

GENETIC

PROBLEMS

III

SOLUTIONS

/ $\begin{matrix} \text{HOMOZYOTIC} & \wedge & \times \\ \text{CARRIER} & - & X^H X \\ \text{NORM} & - & X X \end{matrix}$

\wedge | HOMOZYOTIC MATE
 $X Y = \text{NORMAL MATE}$

a)

	$X^H Y$	
X	$X^H X$	$X Y$
X	$X^H X$	$X Y$

GENO PHENO
 1:1 1:1
 or
 CARRIERS : NORM
 0 →

b)

	$X^H Y$	
X^H	$X^H X^H$	$X^H Y$
X	$X^H X$	$X Y$

GENO PHENO
 1:1:1:1 1:1:1:1

c)

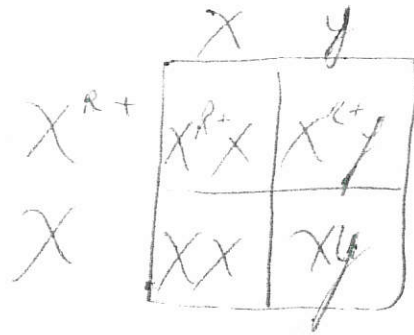
	$X Y$	
X^H	$X^H X$	$X^H Y$
X^H	$X^H X$	$X^H Y$

GENO PHENO
 1:1 1:1

#4

a) $X^{R+} X \times X Y$

$(\frac{1}{4})(\frac{1}{4}) = \frac{1}{16}$
WF RM



b) $(\frac{1}{4})(\frac{1}{4})(\frac{1}{4}) = \frac{1}{64}$
RM RM RM

1) WF WF RF ~~RF~~ = $(\frac{1}{4})(\frac{1}{4})(\frac{1}{4})(\frac{3}{4}) = \frac{1}{256} \frac{3}{64}$
~~RF RF WF WF~~ = $\frac{1}{64}$ = $\frac{1}{256}$
 RF WF WF ~~RF~~ = $\frac{1}{256}$
~~WF RF RF WF~~ = $\frac{1}{256}$
~~RF RF RF WF~~ = $\frac{1}{256}$
 WF RF WF ~~RF~~ = $\frac{1}{64}$ = $\frac{1}{256}$

+ $\frac{1}{256}$

 ~~$\frac{6}{256} = \frac{3}{128} = 2.3\%$~~

1) R R W W $(\frac{1}{2})(\frac{1}{2})(\frac{1}{2})(\frac{1}{2}) = \frac{1}{16}$
 W W R R
 R W R R
 W R R W
 R W R W
 W R W R

$\sum \frac{6}{16} = \frac{3}{8}$

#7

$X^N X^N =$ LETHAL.

$X^N y =$ LETHAL

$X^N X^n =$ SMALL NOTCH

$X^n y =$ NORMAL

$X^n X^n =$ NORMAL.

LITTLE CONFUSING IN THAT IS LETHAL EARLY OR LATE?

a)

	X^N	y
X^N	$X^N X^N$	$X^N y$
X^n	$X^N X^n$	$X^n y$

PHENOCO

1:0

1:1

b)

	X^N	y
X^N	$X^N X^N$	$X^N y$
X^n	$X^n X^N$	$X^n y$

PHENOCO

1:1

#8

	X^N	y
X^N	$X^N X^N$	$X^N y$
X^n	$X^N X^n$	$X^n y$

a) 50%

b) 25%

c) 25%

d) 25%

#11

X-LINKED DOM

- OCCURS IN BOTH SEXES
- AFFECTS MORE FEMALES
- TRAIT DOES NOT SKIP GENERATION
- MOTHER CAN POTENTIALLY PASS IT TO ALL KIDS
- DAD PASSES TO ALL HIS DAUGHTERS.

#12

- | | | |
|-----------------------|-----------------------|------------------------|
| 1. $\frac{X^A X^a}{}$ | 5. $\frac{X^a y}{}$ | 9. $\frac{X^a y}{}$ |
| 2. $\frac{X^a y}{}$ | 6. $\frac{X^a X^a}{}$ | 10. $\frac{X^A X^a}{}$ |
| 3. $\frac{X^A y}{}$ | 7. $\frac{X^A y}{}$ | 11. $\frac{X^a y}{}$ |
| 4. $\frac{X^A X^a}{}$ | 8. $\frac{X^A X^a}{}$ | |

#13

a.) $X^a X^a \times X^A y \rightarrow 50\%$ AFFECTED CHILD.

	X^A	y
X^a	$X^A X^a$	$X^a y$
X^a	$X^a X^a$	$X^a y$

b.) $\rightarrow 0\%$ AFFECTED BOY

c.) $X^A y \times \underline{X} \underline{X} \rightarrow 100\%$ AFFECTED DAUGHTER

#20

SEX LINKED RECESSIVE

- MORE MALES THAN FEMALES ARE AFFECTED
- TRAIT NOT PASSED FROM FATHER TO SONS
- TRAIT TENDS TO SKIP GENERATIONS

#21

- | | | |
|--------------------------------|---------------------------------|---------------------------------|
| 1. $\frac{X^{a}X^{a}}{X^{a}Y}$ | 6. $\frac{X^{A}X^{a}}{X^{a}Y}$ | 11. $\frac{X^{A}Y}{X^{A}X^{?}}$ |
| 2. $\frac{X^{A}Y}{X^{A}Y}$ | 7. $\frac{X^{a}Y}{X^{a}Y}$ | 12. $\frac{X^{a}Y}{X^{a}X^{a}}$ |
| 3. $\frac{X^{A}Y}{X^{A}Y}$ | 8. $\frac{X^{a}X^{a}}{X^{a}Y}$ | 13. $\frac{X^{a}Y}{X^{a}X^{a}}$ |
| 4. $\frac{X^{A}X^{a}}{X^{A}Y}$ | 9. $\frac{X^{a}Y}{X^{A}X^{?}}$ | 14. $\frac{X^{a}Y}{X^{a}Y}$ |
| 5. $\frac{X^{a}Y}{X^{a}Y}$ | 10. $\frac{X^{A}X^{?}}{X^{A}Y}$ | 15. $\frac{X^{A}Y}{X^{A}Y}$ |

#22

2) $X^{A}Y \times X^{A}X^{a} \rightarrow 50\%$

1) #'s 3 and 8

.) 0% He wants pass the Y CHROMOSOME TO HIS SON.