MCB 142 Discussion

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1 Suppressors

1.1 Intragenic

The suppressor mutation is in the same gene as the mutation it suppresses. What are some possible intragenic suppressors for the following mutations?

- Frameshift mutation
- Missense mutation
- Nonsense mutation

Intragenic suppressors are also known as revertants.

1.2 Extragenic

The suppressor mutation is in a different gene from the mutation it suppresses.

- 1. Gene non-specific, allele specific: Also known as *informational suppressors*, which can suppress mutations in multiple genes but only a specific kind of mutation. E.g. nonsense suppressors, *smg* suppressors.
- 2. Gene specific, allele non-specific: Also known as *bypass suppressors*, which can suppress multiple kinds of mutations in a particular gene. The suppressor can be in the same pathway or a parallel pathway to the gene whose mutations it suppresses.
- 3. Gene specific, allele specific: Also known as *interaction suppressors*, which can only suppress a particular mutation in a particular gene.

Think about the *mechanism* by which the suppression works and the *experimental method* by which you can identify what sort of suppressor it is.

A *dominant suppressor* is a dominant mutation that suppresses another mutation (which may be dominant or recessive). A *recessive suppressor* is a recessive mutation that suppresses another mutation (which may be dominant or recessive).

2 Enhancers

An enhancer mutation can occur in the same pathway as the mutation it enhances or a parallel pathway.

Why is it more useful to use hypomorphic alleles when looking for enhancer mutations? When can you get an enhancer of a null mutation?

3 Pathway Analysis

When given a question that asks you to explain a double mutant phenotype, think about the following:

- Are the two mutations both loss-of-function? One gain-of-function and one loss-of-function?
- What are the single mutant phenotypes? Are they similar to each other or are they opposite?
- What is the double mutant phenotye? Is it wild-type (or less severe than the single mutant phenotype)? Does it resemble one of the single mutant phenotypes? Does it have a more severe phenotype than the single mutant?

You are usually asked to propose a model that explains the experimental results or to propose an experiment that tests a certain model.

- $A \rightarrow B \rightarrow$ phenotype X
- A \dashv B \rightarrow phenotype X
- $A \rightarrow phenotype X \leftarrow B$
- A \rightarrow phenotpye X \vdash B