Review Questions

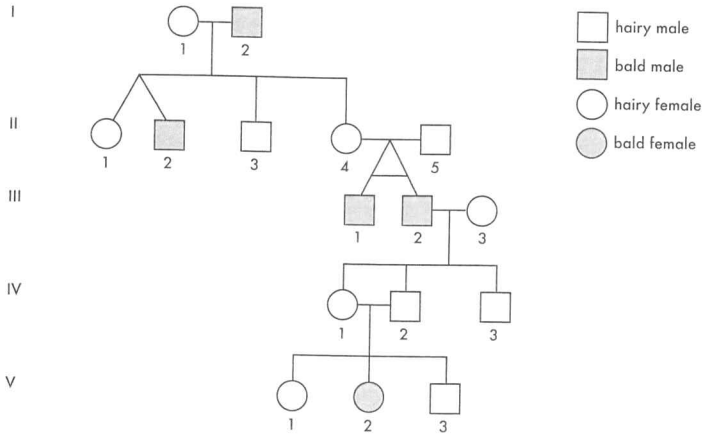
1. Draw the following pedigree in the space provided.

   (i) Bill marries Sue. They have four children, Bob, Sally, Rosie and Tom. Bob marries Cathy and Rosie marries Jim. The other two children do not marry. Bob and Cathy have five children, Bert, Ernie, Harry, Charlie and Pete. Rosie and Jim have only one child whom they name Jane.

   (ii) Jane marries Edmund and they have identical twins (girls). Draw a diagram to illustrate this.

   (iii) Bernard marries Debra and they have non-identical twins, show all the possibilities (given that we are not told the sex of these twins).

2. The pedigree below shows the incidence (in rats) of a disease which causes total baldness.



(i) (a) How is this disease inherited, ie. what is its mode of inheritance?

_____

(b) Explain how you arrived at your answer.

_____

_____

_____

_____

(ii) Write down the possible genotypes of each individual in the pedigree. Use a key.

I 1_____ I 2_____
II 1_____ II 2_____ II 3_____ II 4_____ II 5_____
III 1_____ III 2_____ III 3_____
IV 1_____ IV 2_____ IV 3_____
V 1_____ V 2_____ V 3_____

(iii) Which individuals are twins in this pedigree?

_____

(iv) Which twins are monozygotic and which are dizygotic?

_____

_____

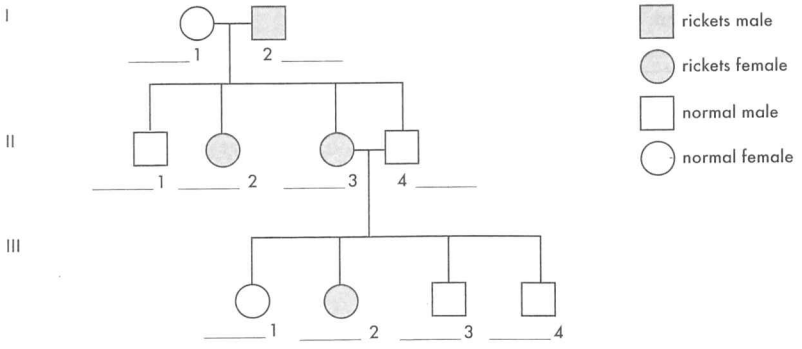
_____

(v) Where did the genes which gave rise to V 2's baldness come from?

_____

_____

3. A rare inherited form of rickets is shown on the pedigree below.



This disease is unusual because it is caused by a gene carried on the X chromosome (sex linked).

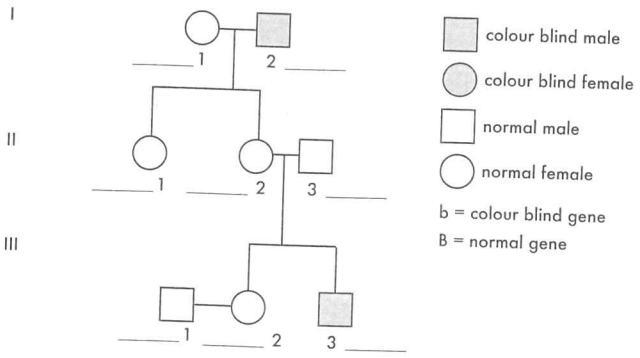
(i) How is this defective gene different from the usual sex-linked defective gene?

(ii) From which parent did individual II 2 inherit the defective gene?

(iii) Under each individual in the spaces provided, write possible genotypes. (Use a key to indicate what your letters stand for.)

(iv) Would you expect more males or more females to inherit this disease? Explain.

4. (i) A family with a history of colour blindness (an x-linked recessive trait) has the pedigree shown below.



Write the possible genotypes for each individual in the spaces provided.

(ii) If individuals 1 and 2 in generation III have children, what is the probability of each of the following genotypes in their offspring? (Use the punnet squares to work out your answers).

X^bY

X^BY

X^BX^B

X^BX^b

X^bX^b

Man

Woman

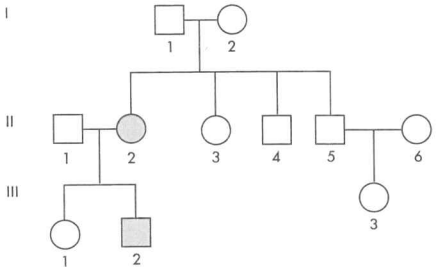
OR

Man

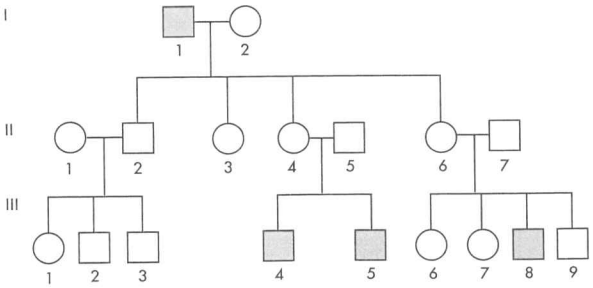
Woman

5. For each of the pedigrees below, determine the most likely mode of inheritance (ie. whether sex linked or autosomal **and** whether dominant or recessive). Explain how you arrived at your answer in each.

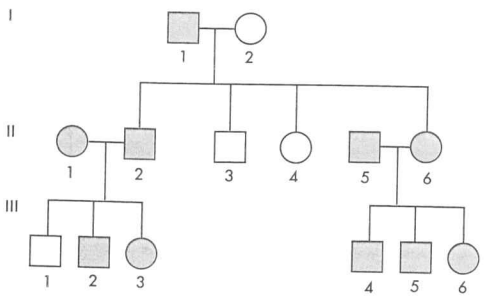
(i)



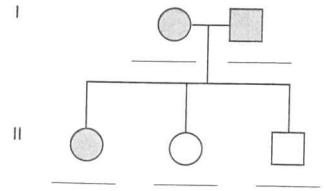
(ii)



(iii)

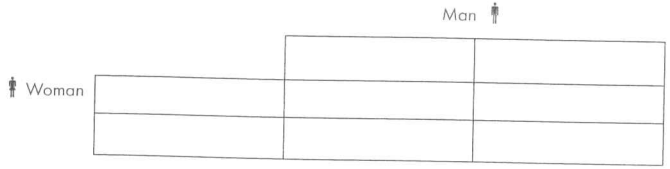


6. In the pedigree below, an autosomal dominant condition represented by R is shown.



(i) Write the possible genotypes in the spaces below each individual.

(ii) If this couple has another child, what is the probability that it will have the condition?



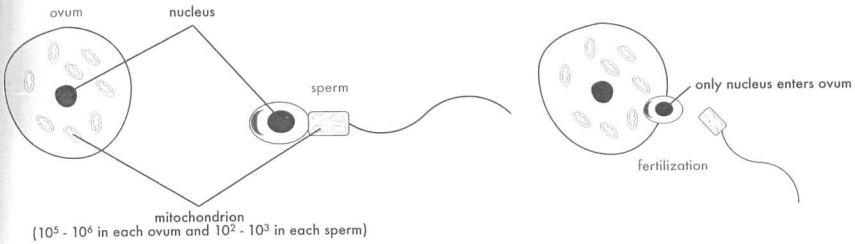
(iii) What is the probability that the child is homozygous (RR or rr)?

(iv) If the child has the condition, what is the probability that he or she is homozygous?

(v) If the child does not have the condition, what is the probability that he or she is homozygous?

(vi) What is the probability that a child both inherits the condition and is heterozygous?

7. Study the following diagrams carefully (cells not drawn to scale)

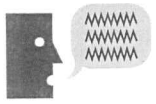


(i) Which cell contributes most of the mitochondria to the new zygote?

(ii) Which organelles contain DNA?

(iii) Mitochondrial DNA is believed to control the production of proteins which are involved in respiration. Which sex contributes this DNA to the offspring?

9.3 GENETIC TESTING



Terminology

These are some of the terms from this section which you should know. Write the meaning of each term in the space provided.

(i) Amniocentesis

(ii) Carrier

(iii) Forensic

(iv) Prenatal Care

Review Questions

1. (i) What is meant by 'genetic testing'?

(ii) Discuss the kinds of gene testing and their use.

(a) Carrier testing

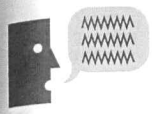
(b) Identity testing

(c) Infant screening

(d) Prenatal testing

(e) Screening

9.4 HUMAN GENOME PROJECT



Terminology

These are some of the terms from this section which you should know. Write the meaning of each term in the space provided.

(i) Anthropology

(ii) Evolution

(iii) Genome

(iv) Locus

(v) Predisposition

Review Questions

1. (i) What is the Human Genome Project?

(ii) What are the benefits of knowing this sequence?