Human Genetics:
Problem Set I

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Abstract

This work contains the solutions to the problem set I of Human Genetics 2015 course at New York University.

Question 1. Consider Mendel's green and yellow peas. Color is inherited via the Y locus, with YY and Yy peas yellow and yy peas green. **a.** What is the expected frequency of yellow peas in the F_1 generation of a cross between YY and yy? **b.** What is the expected frequency of yellow peas in the F_2 generation of the cross? **c.** In a cross of a $RRYY$ round yellow pea to a $rryy$ wrinkly green pea, what's the expected frequency of green peas in the F_2 generation?

Solution. a. As the gamete from the YY pea must be Y, the peas in the F_1 generation must contain at least 1 Y allele. Since we are given that YY and Yy genotypes result in yellow color, we have that the peas in the F_1 generation must be yellow. In other words, the expected frequency of yellow peas in the F_1 generation of a cross between YY and yy is 1.

b. Notice that the argument of The expected frequency of yellow peas in

c.

Question 2.

Solution.

Question 3.

Solution. a. As the father is type AB, we know that his genotype is $I^A I^B$. For the case of the mother, since O is the recessive trait, her genotype is $I^O I^O$.

b. The genotype of their children can be either $I^A I^O$ or $I^B I^O$. Since I^A and I^B are both dominant to I^O, the phenotype of their children can be either A or B.

c.

Question 4.

Solution.