

PLSC 731: Paper Review

Jones et al – Markers and mapping: we are all geneticists now (reference pages in parentheses)

1. Describe some fields in which markers and maps are useful. (165)
2. What is the ultimate goal of molecular marker technology? (165)
3. What is the value of cloning a gene? (165)
4. What is meant by a neutral DNA site? Why are they an advantage for molecular markers? (165)
5. Can the lessons learned from studying RFLP technology be applied to other marker systems? Which ones and why? (166)
6. With respect to RFLP, what is the principle of Southern hybridization? (166)
7. What are the three genotypic forms at a RFLP locus? (166)
8. Describe the major advantage of a codominant marker system. (166)
9. Why are molecular marker systems better than “classical” markers for detecting variation? (166)
10. What is genetic mapping? How does it differ from molecular mapping? (166)
11. Discuss the principles of mapping. (167)
12. By definition, what is the recombination frequency? What is it proportional to? (167)
13. What effects do double crossovers have upon the mapping distance between two genes? (167)
14. What is the difference between genetic and physical distances? (168)
15. Describe the mapping populations that are used for genetic mapping purposes. (168)
16. How might you ensure you have a large number of mappable loci in a population? (168)
17. Explain Figure 4. (169)
18. What is absolutely essential to map a gene of interest onto a molecular map? (170)
19. Define a “major” gene. (170)
20. What evidence from Figure 6 suggests that the marker and the resistance gene are very close? (170)
21. Describe the principle of bulk segregant analysis. (170)
22. Define a “quantitative trait locus”. (171)
23. Explain Figure 7. (171-172)
24. Define the term “transgressive segregation”? How might this be explained genetically? (173)
25. What is marker assisted selection (MAS)? What is the value of MAS? (173)
26. What is the definition of synteny from a molecular marker perspective? (173)
27. Why is the fact that the genetic distance is not proportional to the physical distance of no concern for MAS but is of concern for marker assisted cloning? (174)
28. What are the limitations to a standard mapping population? (174)
29. Besides RFLP, briefly describe four other types of molecular marker systems. (175-176)