CONCEPT: GENETIC SCREENS

● **Genetic screens** allow researchers to evaluate the _____ of thousands of genes at one time

1. Expose the organism to a mutagen in order to cause a lot of random mutations in the DNA

    - Many of these mutations will cause a phenotype in the organism

2. Search through all the organisms to find a few with a phenotype you want

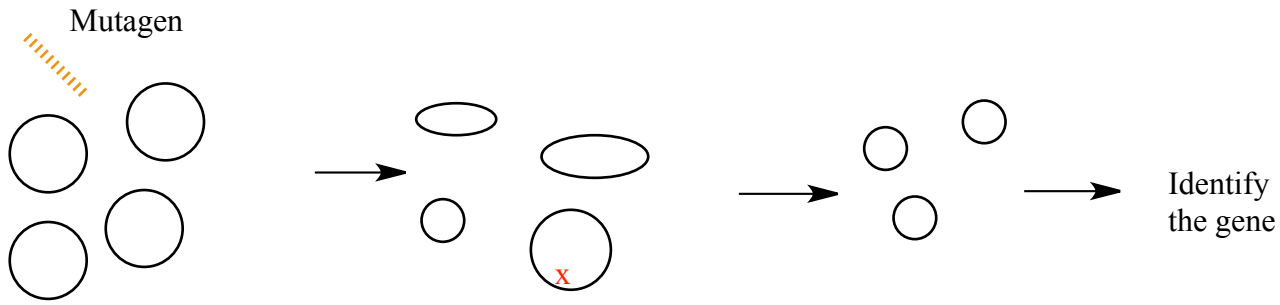
3. Do further tests to identify the gene mutant causing the phenotype

    - This only works if the mutation is not lethal

    - **Conditional mutants** must be used to study lethal mutations

        - These mutations are only expressed under certain conditions (ex: temperature)

EXAMPLE:



● Additional tests can be performed to identify the genes _____

□ **Complementation tests** determines if a phenotype seen in 2+ organisms is due to a mutation in the same gene

- Mate two homozygous recessive organisms

    - If phenotype is seen in the offspring then the mutation is in the same gene

    - If the phenotype is not seen in the offspring then the mutation is in different genes

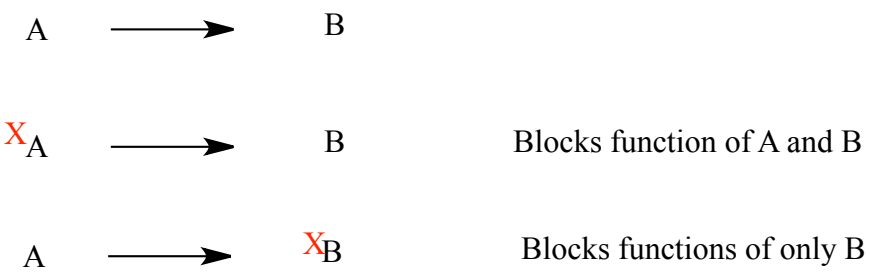
□ **Epistasis analysis** evaluates the order of protein pathways

- If protein A acts before protein B (A→B) then:

    - A mutation in A will also stop the function of B

    - but a mutation in B will only stop the function of B and not A

EXAMPLE: Epistasis analysis



PRACTICE:

1. Which test can be used to identify if two similar phenotypes in two different organisms are caused by mutations in the same gene?
    a. Genetic Screen
    b. Complementation Test
    c. Epistasis Analysis

2. What type of mutant is necessary to study lethal mutants?
    a. Non-lethal mutation
    b. Conditional Mutation
    c. Sensitive Mutation
    d. Epistatic Mutation