Product Profile

Fragile X GeneProber™ GLFXDig1

Catalog Number: 40-3202-01 110µl **Shipped at ambient temperature. Store at -20°C**

Digoxigenin labeled probe spanning the Fragile X CGG triple repeat region.
Ready to use for non-radioactive southern analysis.

For research use only.
Not for use in diagnostic procedures for clinical purposes.

Background

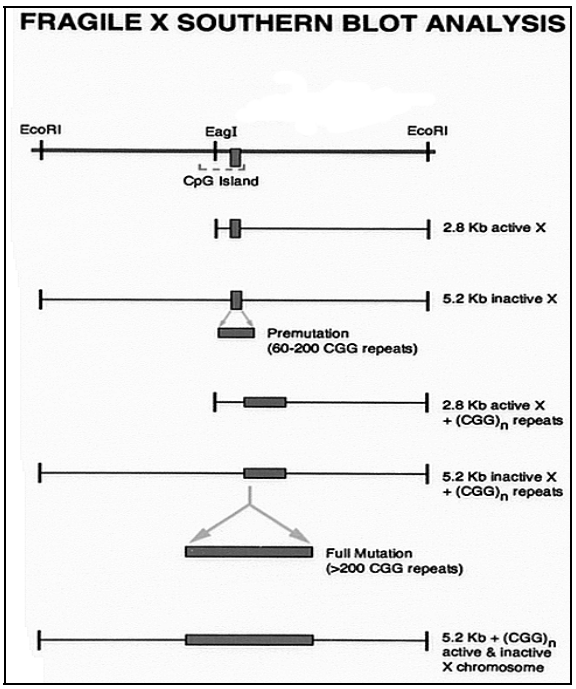
Fragile X syndrome is the most common form of inherited mental retardation. It affects approximately 1 in 1200 males and 1 in 2500 females. As suggested by the name, it is associated with a fragile site under specific cytogenetic laboratory conditions at position Xq27.3 (1).

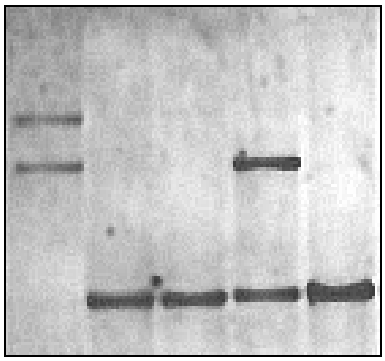
The inheritance pattern of fragile X puzzled geneticists as it did not follow a clear X linked pattern. Approximately 20% of males who are carriers based on pedigree analysis do not manifest any clinical symptoms and are thus termed as Normal Transmitting Males (NTM), mental retardation is rare among the daughters of male carriers. Approximately 35% of female carriers have some mental impairment. Based on the above it has been proposed that there are two states of the mutation, one mutation range in which there is no clinical expression (premutation), which could change to the disease causing state predominantly when transmitted by a female (full mutation)(2). The fragile X syndrome gene (FMR-1, fragile X mental retardation - 1) was cloned in 1991 simultaneously by three groups (3-6). Soon the peculiar genetic mode of transmission was established and a new class of mutation came into existence- Triple repeat amplification. This explained the clinical state of 'premutation' and 'full mutation' as well as 'anticipation'. The fragile X syndrome is caused by the amplification of CGG repeat which is located in the 5' region of the cDNA. The most common allele in the normal population consists of 29 repeats, the range varying from 6 to 54 repeats. Premutations in fragile X families showing no phenotypic effect range in size from 52 to over 200 repeats. All alleles with greater than 52 repeats are meiotically unstable with a mutation frequency of one. In general repeats up to 45 are considered normal, repeats above 50 to 200 are considered as premutation and above 200 as full mutation (3-7). The range between 40-55 is considered even by most experienced clinical geneticists and molecular geneticists very difficult to interpret and is considered as a 'gray zone' with interpretations made on a case by case basis (8).

Genotyping

Fragile X genotyping can be done by direct PCR amplification of the CGG triple repeat region or by southern analysis. In most cases both methods are used to complement the results, full mutations usually cannot be identified by PCR by most investigators and southern analysis is the preferred method to distinguish full mutations. The FMR-1 gene region containing the CGG triple repeat is flanked by Eco RI sites and a Eag I site in the region. Full mutation has been shown to methylate the active gene too and thus it prevents Eag I restriction of DNA. Hybridization of southern blots of Eco RI and Eag I double digested DNA clearly can distinguish between normal, premutation and full mutation genotypes (2).

Southern analysis *can not* determine the exact number of repeats or the identification of genotypes corresponding to the 'gray zone'.





Fragile X southern blot. Lane 1 affected female.
Non-radioactive detection, ~2hr. exposure.

References

1. Nelson, D.L. (1993) Growth Genetics and Hormone. 9:1-4.
2. Rousseau, F. et al. (1991) NEJM 325:1673-1681.
3. Verkerk, A. et al. (1991) Cell 65:905-914
4. Fu, Y.H et al. (1991) Cell 67:1047-1058.
5. Oberle, I. et al. (1991) Science 252:1097-1102.
6. Yu, S. et al. (1991) Science 252: 1179-1181.
7. Nelson, D.L. (1996) Growth Gen. and Hormone. 12:1-4.
8. Richards, R and Sutherland, G.R (1992) TIG 8: 249-255.

Gene Link™

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Material Supplied

One tube containing 110µl of *GeneProber™* GLFXDIG1 probe. This probe is digoxigenin labeled for non-radioactive detection. The quantity supplied is sufficient for at least 5 20x20 cm blots using 20µl for each blot as probe.

Fragile X Southern Protocol

A. Chromosomal DNA digestion

DNA	10 µg
10x Eag I Buffer	10 µl
10x EcoR I Buffer	10 µl
Eag I (10 U/µl)	4 µl
EcoR I(10 U/µl)	8 µl

	H_2O up to 100 µl

Precipitate the digests after over night digestion at 37^{O}C, dissolve the pellets in 10 µl of 1x Loading buffer .

B. Electrophoresis and Transfer

1. Load samples to 0.8% agarose gel , run over night at 45mA for 20-24 hours. (1.6 kb fragment on the bottom of the gel).

2. Depurinate with 0.25N HCl (add 10 ml HCl to 500ml H_2O) for 10 minutes, denature the DNA with 0.4N NaOH/0.6M NaCl for 30 min. at RT, neutralize with 1.5M NaCl/0.5M Tris (pH 7.5) for 30 min. at RT, transfer to the positively charged nylon membrane using 10xSSC and 10 pieces of SIGMA QuickDraw blotting paper overnight. Wash the membrane with 2x SSC, bake at 80^{O}C for 2 hours.

C. Hybridization

1. Perform prehybridization at 55^{o}C for 3 hours in 10 ml of Easy Hyb buffer (Roche Biochemicals) .

2. Boil 20µl *GeneProber™* GLFXDIG1 probe in 500µl of Easy Hyb for 10 minutes. Chill directly on ice. Add the above probe to10ml of Easy Hyb. Discard the prehybridization buffer and replace it with the hybridization buffer containing the boiled probe. Hybridize overnight at 55^{o}C.

Gene Link recommends using Roche Biochemicals (Boehringer Mannheim) Digoxigenin based washing and detection system.

3. Detection with CDP star(Tropix) as substrate will yield reliable result by exposing X-ray film for 1 hour to overnight at room temperature.

D. Stripping

Wash the membrane in water to remove the substrate. Then wash the membrane in 0.2N NaOH/0.1% SDS at 37^{o}C for 30 minutes. Rinse the membrane in 2XSSC. Air dry.

Call Gene Link Technical service for more information.

1-800-Gene Link (1-800-436-3546)

Ordering Information

Fragile X Genemer™ and GeneProber™ products.

Product	Size	Catalog No.	Price, $
GLFX1 GeneProber™ Probe spanning the Fragile X CGG triple repeat region. Suitable for random primer labeling for southern analysis.	500ng	40-3201-01 (old number 40-2015-10)	350.00
GLFXDig1 GeneProber™ Digoxigenin labeled probe spanning the Fragile X CGG triple repeat region. Ready to use for non-radioactive southern analysis.	110µl	40-3202-01	400.00
GLFX PCRprober™ Probe for non-radioactive detection of Fragile X CGG triple repeat region amplified PCR products. Contains Probe only.	5 blots	40-3101-01	400.00
GLFX PCRprober™ Kit Kit for amplification and **non-radioactive** detection of Fragile X CGG triple repeat region amplified PCR products.	5 blots	40-3102-00	650.00
GLFX Genemer™ Kit Kit for amplification and **radioactive** detection of Fragile X CGG triple repeat region amplified PCR products using ^{35}S or ^{32}P.	100 reactions	40-3103-00	650.00
GLFX Genemer™ Primers for Fragile X CGG triple repeat region amplification. Contains primers only.	10 nmoles	40-2004-10	100.00

GENEMER™

Product	Size	Catalog No.	Price, $
Sickle Cell SC2/SC5 primer pair	10nmoles	40-2001-10	100.00
RhD (Rh D gene exon 10 specific)	10nmoles	40-2002-10	100.00
Rh EeCc (Rh Ee and Cc exon 7 specific)	10nmoles	40-2003-10	100.00
Fragile X (spanning triple repeat region)	10nmoles	40-2004-10	100.00
Gaucher 1226G mutation specific	10nmoles	40-2005-10	100.00
Gaucher 1448C mutation specific	10nmoles	40-2006-10	100.00
Gaucher 84GG mutation specific	10nmoles	40-2007-10	100.00
Gaucher IVS2 mutation specific	10nmoles	40-2008-10	100.00
Cystic Fibrosis ΔF508	10nmoles	40-2009-10	100.00
Cystic Fibrosis G542X	10nmoles	40-2010-10	100.00
Cystic Fibrosis W1282X	10nmoles	40-2011-10	100.00
Cystic Fibrosis G551D/R553X	10nmoles	40-2012-10	100.00
Cystic Fibrosis N1303K	10nmoles	40-2013-10	100.00
Cystic FibrosisCT3849	10nmoles	40-2014-10	100.00
SRY (sex determining region on Y)	10nmoles	40-2020-10	100.00
X alphoid repeat	10nmoles	40-2021-10	100.00
Y alphoid repeat	10nmoles	40-2022-10	100.00

Please inquire about other GENEMER™ not listed here

**The polymerase chain reaction (PCR) process is covered by patents owned by Hoffmann-La Roche. A license to perform is automatically granted by the use of authorized reagents.

Prices subject to change without notice. **All Gene Link products are for research use only.**

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