

Bacterial Genetics—Mutant Hunt

A. Introduction to Mutagenesis

1. What does it mean in biological terms to be a mutant?
2. How do you generate a mutant? Does it matter if the organism is unicellular or multicellular?
3. Why would UV irradiation generate mutants?
4. Why should you wear sunscreen?

B. Mutant Hunt—Cysteine Auxotrophs

We walk through the steps of the mutant hunt based on the example of looking for yeast that can not make amino acid cysteine.

I. General

1. Why do geneticists look for organisms lacking a trait?

2. How are genes responsible for traits?
3. Why would we be interested in cysteine biosynthesis?
4. Why are we studying this process in yeast?

II. Technical issues

5. How do we make yeast mutants?
6. Will all the mutants we make be mutant in cysteine biosynthesis?
7. What is in complete medium?
8. What is in minimal medium?

III. Planning the experiment

9. If you wanted to make media on which to grow a strain that was unable to synthesize cysteine, what would you need to put in it?

10. What medium could we use to screen for cysteine auxotrophs?
11. What is a selective condition?
12. Why don't we plate the mutagenized yeast directly on selective conditions?
13. How should we find the rare mutant yeast that cannot synthesize cysteine within the large collection of yeast colonies we have on the plates?

IV. Identifying mutants

14. When you "screen" the plates, how do you identify the mutants?
15. If we find some colonies that grow on CM but not MM, can we determine which amino acid they are unable to synthesize?
16. How might we figure this out?