NATIONAL **FRAGILE X** FOUNDATION

GENETIC TESTING

FOR FRAGILE X/*FMR1*-ASSOCIATED CONDITIONS

When considering genetic testing, it's important to work closely with your healthcare provider and genetic counselor. Fragile X inheritance patterns, as well as understanding the potential risks and test results, can be complex. Experienced providers will guide you, support you in making informed decisions, and ensure the right test is ordered based on your specific situation.

WHAT SHOULD I CONSIDER ASKING BEFORE GETTING TESTED?

- **What type of genetic test** is recommended for my situation (e.g., carrier screening, diagnostic testing)?
- **Are there any risks** or limitations associated with the test?
- **What information** will the test results provide, and how might they impact my health or my family's health, or healthcare decisions, including the management of Fragile X-associated conditions?
- **What will the test cost**? Will my insurance cover it, and what resources are available to help with the cost information?
- **How long will the test results take**?
- **What type of sample**, (e.g. blood, saliva, buccal (cheek swab), etc.), will be required? *Note: Calling the laboratory to verify the type of sample is recommended.*

WHAT KIND OF GENETIC TESTING IS AVAILABLE FOR FRAGILE X?

The NFXF does not intend for this information to serve as medical advice. Individuals and families living with or suspected Fragile X-associated conditions should discuss their specific situations — including questions about laboratory results, symptoms, and treatments — with qualified healthcare providers.

Carrier Screening – screening that can be completed before or during pregnancy to identify Fragile X-specifically and/or other genetic conditions.

TEST TYPE	DESCRIPTION
Targeted	Screens for Fragile X based on known risk factors, such as a family history of Fragile X. Typically recommended for individuals or couples planning a pregnancy, or those already pregnant with a known family history of Fragile X.
Standard	A test that screens for common genetic conditions like cystic fibrosis, spinal muscular atrophy, Tay-Sachs, and Fragile X. Typically recommended for individuals or couples planning a pregnancy or who are pregnant, with no known family history of genetic conditions.
Expanded	A comprehensive test that screens for a wider range of genetic conditions, including Fragile X. Typically recommended for individuals or couples planning a pregnancy who want a thorough screen for multiple genetic conditions.

Want to know more?

- fragilex.org
- contact@fragilex.org

Prenatal/Fetal *FMR1* Diagnostic Testing – testing that can detect Fragile X through samples from the placenta, amniotic fluid, or cord blood analysis during pregnancy or at birth.

TEST TYPE	DESCRIPTION
CVS (Chorionic Villus Sampling)	A prenatal test that diagnoses Fragile X by analyzing fetal DNA from the placenta, is typically done in the first trimester for pregnant women at risk or with a family history of Fragile X.
Amniocentesis	A prenatal test that analyzes amniotic fluid to detect genetic conditions, including Fragile X, for pregnant women at risk or with a family history, typically performed in the second trimester.
Cord Blood	A test that analyzes DNA from umbilical cord blood to diagnose Fragile X, for newborns at risk or when prenatal testing was not done.

***FMR1* Diagnostic Testing** – testing for individuals who may have clinical symptoms or a family history of a Fragile X-associated condition. Testing may be suggested for individuals who have intellectual or learning disabilities, autism of unknown cause, or infertility.

TEST TYPE	DESCRIPTION
Fragile X / *FMR1* DNA Test	A test that analyzes the *FMR1* gene for expanded CGG repeats. Test names may vary, but common names are PCR with reflex to Southern Blot, Fragile X CGG repeat analysis, or Fragile X DNA test.
Next-Generation Sequencing (NGS)	A high-tech way to sequence many genes at once, including FMR1, to detect mutations with high accuracy.

Ataxia Panel Testing – testing panels that screen for genetic causes of various forms of ataxia, a group of disorders that affect coordination and movement.

TEST TYPE	DESCRIPTION
Targeted	A test that screens for specific genetic mutations known to cause certain forms of ataxia, based on clinical symptoms or family history. Typically recommended for individuals with a suspected ataxia diagnosis.
Comprehensive	A broad genetic test that examines multiple genes associated with various types of ataxia. This panel is typically recommended for individuals with unknown or unclear diagnoses of ataxia symptoms.
Next-Generation Sequencing (NGS)	A high-tech test that sequences multiple ataxia-related genes at once, providing a detailed analysis of genetic mutations. It is used for accurate diagnosis of ataxia in individuals with complex or overlapping symptoms.

Additional Results: If a Fragile X premutation or full mutation CGG repeat range is found, additional information may be included in your test results. Be sure to discuss with your healthcare team whether these will be included in your test.

- **Methylation:** When a full mutation (> 200 CGG repeats) occurs in the *FMR1* gene, it usually causes the gene to turn off, leading to Fragile X syndrome. This is typically not reported for premutation or intermediate expansions.
- **AGG interruptions:** These are interruptions in the CGG repeat sequence that help stabilize an *FMR1* premutation or intermediate allele, preventing it from expanding when passed down. Currently, there is no evidence that the number of AGG interruptions affects a person's symptoms. As a result, AGG interruptions are typically not analyzed for individuals with a full mutation or for males with a premutation. For females with around **90 CGG repeats** or more, the risk of expansion to a full mutation is high enough that AGG interruptions can no longer prevent further gene expansion.