into adolescence and adulthood. Symptoms include difficulty staying focused and paying attention, difficulty controlling behavior, and very high levels of activity. Studies show that the number of children being diagnosed with ADHD is increasing.

Yesterday

- ADHD was once considered a transient disorder of childhood that children would outgrow upon entering their teen years.
- ADHD was seen as a behavioral disturbance caused by environmental factors, such as inconsistent parenting.
- Brain development in people with ADHD could not be studied directly, but only estimated by observing behavior or using other indirect methods.
- ADHD was treated with immediate release stimulant medications such as methylphenidate (for example, Ritalin), which worked well but whose effect lasted only a few hours. Children needed multiple doses during the day, disrupting their school schedules and daily activities.

Today

- Using brain imaging, scientists observed that in some young people with ADHD the development of the brain, while still showing a normal pattern, is delayed in some regions by an average of three years compared to children without the disorder.
- The delay was most marked in the brain area that supports the ability to suppress inappropriate actions and thoughts, focus attention, remember things moment to moment, work for reward, and plan (the frontal cortex). By contrast, the area that controls movement (the motor cortex) tends to mature faster than normal, an exception to the pattern of delay. This mismatch in brain development may account for the restlessness and

fidgety symptoms common among those with ADHD.

- Findings from the Preschoolers with ADHD Treatment Study (PATS) indicate that using low dose methylphenidate (for example, Ritalin) to treat children age 3–5 years diagnosed with severe ADHD can be effective.
- A preschooler's response to medications for ADHD has been found to be associated with the number of coexisting mental disorders the child has. Children with fewer coexisting disorders were most likely to respond to methylphenidate treatment, whereas those with three or more coexisting disorders did not respond to the treatment.
- For some children, early behavioral interventions designed to reduce symptoms of ADHD in preschoolers may be effective alternatives or additions to medication treatment.
- One study comparing a parent education (PE) program with a multi-component intervention (MCI) found that problem behavior decreased among the children in both programs and their social skills improved after one year.
- The PE program focused on teaching parenting skills in a group setting. The MCI included parent education classes as well as individualized interventions in the home and at preschool or day care.
- The ongoing Multimodal Treatment Study of Children with ADHD (MTA study) is helping to inform long-term treatment decisions. For example,

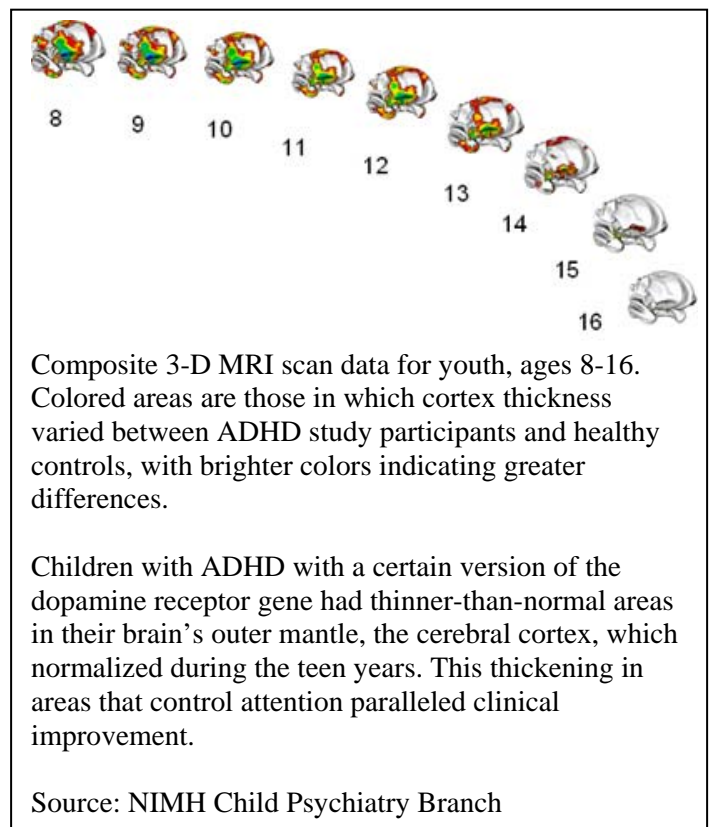
MTA researchers found that medication works best when treatment is regularly monitored by the prescribing doctor and the dose is adjusted based on the child's needs. Two years after the study ended, most children treated in a variety of ways for ADHD showed sustained improvement.

Tomorrow

- Research continues on the search for innovative methods to treat ADHD and may someday offer more options for children who cannot take ADHD medications or do not respond to them. These methods include using neurofeedback and novel psychosocial treatments.
- During neurofeedback, a person uses information (feedback) about his or her brain waves to try to bring those waves into a range associated with healthy brain function. NIH-funded researchers are testing whether children with ADHD could learn to respond to neurofeedback and change their brain wave patterns in a way that would improve behavior. The research uses a new technology to provide neurofeedback in which a child's brain waves control a video game. In the test group, changes in brain waves will change the action occurring in the video game, while in the control group, pre-programmed changes will occur, independent of changes in the child's brain waves.
- Another study is focusing on treating children with ADHD and impaired mood (AIM), which bears some resemblance to bipolar disorder. Treatment for AIM can be complicated because the symptoms straddle two mental disorders that are usually treated with very different medications. Currently, it is unclear how children with AIM will respond to treatment with stimulants or whether medications used for bipolar disorder are appropriate as initial treatment. Researchers are evaluating a new psychosocial treatment that combines several different therapeutic approaches to see whether the treatment is safe for children with AIM. They are also trying to identify a safe and effective initial treatment for AIM as well as evaluating the safety of stimulant medications in these children.
- While ADHD symptoms may decline for some children as they grow up, others may face continuing problems. A recent study found that adults with ADHD have higher than average rates of divorce, unemployment, substance abuse, and disability. Also, while many adults with ADHD receive treatment for other mental disorders or

substance abuse, a smaller proportion receive treatment for their ADHD symptoms.

- More studies are needed to assess the effects of ADHD over the lifespan and to find better ways to diagnose and treat ADHD in adults, with a special focus on promoting competence and improving functioning.
- New research linking genetics, brain development, and functioning are providing scientists with a new understanding of how ADHD develops.
- One such study showed that brain areas controlling attention were thinnest in children with ADHD who carried a particular version of the gene for one type of neuro-chemical receptor in the brain. However, these areas normalized in thickness during the teen years in these children, coinciding with clinical improvement. Although this particular gene version increased risk for ADHD, it also predicted better clinical outcomes and higher IQ than two other versions of the same gene in youth with ADHD.



For more information, please contact the NIMH Information Center at nimhinfo@nih.gov or 301-443-4513.