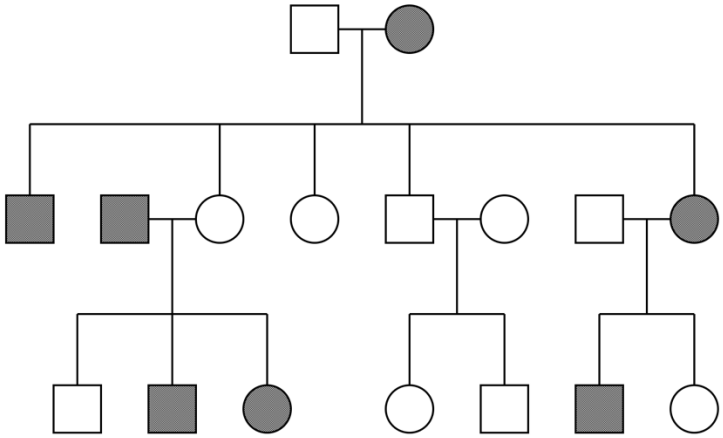
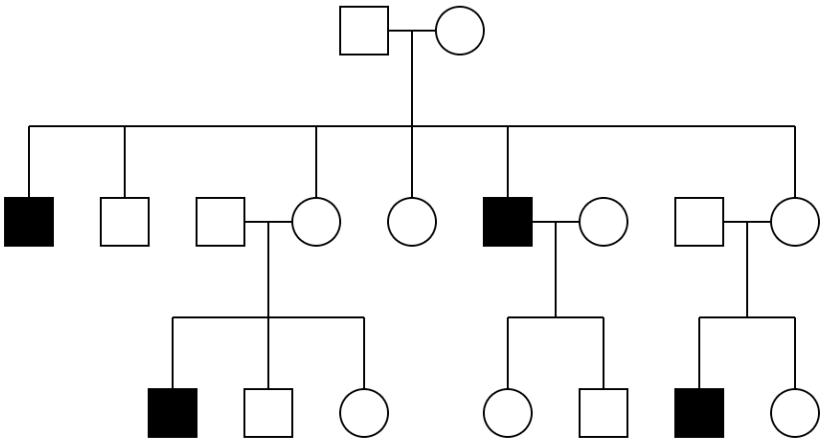
BIOL3120 Problem set 1



1. **What is the *most likely* mode of inheritance for the condition shown in the above pedigree? Why?**

a) Autosomal dominant
b) Autosomal recessive
c) X-linked dominant
d) X-linked recessive



2. **What is the *most likely* mode of inheritance for the condition shown in the above pedigree? Why?**

a) Autosomal dominant
b) Autosomal recessive
c) X-linked dominant
d) X-linked recessive

3. Assuming that Hardy-Weinberg equilibrium fits for humans: 1 in 5,500 people are affected by an autosomal recessive condition.

   What is the carrier frequency for this condition?

4. You take genotypes from 500 people for a particular gene with two alleles, and find the following:

   homozygous dominant: 401 people
   homozygous recessive: 8 people
   heterozygous: 91 people

a) What is the frequency of the dominant allele?

b) What is the frequency of the recessive allele?

5. Haemochromatosis is a mild autosomal recessive condition. Approximately 1 in 200 Australians have the condition, and approximately 1 in 7 Australians are carriers.

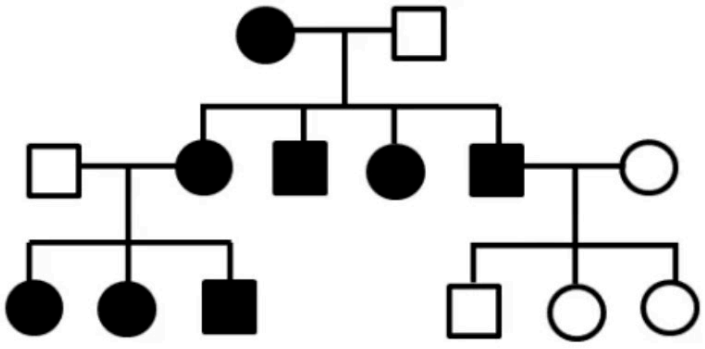
   Jane is planning on starting a family, and does not have haemochromatosis, though her mother is affected with the condition. Her father is not affected, and is not a carrier. Jane's partner Steve does not have the condition either, but his father is a carrier (his mother is not a carrier).

   What are the chances their first child will be affected with haemochromatosis? (hint: draw a family pedigree)

6. Unfortunately, things don't work out with Steve. Jane is now planning to have a child with Fred, who is not affected with haemochromatosis. Fred was adopted and knows nothing about his biological family, except that they are Australian.

   What are the chances that Jane and Fred's first child will be affected with haemochromatosis?

7. **Assuming full penetrance, no heteroplasmy, no de novo mutation, and onset from birth, which modes of inheritance could be possible in the pedigree on the right, even if unlikely?**



Note that in your online submission of this question:

- multiple answers are possible
- correct answers will earn you marks
- incorrect answers will lose you marks
- but you can't score a negative mark overall for this question

a) Autosomal dominant
b) Autosomal recessive
c) X-linked recessive
d) X-linked dominant
e) Y-linked
f) mitochondrial