

PLSC 731: Paper Review

Reid and Ross: Mendel's Genes: Toward a Full Molecular Characterization

(The page where you might find the answer is found in parentheses.)

1. What seven traits did Mendel study? (1)
2. Why were his results considered controversial? (3)
4. Why is it difficult to know for sure what specific genes Mendel was studying? (3)
5. Why is it difficult to know which alleles Mendel studied for each gene? (4)
6. Describe the seed shape phenotype from a morphological and physiological perspective. (4)
7. How did wrinkled and round seed types differ for these characteristics? (4)
8. Was it reasonable to consider that the *R* locus was a regulatory gene? (4)
9. What gene controls the seed shape gene and how was it discovered? (4)
10. What is the nature of the mutation at the *R* locus that is responsible for the wrinkled seed phenotype? (5)
11. What phenotype does the *LE* locus control? What evidence suggested that it was a gene that controlled gibberellin acid biosynthesis? (5)
12. Describe the cloning of the *LE* gene. What is the role of cosegregation data for this type of cloning experiment? What are the differences between *le-1*, *le-2*, and *le-3*? (5)
13. How can a plant survive a mutation, such as those affecting the gibberellin pathway, and still develop normally? (5)
14. What is the phenotypic relationship between the pea *I* gene (that controls green cotyledon) and the rice *sgr* gene? What pleiotropic effects are observed in pea plants with the *ii* genotype? (5,6)
15. How was it determined that the *I* gene is functionally equivalent to the *sgr* gene of rice? What is the nature of the three mutations in *I*? What is the biochemical function of the SGR protein? (6)
16. What pleiotropic effects are seen at the *A* locus in pea? What is the molecular role of *A* in controlling seed and flower color in pea? How was this determined? What is meant by "...synteny between the *Medicago* and pea genomes..."? What is meant by "...rescue pigment formation..."? (6)
17. What is the phenotype and structural changes associated with the *GP* mutation? (7)
18. What is the phenotype and structural changes associated with the *p* and *v* mutations? What evidence suggested that Mendel worked on the *P v* genotype? Why didn't Mendel discover the linkage between *LE* and *V*? (7)
19. What is the phenotype of mutants at the *FA* locus? What evidence suggests that gene may be an ortholog of the *Medicago clavata* gene? (8)
20. How has the cloning of Mendel's genes provided further evidence of the validity of his major discoveries? (8)
21. What basic principles of molecular genetic analysis are demonstrated by the cloning of Mendel's genes? (8)