Exercises week 6 Bio-105 (2024)

Question 1

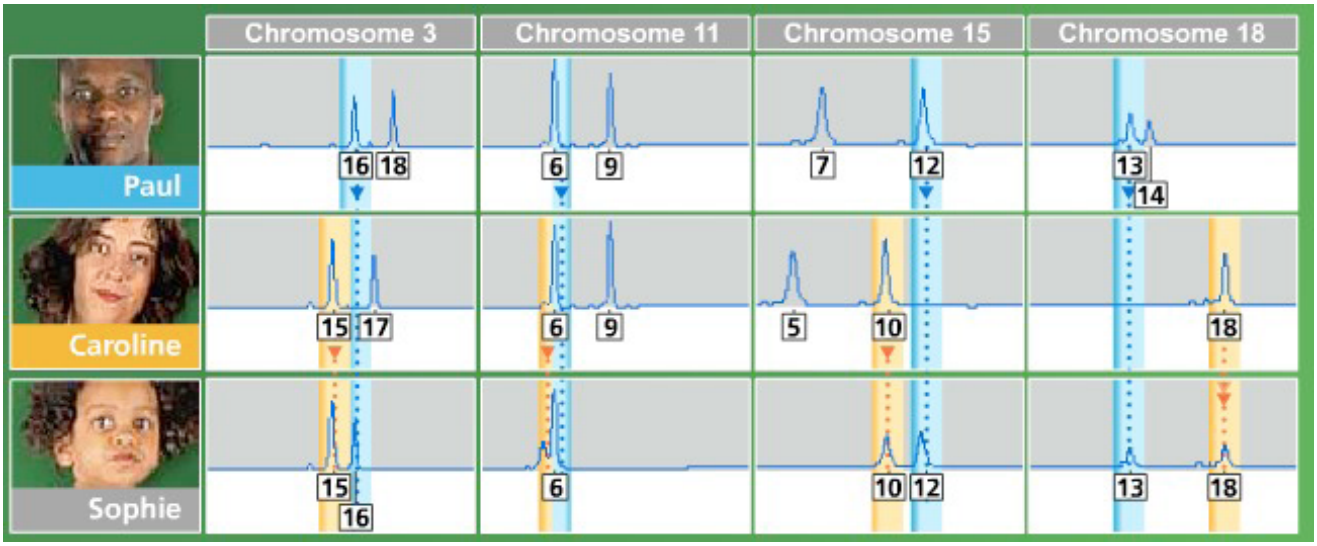
Which primers pair should be used to amplify the following DNA sequence?

5’ ATCGGCTATCGACTACGGGATTCATCAGGCTACGGGCATCTATATTATCGGTATCGA 3’

Primers :

A. 5’ ATCGGCTATCGACT 3’ et 5’ ATTATCGGTATCGA 3’
B. 5’ ATCGGCTATCGACT 3’ et 5’ TCGATACCGATAAT 3’
C. 5’ TAGCCGATAGCTGA 3’ et 5’ ATTATCGGTATCGA 3’
D. 5’ AGTCGATAGCCGAT 3’ et 5’ TCGATACCGATAAT 3’

Question 2

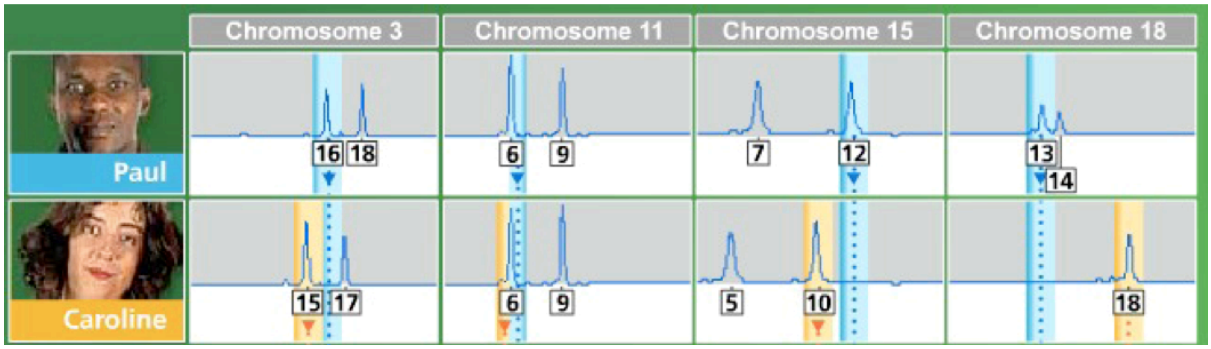


Paul and Caroline have a second child (Adrian):

What is the probability that Adrian’s DNA profile is *identical* with Sophie’s profile for the 4 loci shown?

Show your calculations.

Question 3



Paul and Caroline plan to have two children. What is the probability that their 2 children will have an identical DNA profile for the 4 loci shown? (Assume that the 2 children are not monozygotic twins)

Show your calculations.

Question 4

In the human genome a highly polymorphic microsatellite exists in 10 variants (10 alleles, 10 different lengths). One analyzes this locus in 2 persons picked randomly (a European and an Asiatic, they are not relatives).

4.1 What is the probability that these 2 persons have the same genotype at the tested locus? (assume the same frequency for all alleles)

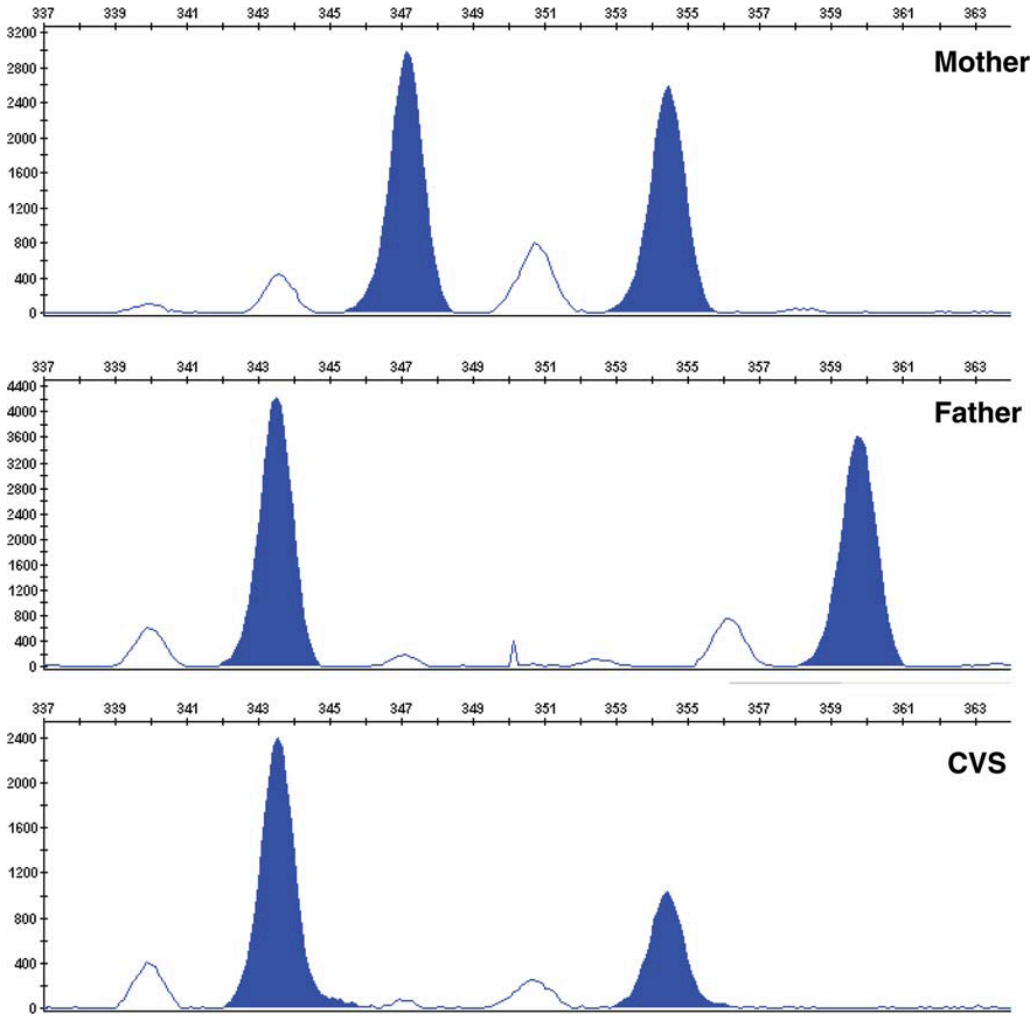
Show your calculations.

4.2 What is the probability that these 2 persons have identical DNA profiles.
Assume a profile made of 10 loci; 10 alleles at each locus, same frequency for all alleles at all loci (as in question 4.1)

Show your calculations.

Question 5

A prenatal test is done on a fetus: the microsatellite D21S1414 has been analyzed in the mother, the father and the fetus. For the fetus a placenta biopsy (Chorionic Villi Sample CVS) has been obtained. (real case, real analysis)



What do you conclude from the analysis?

5.1 The test excludes the “official” father as the biological father.

A. RIGTH B.WRONG

5.2 The child is A. normal B. abnormal

5.3 If you think that the child is abnormal precise what is the problem and what happened.