

1. A population of 100 diploid individuals contains 100 A alleles and 100 a alleles. If there is no mutation and the three genotypes are selectively equivalent (neutral), what would you expect the genotype frequencies to be 10,000 generations in the future?
2. What is the heterozygosity (H) in each of the following populations?

Pop'n	Genotype Frequency		
	AA	Aa	aa
1	25	50	25
2	50	0	50
3	0	50	50
4	0	0	100

3. If the neutral rate is 10^{-8} at a locus, what is the rate of neutral evolution at that locus if the population size is a) 100, b) 1000.
4. Why is the neutral theory confined to molecular evolution, rather than being applied to all evolution?
5. What facts about molecular evolution led to the proposal of the neutral theory of molecular evolution?
6. What facts about molecular evolution led to the proposal of the nearly neutral theory of molecular evolution?
7. Explain the relationship between the degree of functional constraint on a molecule (or a region of a molecule) and its rate of evolution according to the neutral theory.
8. Do synonymous sites show pan-neutral evolution (in the sense that all mutations are neutral) [see pp 260-262 in your text]? Why does this not invalidate the argument that synonymous sites evolve according to the neutral theory?
9. Three genes have dN/dS ratios of a) 0.2, b) 1, c) 10. What inferences can we make about the evolution of these genes?