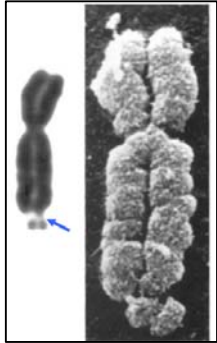


# X ثانياً.



X :3

%25

X (X-Linked Mental Retardation) (XLMR) X

)

.(

*Down*

(Folate)

X

flourdeoxyuridine

CGG

[13].(3 ) thymidine

200

: -1-2

: -1-1-2



:4  
X [2]

X

prognathism

[15,14]

x

[16]

(2008- - - - ) X ρ

%75  
[17].X •

[18].metacarpophalangeal joints •

X  
[15]. •

simian or Sydeny •

) callus .palmar crease

[19].(

sudden •

premature growth  
[20].

.mitral valve prolapse  
[21]. •

[22]. •

: -2-1-2

X %80

.50 IQ  
IQ .85 70 IQ

[23,1]. IQ

X

cluttered ( ) ( ) echolalia  
[1].( )

(2008- - - - ) X e

: -3-1-2

.hand-flapping  
[13]

( )

: -4-1-2

X

X - ( X )

X

[1]

: -5-1-2

X

X

X

X

[1]

X

Lejeune 1982

[13]

[1] ( 65) placebo

objective

subjective

[1]

.clonidine

dextroamphetamine methylphenidate

[1]

tactile defensiveness

[13]

X

**:genetics -3-2**

X

(*Sherman paradox*) "*Sherman*"

[2] DNA " .FRAXA "

*Sherman et al*

[23].

-1

(%10 ) %5 -2

(%18 ) %9

) %28 %50 -3

( %56 %100

**: cytogenetic map -1-3-2**

100 [2].karyotyping

Xq28 Xq27.3 FRAXE FRAXA

locus FRAXA

FRAXE X

FRAXA

%4

.%2 FRAXA

thymidylate synthetase

[24].FRAXA

[24] FRAXA [1]

**:molecular genetics**

**-2-3-2**

17 (Fragile X mental retardation gene) FMR1

5' CGG .Xq27,3 38kb

50-6 . 1

AGG CGG .30/29

[1 ,23 ,13] CGG

200 X **Full mutation (FM)**

(5 )<sup>[13]</sup> **permutation (PM)** 200 50

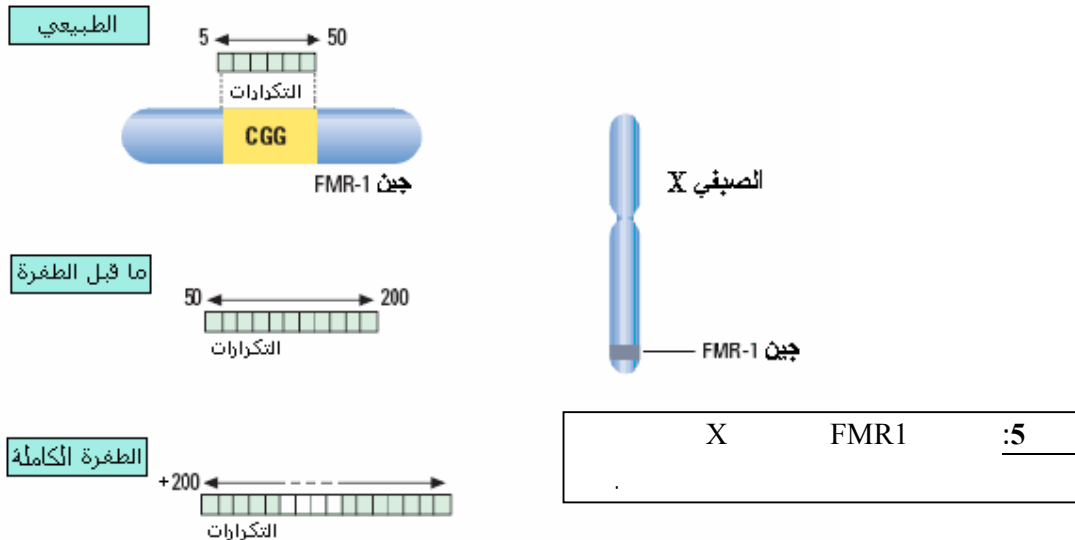
CpG

X

[25 ,13 ,23] ( )

250bp CpG CpG

[25 ,1]



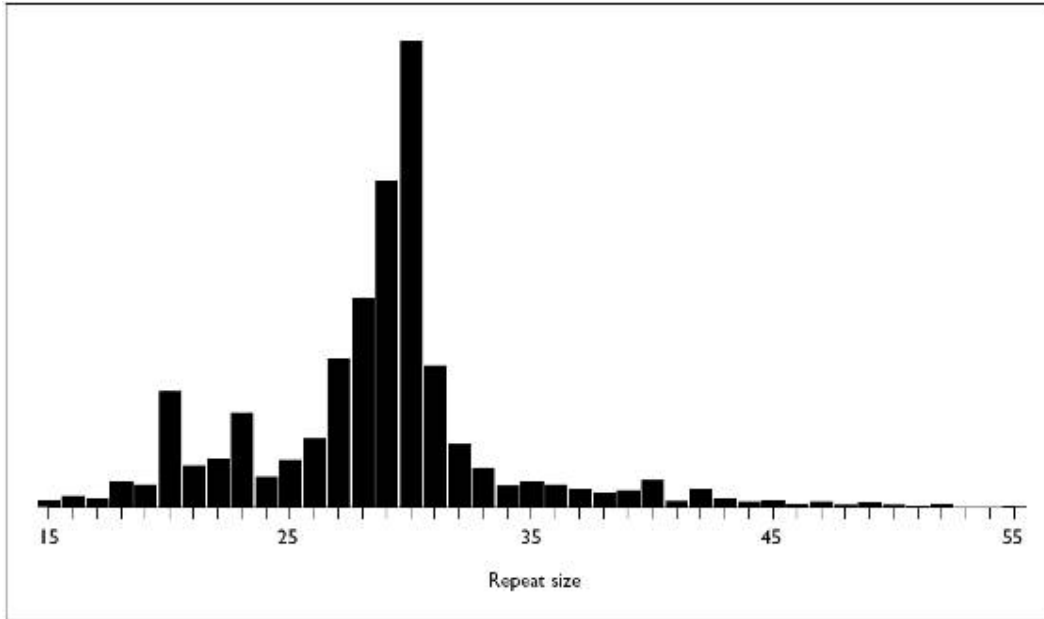
-1-2-3-2

5 .30  
52

[26] .54

[1] .6052

(6 )



:6

X

%29

.heterozygote normal

[1].(1518 ) homozygote

: \_\_\_\_\_ -2-2-3-2

FMR1

PM

FM

X

200

mRNA

.FMR1

CpG

FMR1

199 55

.FMR1

FRAXA

.FMRP FMR1 mRNA

:mosaic

146 604 )

[1].(

21 298

FMR1

FMR1 mRNA

smear

(deletion )

: \_\_\_\_\_ -3-2-3-2

55



(2008- - - - ) X e

73 52 )

.( 52 46

) 55

AGG

CGG

(

-4-2

: -1-4-2

.FMRP

IQ

%20

.IQ

.X

:X -2-4-2

.X

: -3-4-2

IQ

(2008- - - - ) X e

: \_\_\_\_\_ -5-2

( ) .CGG  
CGG

AGG  
.( 722) %50  
[27] . CGG

AGG  
) 150-200bp

[28] .DNA

DNA

.(Okazaki

oocyte  
:post-zygotic

monozygotic

twins

- 
- 
-

**-6-2**

FMR1

15

(fragile X related protein) FMRP

(Gly-x-x-Gly) KH

(RGG box)

Arg-Gly-Gly

RNA

10 8

(KH1,KH2)

[29]

DNA

FMRP

[30]

25

CGG

CGG

[31] X

[23]

RNAs

FMRP

RNA ) RNAi

(

) FMRP

*Drosophila*

RNAi

(

RNA

:interference

L11 L5

KH

[34 ,33 ,32] .5S RNA

.(Ile304Asn)

KH2

X

[23] .RNA

FMR1

FMRP

1500

24

(

20

)

( -1 ) [35]

FMRP

FMR1

[13] X

[36]

FMRP

dihydroxyphenylglycine

(metabotropic glutamate receptor) mGluR

X

.FMRP

[38 ,37]

: **X** -7-2

Screening  
[1].

. high risk of well defined disease

- 
- 
- 
- 

X

prevalence rate

.( )

: -1-7-2

X

tertiary

prevention

[1].

: -2-7-2

[39].

-3-7-2

- 
- 

:cascade

-

(2008- - - - ) X

-8-2

X

: -1-8-2

intrinsic  
[1](150-75£)

.FRAXA

:DNA -2-8-2

.restriction enzymes

DNA

.(deletion )

DNA

radioactive

*SacII BclI HindIII BglII PstI EcoRI*

*BstZI EagII BssHII*

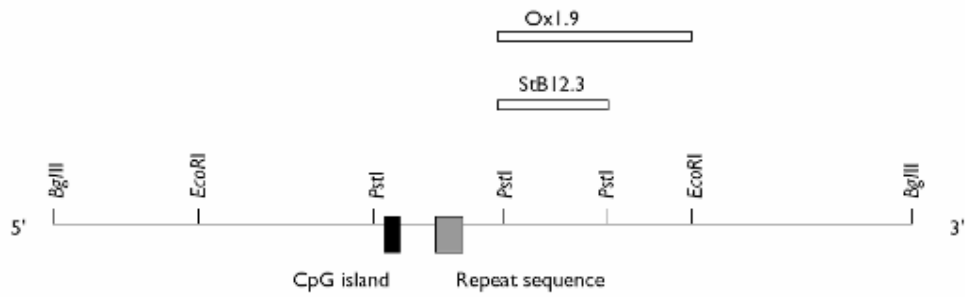
.StB12XX StB12.3 Ox1.9

*PstI*

*BglIII EcoRI*

*BclI*

[40]



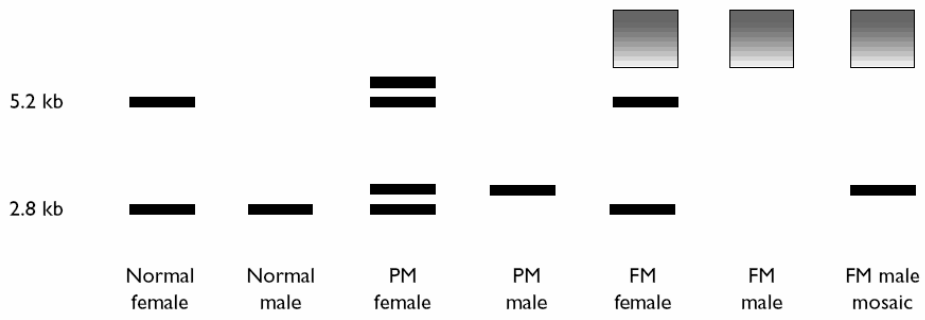
.FMR1	:7
-------	----

[41]

7

X

( )



8

)

(

[1].(75-50£)

:(PCR)

DNA

-3-8-2

.DNA

[42]

DNA

[1]

:

•

•

(2008- - - - ) X

CGG

•

[1]

10E

:

PCR

-4-8-2

(PCR)

%8

CGG

:PCR

-5-8-2

PCR

.CGG

[43]

.PCR

:PCR

-6-8-2

FMR-1

X

[44]

:FMRP

-7-8-2

.FMR1

X

[45]

:

534  
%81

.%99

.( 161)

[1]

[1]

:1

<b>Normal allele</b>				
0	74	-	-	USA (Hull&Hagerman, 1993)
3	252	0	221	Canada (Rousseau et al, 1994)
<b>3 (1%)</b>	<b>326</b>	<b>0 (0%)</b>	<b>221</b>	<b>All</b>
<b>PM allele</b>				
4	37	-	-	USA (Hull&Hagerman, 1993)
14	62	0	10	Finland (von Kuskull et al, 1994)
12	239	1	39	Canada (Rousseau et al, 1994)
0	42	0	10	UK (Macpherson et al, 1992)
3	29	-	-	Brazil (Mingroni-Netto et al, 1994)
<b>33 (8%)</b>	<b>409</b>	<b>1 (2%)</b>	<b>59</b>	<b>All</b>
<b>FM allele</b>				
17	28	-	-	USA (Hull&Hagerman, 1993)
25	28	50	50	Finland (von Kuskull et al, 1994)
34	34	60	61	USA-Rochester (Snow et al, 1992)
169	19	386	392	Canada (Rousseau et al, 1994)
18	22	31	31	UK (Macpherson et al, 1992)
21	30	-	-	Brazil (Mingroni-Netto et al, 1994)
<b>131 (81%)</b>	<b>161</b>	<b>527(99%)</b>	<b>534</b>	<b>All</b>

Xq27.3

) FRAXF FRAXD FRAXE FRAXA

.( X

Morton et al 1997 Webb et al 1986

PCR

Turner et al 1996

[24]



: \_\_\_\_\_ -9-2

( )

%4-3

amniocentesis

chorionic villus

.(6-4 )

.limb reduction

sampling

: \_\_\_\_\_ -10-2

[1]

FMR1

IQ