

Genetics, L2 Biology Module provided by: Medjani S,
TD 3 (Transmission of characters)

Exercise 1:

We cross 2 drosophila, purebred for all the genes involved in establishing the phenotype, one with red eyes, the other with white eyes. All the drosophila resulting from this cross (which we call individuals of 1a F1) have red eyes. The self-crossing (self-fertilization) of individuals of 1a F1 gave 330 individuals with red eyes and 112 with white eyes.

1) Determine the number of characters studied and the dominance or recessiveness of the phenotypes studied. Justify each statement.

A cross is made between an F1 female and a white-eyed male.

The experimental results are as follows: 249 individuals with red eyes and 244 individuals with white eyes

2) What is such a crossing called?

3) What does it allow to check ?

4) Using reasoning based on chromosomal representations and the writing of genotypes, test the two hypotheses and then conclude.

Exercise 2:

A genetic model has been proposed to explain the inheritance of right-handedness or left-handedness in humans (laterality). This model is as follows: the quality of being right-handed or left-handed is controlled by a gene with two alleles: - allele R Contribution to the right-handed phenotype (dominant)

- allele r undetermined laterality (recessive)

SO :

RR or Rr **genotype** gives right-handed **phenotype**

genotype rr gives an indeterminate laterality: half of these children become left-handed individuals and half become right-handed.

1) Based on this model, two Rr (right-handed) parents have a 1/8 chance of having a left-handed child. Explain why this is so.

2) According to this model, can a left-handed mother and a right-handed father have a left-handed child? Justify your answer.

3) According to this model, can two left-handed parents have a right-handed child? Justify your answer.

Exercise 3:

In a hybridization experiment, if the allele for long-stemmed plants (T) was incompletely dominant over the allele for short plants (t),

1) What would be the result of crossing a homozygous long-stemmed plant (pure line) and a homozygous short plant?

2) What would be the result of crossing two heterozygous plants?

Exercise 4:

codominant alleles. There are three different alleles, known as I^A , I^B , and i . The I^A and I^B alleles co-dominate, and the i allele is recessive. Possible human phenotypes for blood group are type A, type B, type AB, and type O.

What are the possible blood types of children from a marriage between a type AB woman and a type O man?

What are the possible blood types of children from a marriage between a type A woman and a type O man?