BIO-341-01-0901: Enrichment Activity #9: Genetic Counseling Exercise

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Keys

Enrichment Activity #9: Genetic Counseling Exercise (Due: 28Apr09)

albino a) P(2 x 13 ---> c/c) = ? 1/12

carrier b) P(2 x 13 ---> C/c) = ? 5/12

homo normal c) P(2 x 13 ---> C/C) = ? 6/12

III 2 is C/-

	c
C	C/c
c	c/c

II1 C/c × II2 C/c

III 2 C/-

III 13 is C/-

	C	c
C	C/C	C/c
c	C/c	c/c

II7 C/c × II8 C/c

III 13 C/-

Complete Enrichment Activity #9 before 28 April 09.

Indicate your completion of EA#9 by posting your name in the Genetics Discussion Board under the "Enrichment Activity #9" Forum.

III 2 × III 13		Progeny (a)	(b)	(c)	Scenario
C/-	C/-	c/c	C/c	C/C	
1/2 C/c	2/3 C/c	1/4	2/4	1/4	i/
	1/3 C/C	0	1/2	1/2	ii/
1/2 C/C	2/3 C/c	0	1/2	1/2	iii/
	1/3 C/C	0	0	1	iv/
Probability P		1/12	5/12	6/12	
		c/c albino	C/c carrier (heterozygous normal)	C/C homozygous normal	

i/ C/c × C/c

	C	c
C	C/C	C/c
c	C/c	c/c

ii/ C/C × C/C

	C
C	C/C
c	C/c

iii/ C/C × C/c

	C	c
C	C/C	C/c

iv/ C/C × C/C

	C
C	C/C

P(normal) = 1 - P(albino) = 1 - 1/12 = 11/12

normal

P(normal) P(C/c) + P(C/C) = 5/12 + 6/12 = 11/12

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ⓐ $P(\overset{C/-}{2} \times \overset{C/-}{13} \rightarrow \overset{\text{albino}}{c/c}) = ?$ (1/12)

$i/ + ii/ + iii/ + iv/ = 1/12 + 0 + 0 + 0 =$

$P(2 \text{ is } C/c) = 1/2$

$P(13 \text{ is } C/c) = 2/3$

$P(C/c \times C/c \rightarrow c/c) = 1/4$

Scenario i/ $P(2 \text{ is } C/c \times 13 \text{ is } C/c \rightarrow c/c) =$ (1/12)

$1/2 \cdot 2/3 \cdot 1/4 = 2/24 = 1/12$

Scenario

ii/ $P(2 \text{ is } C/c) = 1/2$

$P(13 \text{ is } C/C) = 1/3$

$P(C/c \times \overset{C/C}{~~c/c~~} \rightarrow c/c) = 0$

Scenario

iii/ $P(2 \text{ is } C/C)$

$P(13 \text{ is } C/c)$

$P(C/C \times C/c \rightarrow c/c) = 0$

Scenario

iv/ $P(2 \text{ is } C/C)$

$P(13 \text{ is } C/C)$

$P(C/C \times C/C \rightarrow c/c) = 0$

(6) $P(\underset{C/-}{2} \times \underset{C/-}{13} \xrightarrow{\text{carrier}} C/c) = ?$ $\quad P(2 \text{ is } C/- \times 13 \text{ is } C/- \to C/c) =$

i/ + iii/ + iii/ + iv = $2/12 + 1/12 + 2/12 + 0 = \boxed{5/12}$

Scenario i/ $P(2 \text{ is } C/c) = 1/2$

$P(13 \text{ is } C/c) = 2/3$

$P(C/c \times C/c \to C/c) = 2/4$

$P(2 \text{ is } C/c \times 13 \text{ is } C/c \to C/c)$

$1/2 \cdot 2/3 \cdot 2/4 = 4/24 = 2/12$

Scenario ii/ $P(2 \text{ is } C/c) = 1/2$

$P(13 \text{ is } C/C) = 1/3$

$P(C/c \times C/C \to C/c) = 1/2$

$P(2 \text{ is } C/c \times 13 \text{ is } C/C \to C/c)$

$1/2 \cdot 1/3 \cdot 1/2 = 1/12$

Scenario iii/ $P(2 \text{ is } C/C) = 1/2$

$P(13 \text{ is } C/c) = 2/3$

$P(C/C \times C/c \to C/c) = 1/2$

$P(2 \text{ is } C/C \times 13 \text{ is } C/c \to C/c) = 2/12$

$1/2 \cdot 2/3 \cdot 1/2$

Scenario iv/ $P(2 \text{ is } C/C) = 1/2$

$P(13 \text{ is } C/C) = 1/3$

$P(C/C \times C/C \to C/c) = 0$

~~$1/2 \cdot 1/3 \cdot$~~

$P(2 \text{ is } C/C \times 13 \text{ is } C/C \to C/c) =$

$1/2 \cdot 1/3 \cdot 0 = 0$

c) $P(2 \times 13 \rightarrow C/C) = ?$ (C/– C/– Romo normal) **6/12**

i/ + ii/ + iii/ + iv $= 1/12 + 1/12 + 2/12 + 2/12 =$

Scenario i/
$P(2 \text{ is } C/c) = 1/2$
$P(13 \text{ is } C/c) = 2/3$
$P(C/c \times C/c \rightarrow C/C) = 1/4$
$P(2 \text{ is } C/c \times 13 \text{ is } C/c \rightarrow C/C) = 1/2 \cdot 2/3 \cdot 1/4 = 2/24 = 1/12$

Scenario ii/
$P(2 \text{ is } C/c) = 1/2$
$P(13 \text{ is } C/C) = 1/3$
$P(C/c \times C/C \rightarrow C/C) = 1/2$
$P(2 \text{ is } C/c \times 13 \text{ is } C/C \rightarrow C/C) = 1/2 \cdot 1/3 \cdot 1/2 = 1/12$

Scenario iii/
$P(2 \text{ is } C/C) = 1/2$
$P(13 \text{ is } C/c) = 2/3$
$P(C/C \times C/c \rightarrow C/C) = 1/2$
$P(2 \text{ is } C/C \times 13 \text{ is } C/c \rightarrow C/C) = 1/2 \cdot 2/3 \cdot 1/2 = 2/12$

Scenario iv/
$P(2 \text{ is } C/C) = 1/2$
$P(13 \text{ is } C/C) = 1/3$
$P(C/C \times C/C \rightarrow C/C) = 1$
$P(2 \text{ is } C/C \times 13 \text{ is } C/C \rightarrow C/C) = 1/2 \cdot 1/3 \cdot 1 = 1/6 = 2/12$

$P(2 \times 13 \rightarrow C/C) = P(2 \text{ is } C/– \times 13 \text{ is } C/– \rightarrow C/C) =$
i/ + ii/ + iii/ + iv/ $= 1/12 + 1/12 + 2/12 + 2/12 = 6/12$