Practicing your *P*s and *Q*s

1. A wild population of a butterfly species consists of 99% orange butterflies and 1% yellow. Genetic tests proved the yellow form is due to an autosomal recessive gene. Estimate the percentage of heterozygotes in the population. What assumptions have you made in order to reach this estimate.

2. If 6% of the males in a population have the same type of X-linked recessive red-green color blindness, estimate the frequency of women in the population with this same type of color blindness. What proportion of the women will have normal color vision but nevertheless have half of their sons color blind because of this gene?

3. From a population 80% normal and 20% heterozygous for an autosomal recessive lethal, what percentage of the next generation will be expected, with random mating, to be homozygous for the recessive lethal?

4. The frequency of a dominant gene is 0.2. What proportion of the population would you expect to show the dominant trait?

5. Would you expect an X-linked dominant trait to be more frequent in men or in women? If a dominant X-linked trait affects 5% of the men in a population, what proportion of the women do you estimate would be affected?

6. Thalassemia major is a severe anemia, usually fatal in childhood and rather frequent in populations in the Mediterranean region. It results from homozygosity for a particular gene. Thalassemia minor results from heterozygosity for this gene. If, among people of southern Italian ancestry now living in Rochester, NY, thalassemia major occurs in about 4 in 10,000 births, what is the expected incidence of thalassemia minor.