



# FRAGILE X and AUTISM

Families and some providers are often confused by the relationship between Fragile X Syndrome (FXS) and Autism Spectrum Disorder (ASD). It is important to note that it is more common for a child to be diagnosed with ASD and then to receive an additional diagnosis of FXS. Here, we attempt to clarify the overlaps and gaps between the two conditions. Understanding these distinctions can be particularly helpful when deciding upon the most appropriate medical, therapeutic, counselling and education interventions, and will increase the potential for both short-term and long-term benefits.

## **What is known about ASD and its relationship with FXS?**

Autism Spectrum Disorder is a developmental disorder primarily characterized by a selective impairment in social interaction. Namely, people with ASD have differences in how they understand and react to people and social situations, which result from differences in how their brains process socially-relevant information. Symptoms of ASD appear in early childhood. It is a lifelong disorder, though symptoms can change over time. At this time, there is no medical test, such as a blood test or brain scan that can diagnose ASD. Yet in some cases the cause of ASD is known, such as FXS, the most common-known single-gene disorder that accounts for about 2-3 percent of all ASD cases. Specifically, FXS is a genetically-defined condition that can be diagnosed by a DNA blood test, unlike ASD that is a behaviourally-defined diagnosis. Thus FXS is one cause out of many, for a person to manifest the clinical symptoms that define ASD.

## **Why are Autistic features common in FXS?**

Current ASD knowledge indicates that it is a developmental brain disorder, beginning shortly after birth or even earlier. Its most characteristic feature is the presence of abnormal patterns of neural “wiring” or connectivity. Because multiple genetic and environmental factors have been linked to ASD, there are probably multiple ways in which neural connectivity and other processes can be disrupted, leading to a common outcome or set of clinical features that result in a diagnosis of ASD.

In regard to the neural connectivity, many proteins that have similar jobs as FMRP (the protein made from the Fragile X gene, which is absent or reduced in people with FXS) and also proteins that interact with FMRP have been found to be associated with ASD. Thus, it is likely that ASD is frequently present in FXS because the lack of FMRP in FXS adds to the risk of developing the types of abnormal ‘wiring’ and related brain abnormalities that lead to ASD symptoms.

Individuals with FXS who meet criteria for the current definition of ASD represent a point where one may meet criteria for ASD but also tend to have an FXS-related type of ASD with higher rates of social anxiety, intellectual disabilities, hyper-arousal, repetitive behaviours and other FXS-related differences, than those with ASD of unknown cause. Yet sometimes it is unclear whether or not someone should receive a diagnosis of ASD.

The level of overlap between the FXS behavioural phenotype (symptoms) and ASD determines whether a person with FXS makes it into the spectrum of ASD. Some individuals may have enough ASD features to be near the spectrum, but not at the threshold needed for an ASD diagnosis. Those with FXS who are in the spectrum likely have genetic factors that add to FMRP deficiency, which pushed them toward meeting the ASD criteria.

## **What are some recommendations for treatment of individuals with FXS who meet criteria for ASD?**

Challenging behaviours such as attention problems, disruptive behaviour, anxiety, and aggressive and self-injurious behaviours, can significantly impact an individual's academic and adaptive functioning, limiting their participation in the community.

In addition to behavioural therapy (the mainstay of treatment), medication can sometimes be helpful to support therapeutic services and to allow a child to learn in the least restrictive environment. For children with FXS, regardless of whether they meet criteria for ASD, interventions that target communication and socialization skills are appropriate. However, the crucial point for teachers, therapists, and others involved in the support of individuals with FXS, is to utilize existing knowledge of behaviour and learning styles typical of FXS in an individualized manner (i.e., in FXS we would not force eye contact, different from some of the applied behavioural analysis-based treatment of individuals with ASD of unknown cause).

This approach will help to better customise educational, behavioural and other strategies to the needs of each individual. Further molecular, educational, behavioural and non-pharmacological therapeutic intervention studies are needed to refine our understanding of the similarities and differences between individuals with only FXS and individuals with FXS and ASD. Clinical trials of both standard pharmaceutical medications and promising new treatments targeted to underlying brain mechanisms are also needed to explore whether individuals with FXS who meet or do not meet the criteria for ASD respond differently to treatment.

Overall, the future not only holds hope but also the realistic potential for meaningful clinical and functional progress in individuals with FXS and ASD.

SOURCE : National Fragile X Foundation (USA) : <http://www.fragilex.org>