CONCEPT: TRANSDUCTION

● **Transduction** is the process of a bacteriophage transferring foreign DNA into a bacterium

□ Discovered by Lederberg and Zinder in 1951

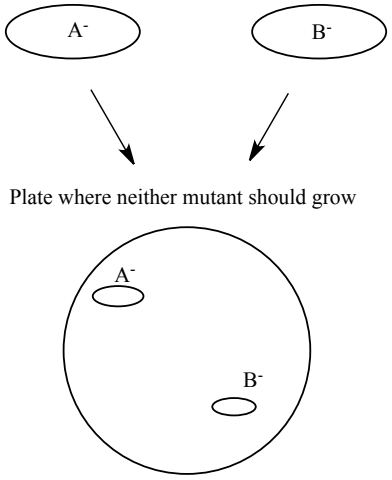
- Two mutant *E.coli* strains that they _____ together

- They plated the mixed *E.coli* on conditions where neither would grow (thinking they would die)

- BUT, around 1 in 10^5 *E. coli* cells did grow – meaning that some kind of DNA transfer had to be occurring

- Proved it wasn't conjugation by using a filter to prevent it – Found that it was a phage

EXAMPLE:



● There are two _____ of transduction

□ **Generalized transduction** is able to transfer any part of a bacterial chromosome

- Lysed bacteria released cut up DNA into the environment – and a phage takes it up

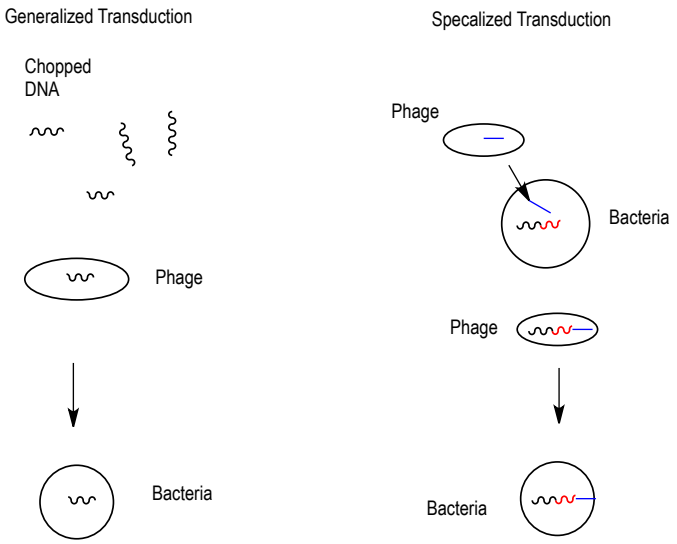
- Phage then transfers this into another cell

□ **Specialized Transduction** is able to transfer only specific parts of a bacterial chromosome

- A specialized **transducer** inserts into only one place in the bacterial chromosome

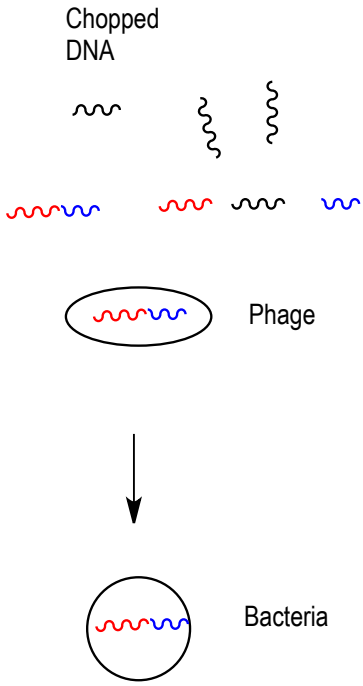
- When it is stimulated to leave, it picks up nearby genes

EXAMPLE:



- Generalized transduction can be used to _____ genes and study linkage
  - The closer two genes are, the more likely they'll be transduced together
    - **Cotransduction** occurs when a single bacteriophage carries more than one gene loci
  - The **cotransduction frequency** measures how often two gene loci are cotransduced
    - The closer two genes are, the more likely they'll be cotransduced together

EXAMPLE:



PRACTICE

1. True or False: Transduction uses viruses to transfer foreign DNA into bacteria
    a. True
    b. False

2. Specialized transduction differs from generalized transduction because specialized transduction is defined by what?
    a. The ability to only transfer specific DNA molecules
    b. The ability to transfer any DNA molecules
    c. The ability to transfer DNA and protein
    d. The ability to transfer specific RNA molecules

3. A cotransduction experiment was performed with two bacteria strains. The first train has the genotype l^+ g m^+ while the second strain has the genotype of l g^+ m. The researchers found that 46 colonies had cotransduced m^+ with l^+, while only 25 colonies had cotransduced g with l^+. Using this information determine which of the following gene pairs are closest together.
    a. l and m
    b. l and g
    c. m and g