NATIONAL **FRAGILE X** FOUNDATION

PREIMPLANTATION GENETIC TESTING

FOR MONOGENIC DISORDERS (PGT-M)

WHAT IS PGT-M FOR FMR1?

Preimplantation genetic testing for monogenic disorders (PGT-M) is an option for individuals or couples who have a higher chance of passing on a specific inherited condition. Monogenic means the condition is caused by a change in a single gene. For Fragile X, PGT-M can be used to screen embryos to identify whether they carry a *FMR1* mutation. The results can help individuals and couples make informed decisions about embryo transfer based on their personal values, preferences, and family-building goals.

WHAT IS THE PGT-M PROCESS?

CASE REVIEW

Before anything can begin, the genetics lab reviews your case to make sure PGT-M for Fragile X is possible for your family. Essentially, the lab must confirm that they have enough information to build an accurate test.

TEST DEVELOPMENT

Once approved, the lab begins designing a test specifically for your family. To do this, they collect samples from you, your partner, and other relatives, if available. This helps them understand exactly how Fragile X presents in your family.

Using this information, the lab creates **probes,** which act as labels or markers. These labels help the lab see which X chromosome each embryo inherited: either the X with a typical *FMR1* repeat size or the X with the *FMR1* mutation. It can take the lab about 4-12 weeks to develop these probes. Some labs can also measure each embryo's CGG repeat size to tell whether an embryo is unaffected, a premutation carrier, or has a full mutation. Not all labs offer this repeat size detection, so your fertility specialist and genetic counselor can help you choose the right lab for your goals.

IVF CYCLE AND EMBRYO BIOPSY

Once the custom test is ready, you move forward with an **IVF (in-vitro fertilization)** cycle to create embryos. After the embryos grow for several days, a few cells from each embryo will be gently removed. This step is called an **embryo biopsy.** Most embryology laboratories then freeze (preserve by cooling and storing) the embryos. The embryos remain frozen while the removed cells are sent to a genetics laboratory for testing.

EMBRYO TESTING

The genetics lab uses the custom probes that were designed for your family to analyze the embryo cells. For Fragile X, the main goal is to determine whether the embryo inherited the X chromosome with or without the *FMR1* mutation. If the lab offers repeat size testing, they may also determine whether the embryo has a typical (normal), premutation, or full mutation repeat size.

RESULTS

Results take about 2-4 weeks after the lab has received the embryo samples, and the results are released directly to your IVF clinic. Your fertility specialist or genetic counselor will discuss the results with you. The fertility specialist may offer recommendations and suggestions based on the results, but ultimately, the decisions moving forward are up to you.

THINGS TO CONSIDER ABOUT PGT-M

- **PGT-M is not perfect.** While PGT-M greatly reduces the risk of having a child affected with *FMR1*-associated conditions, it does not fully eliminate this risk.
- **IVF is required.** PGT-M can only be done on embryos, so an IVF cycle is necessary even if you do not have infertility or primary ovarian insufficiency.
- **Costs can be significant.** IVF cycles and PGT-M can be expensive, and insurance coverage varies. The cost of IVF alone can be $15,000 to $20,000 or more, with up to $10,000 in additional fees for PGT-M.
- **Not every case is eligible for PGT-M.** The lab may not have enough information to build a reliable test. Some cases may need additional family samples, which may not always be available.
- **Embryo numbers vary.** Not every IVF cycle produces many embryos, and not all embryos will be suitable for biopsy or yield a clear result.

PGT-M is not the right choice for everyone. The NFXF does not intend for this information to serve as medical advice. Whether to pursue PGT-M is a personal decision that should be made together with a fertility specialist and a genetic counselor, who can help you understand how it applies to your specific situation.

Want to know more?

- fragilex.org
- contact@fragilex.org