

Questions about Genetic disorders and embryo screening

Q1. Cystic fibrosis is an inherited disorder that can seriously affect health.

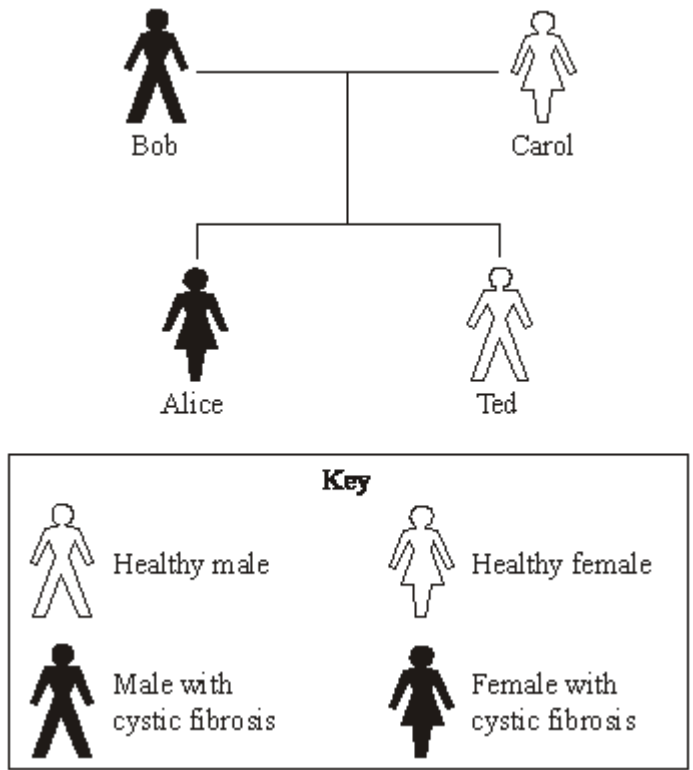
(a) Which **one** of these is affected by cystic fibrosis?

Draw a ring around your answer.

- blood cell membranes kidneys nervous system**

(1)

(b) The diagram shows the inheritance of cystic fibrosis in a family. The allele that produces cystic fibrosis is recessive.



(i) Explain why Alice inherited cystic fibrosis.

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.....

(2)

(ii) Explain why Ted did **not** inherit cystic fibrosis.

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(2)

(c) Bob and Carol know that there is a risk that their next baby will have cystic fibrosis.
Embryos can be screened for the allele that produces cystic fibrosis.
Many people support the screening of embryos, but others do not.

(i) Suggest **one** reason why many people support the screening of embryos for the cystic fibrosis allele.

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.....

(1)

(ii) Suggest **one** reason why many people are against the screening of embryos for the cystic fibrosis allele.

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(1)

(Total 7 marks)

Q2. Cystic fibrosis is a disease which affects 1 in 1600 babies.

(a) What are the symptoms of cystic fibrosis?

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(3)

(b) Two parents with normal characteristics have a child who was born with cystic fibrosis.

Explain, as fully as you can, how this can happen.

You may use a genetic diagram if you wish.

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(4)
(Total 7 marks)

Q3. Polydactyly is an inherited condition. Polydactyly is controlled by a dominant allele.

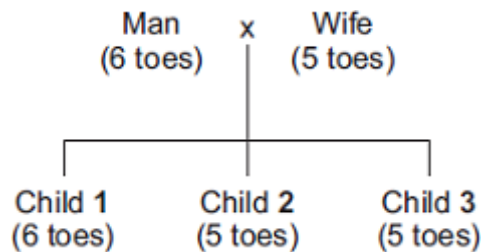
The photograph shows the foot of a baby with polydactyly.



CNRI/Science photo library

A man and his wife have three children. The man has polydactyly.

The diagram shows the inheritance of polydactyly in this family.
The diagram also shows the number of toes each person has on each foot.



In the rest of this question, the following symbols are used to represent alleles.

D = allele for polydactyly (6 toes on each foot)

d = allele for 5 toes on each foot

(a) (i) How many alleles for the number of toes will there be in **one** sperm cell?

(1)

(ii) Complete the sentence.

A sperm cell joins with an egg cell in a process called

(1)

(b) (i) What combination of alleles does the man have?

Tick (✓) **one** box.

DD

Dd

dd

(1)

(ii) What combination of alleles does the man's wife have?

Tick (✓) **one** box.

DD

Dd

dd

(1)

(c) Draw a ring around the correct answer to complete each sentence.

(i) The man and his wife plan to have a fourth child.

The probability that this child will have 6 toes on each foot is

1 in 2.

1 in 3.

1 in 4.

(1)

(ii) When Child 2 grows up, he marries a woman with 5 toes on each foot.

The probability that their first child will have 6 toes on each foot is

0.

1 in 2.

1 in 4.

(1)
(Total 6 marks)