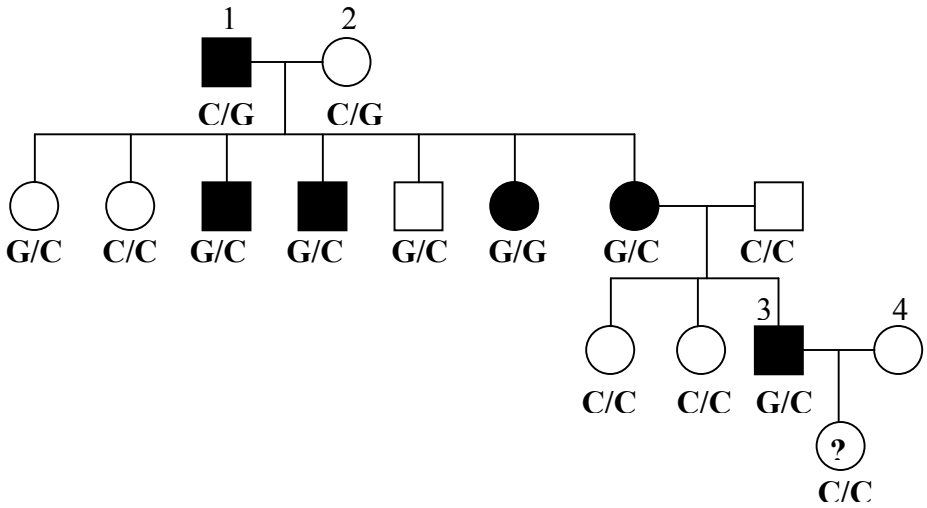
Solution Key -7.012 Recitation 11 - 2010

Questions:

1. You identify a hypothetical Gene R in humans that encodes for protein "R" which is involved in maintaining low blood cholesterol level. This gene shows an autosomal dominant mode of inheritance and the affected individuals are at a higher risk of developing a cardiac disorder (CD). You come across a SNP (Single nucleotide polymorphism) that is tightly linked to Gene R. You decide to use this SNP as a marker for CD. The two alleles of SNP (C and G) are shown for each individual in the following pedigree. *Individuals affected by CD are shaded in black.*



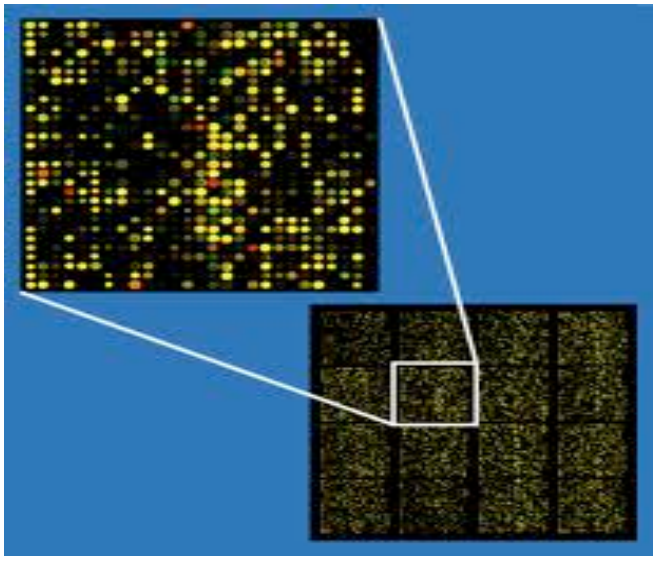
a) Assuming no recombination between this SNP and Gene R, which allele of the SNP is linked to the disease associated $\mathbf{R^-}$ allele in individual #1?

It is the "G" allele.

b) Assuming no recombination between this SNP and Gene R, what is the probability that the offspring of individual #3 and individual #4 has the disease?

This offspring has the C/C alleles for this SNP. Therefore he is obtaining the good allele "C" from #3 and another allele, also "C" from #4. Therefore this offspring will be normal and will not have the disease.

2. Describe what the image below is showing.



It shows a microarray profile or a gene expression profile which is the measurement of the activity / expression of thousands of genes at once, to create a global picture of cellular function. These profiles can, for example, distinguish between cells that are actively dividing, or show how the cells react to a particular treatment. Many experiments of this type measure an entire genome, that is, every gene present in a particular cell.