Autism and Genes

The autistic disorder was first described by Leo Kanner 60 years ago. This complex developmental disability is characterized by poor social and communicative skills, and repetitive and stereotyped behaviours and interests. Autism occurs in the general population in about 1 in 1,000 with a 4:1 ratio male to female. In approximately 15% of cases autism is associated with known genetic disorders such as Fragile X syndrome, tuberous sclerosis or Rett Syndrome. Only in a minority of cases is a known cause for autism found. There does seem to be a genetic link. For example, in families who already have one autistic child there is a higher risk of other children being autistic (45 times greater). The higher concordance of autism (i.e. *both* twins in a pair affected) amongst monozygotic (60-90%) than dizygotic (0-10%) suggests that there may be a genetic link rather than an unknown cause for autism. In addition it has been shown by some studies that the twinning process itself is an important risk factor in the development of autism. However other researchers have challenged this on the grounds that the high concordance rate monozygotic twins would explain the higher overall prevalence of autism in twins.

The past decade has been marked by an increased interest in the genetic basis of autism, with a series of chromosome studies taking place. The analysis of these has pointed to several likely candidate gene regions on certain chromosomes. These regions have genes that have been screened for mutations or association with autism. However, it is still far from clear that a major susceptibility gene (or genes) is involved in autism. The results from linked studies, and the clear difference in concordance rates between monozygotic and dizygotic twins, suggests that the genetic cause of autism is certainly heterogeneous (different genes in different families) and polygenic (more than one affected gene per individual).

Recent research has indicated that autism is not a discrete disorder and that family members of diagnosed autistic children have an increased likelihood of exhibiting autistic symptoms with a wide range of severity. Autistic traits have been measured by the Social Responsiveness Scale

and found to be were continuously distributed across the autistic spectrum and moderately to highly heritable. Levels of severity of autistic traits at or above the previously published threshold for children with pervasive developmental disorder were found in 1.4% of boys and 0.3% of girls. Although boys are more affected than girls, studies have not revealed sex-specific genetic influences and have suggested specific mechanisms by which females may be relatively protected from vulnerability to autistic traits.

Research has indicated that the social problems characteristic of autism spectrum disorders are common. Given the continuous distribution of these traits from mild to severe, it may be that the cut-off between a designation of 'affected' and 'unaffected' is rather arbitrary. The genes influencing autistic traits appear to be the same for boys and girls. Lower prevalence and severity of autistic traits in girls may be the result of increased sensitivity to early environmental influences that operate to promote greater social competency in girls.

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