Tutorial #1 BIOL 433

Tues. January 7th, 2020

Please read the following paper. Try to answer the questions below as you read and after you read. We will discuss these in the tutorial.

Bhattacharyya et al, 1990. The wrinkled-seed character of pea described by Mendel is caused by a transposon-like insertion in a gene encoding starch-branching enzyme. Cell 60, 115-122.

Introduction section:

- 1. What was known about the *R* gene before the studies in this paper were undertaken?
- 2. What is the phenotype of r (rugosus) mutant plants? Why is this an easy phenotype to study genetically?
- 3. How is the r phenotype inherited?
- 4. What are possible biochemical defects leading to the r phenotype?
- 5. What is SBEI and why was it felt that this enzyme might be defective in r plants?

Results

- 6. What methods were used to confirm that SBEI is defective in r plants?
- 7. How was the SBEI gene cloned? Why was it cloned?
- 8. What techniques were used to analyze an SBEI cDNA? What did these analyses demonstrate?
- 9. Is there genetic linkage between SBEI gene and r? How was linkage demonstrated? Why was it important to demonstrate linkage?
- 10. Can you think of any other ways which, in theory, could be used to demonstrate that a defect in the SBEI gene causes the wrinkled phenotype?
- 11. What is the molecular basis for the r mutation? What methods were used to demonstrate this, and how do the results show this?
- 12. What alternative strategy **could** have been used to clone the *R* gene if the molecular basis of the mutation had been known beforehand?

Discussion

- 13. What is the significance of the results reported in the paper?
- 14. What do we know now that wasn't known before? What questions have been answered? Have any new questions been raised?