

and Baron-Cohen, 2014). It occurs in 1 in 68 children in the United States; is about four times more common in boys than in girls; and is not related to socioeconomic level, race, or parenting style (Centers for Disease Control and Prevention, 2014; National Autism Association, 2015a).

Etiology

The cause of ASD is unknown. Researchers are investigating a number of theories, including a link between hereditary, genetic, medical problems, immune dysregulation/neuroinflammation, oxidative stress (damage to cellular tissue), and environmental factors (Lai, Lombardo, and Baron-Cohen, 2014; Rossignol and Frye, 2012). Individuals with ASD may have abnormal electroencephalograms, epileptic seizures, delayed development of hand dominance, persistence of primitive reflexes, metabolic abnormalities (elevated blood serotonin), cerebellar vermis hypoplasia (part of the brain involved in regulating motion and some aspects of memory), and infantile abnormal head enlargement (Rutter, 2011).

The strong evidence for a genetic basis in twins is consistent with an autosomal recessive pattern of inheritance. Twin studies demonstrate a high concordance (60% to 96%) for monozygotic (identical) twins and less than 5% concordance for dizygotic (nonidentical) twins. In addition, between 5% and 16% of boys with ASD are positive for the fragile X chromosome (Clifford, Dissanayake, Bui, et al, 2007; Grafodatskaya, Chung, Szatmari, et al, 2010).

There is a relatively high risk of recurrence of ASD in families with one affected child (Chawarska, Shic, Macari, et al, 2014; Rutter, 2011; Yoder, Stone, and Walden, 2009). Several genes have been suggested as possible causative factors in ASD (Kolevzon, Gross, and Reichenberg, 2007; Talkowski, Minikel, and Gusella, 2014; Willsey and State, 2015).

The scientific evidence to date shows no link between measles, mumps, and rubella (MMR) and thimerosal-containing vaccines and ASDs (Barile, Kuperminc, Weintraub, et al, 2012; Price, Thompson, Goodson, et al, 2010; Taylor, Swerdfeger, and Eslick, 2014; Uno, Uchiyama, Kurosawa, et al, 2015) (see [Translating Evidence into Practice](#) box). ASD has been reported in association