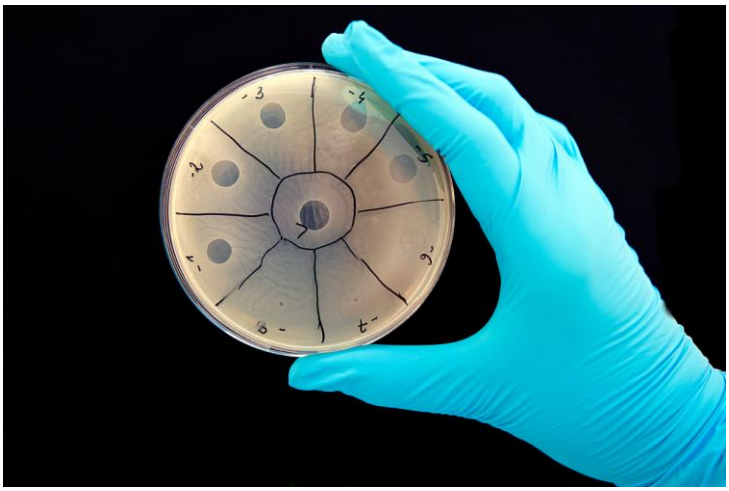
CONCEPT: BACTERIOPHAGE GENETICS

- **Bacteriophages** are viruses that infect bacteria
    - □ A **Plaque assay** is used to study these viruses
        - Infect a bacterial culture with a _____
        - Plate the bacterial culture onto a petri dish that will grow the bacteria
        - Count the number of **plaques**, which form through **lysis** (breaking open) of infected bacteria
            - Lysis releases viral progeny into the environment

EXAMPLE:



- □ There are three _____ of phages
    - **Prophage** is a virus that has integrated its genetic material into the bacterial genome
    - **Virulent phages** are those that immediately lyse and kill the host
    - **Temperate phages** are those that remain inside the host for a period of time without lysing and killing it

Bacteriophages and Mapping

● Bacteriophage infections can be used to map bacteriophage _____

□ Recombination frequencies can be used to map genes

- Perform a **mixed infection** of a bacterial culture with two strains of bacteriophages

-Virus 1: H^+ and R^+ and Virus 2: H^- and R^-

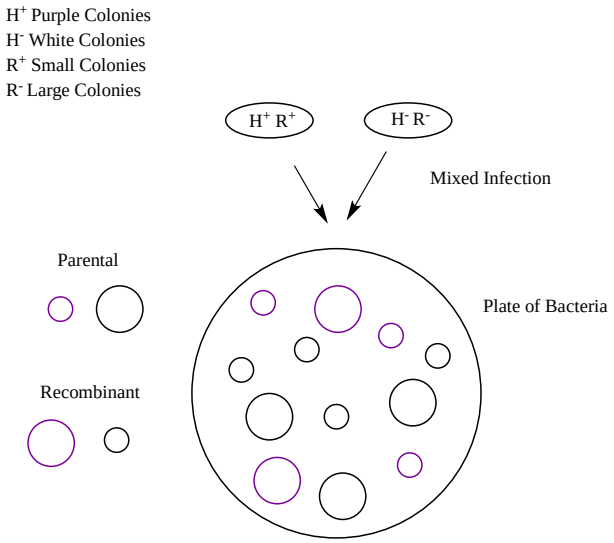
H^+ creates purple colonies, and R^+ creates small colonies

- Colonies will appear different than parental if they have recombined

- H^+/R^- or H^-/R^+

- RF = # number of recombined colonies / # number of colonies

EXAMPLE:



□ **Intragenic recombination** occurs when recombination occurs _____ a gene

- Usually this results in the ability to map the position of mutations inside a gene

- Benzer studied this in the r11 locus of T4 bacteriophage

- He collected over 20,000 independent r11 mutants, and crossed them

- By collecting the recombinants, he was able to map the individual mutations within the r11 gene

EXAMPLE:

r11 locus