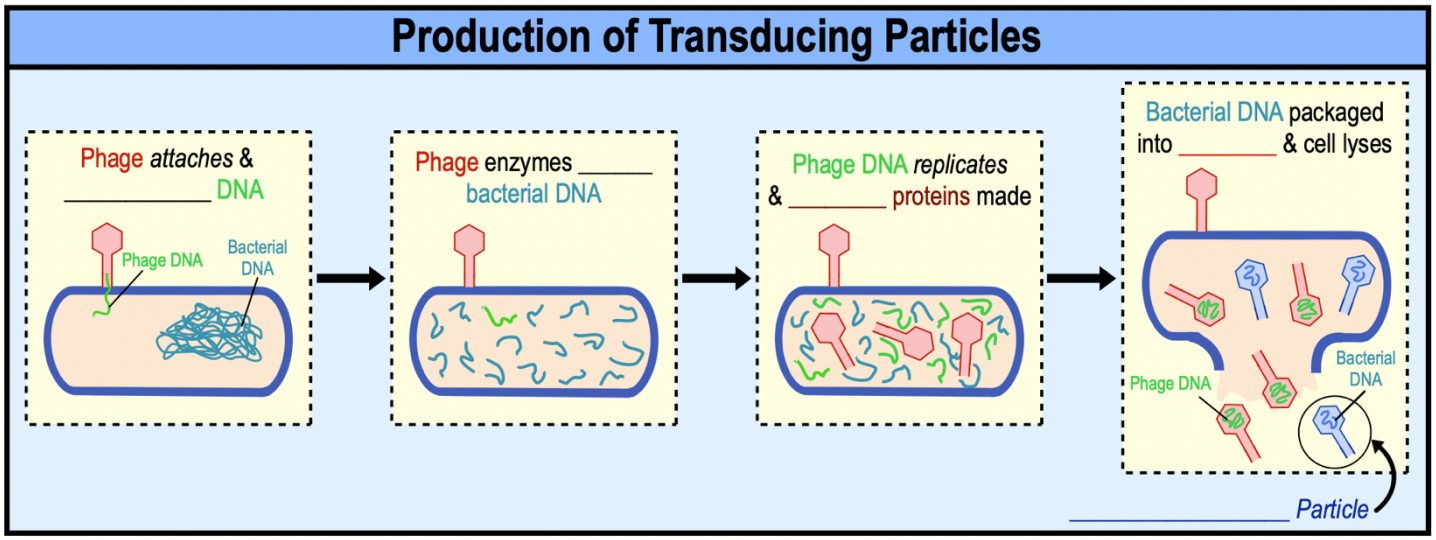
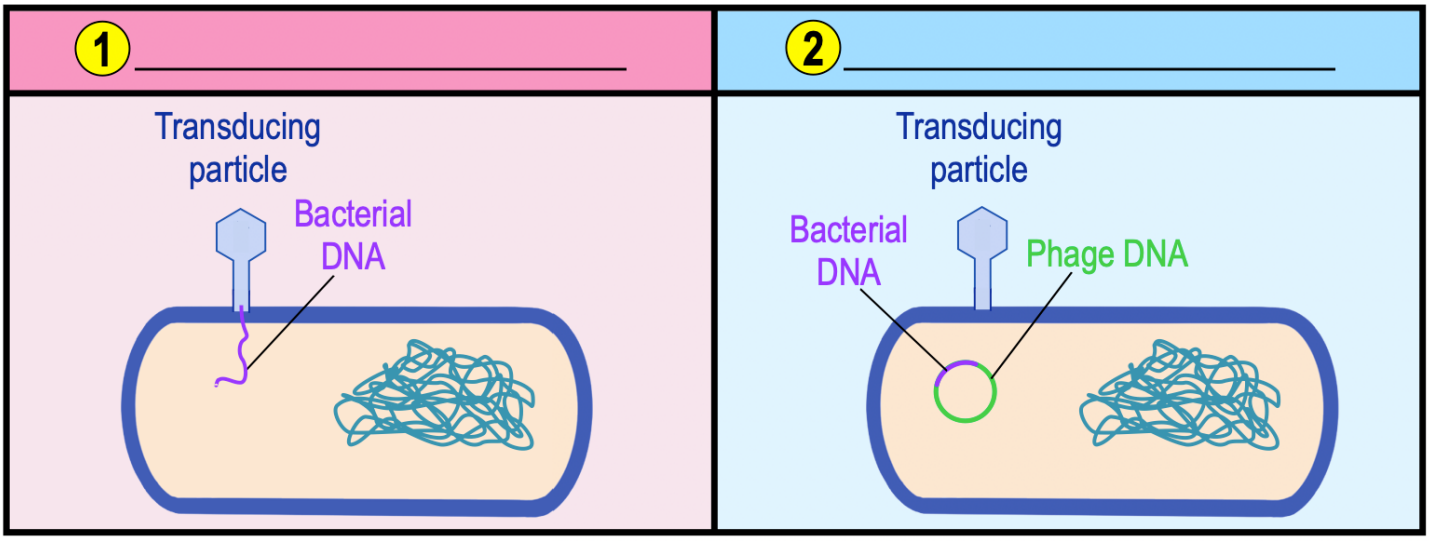
CONCEPT: TRANSDUCTION

- *Recall:* **Transduction:** horizontal DNA transfer between cells mediated by a *bacteriophage* virus (or phages).
  - □ _____**:** bacterial obligate intracellular parasite made of DNA or RNA packed into a protein coat.
  - □ Phage *infects* cell, *replicates*, & _____ cell so new phage particles are released.
- *Transduction* results from an _____ where bacterial DNA is packaged into the phage creating a *transducing particle*.
  - □ **Transducing Particle:** *defective* phage carrying _____ DNA instead of its own.



Types of Transduction

- There are 2 main types of *transduction*:
  1) **Generalized:** transducing particle ONLY contains _____ (not phage) DNA.
  2) **Specialized:** transducing particle contains _____ bacterial & phage DNA.



CONCEPT: TRANSDUCTION

PRACTICE: Transduction is a form of horizontal gene transfer which requires a carrier for the genetic information being transferred. What is this carrier and what is it made of?

a) Transduction particle made of a human virus carrying bacterial DNA.
b) Transformation particle made of bacteriophage carrying human DNA.
c) Transduction particle made of a bacteriophage carrying bacterial DNA.
d) Transduction particle made of a bacteriophage carrying viral DNA.

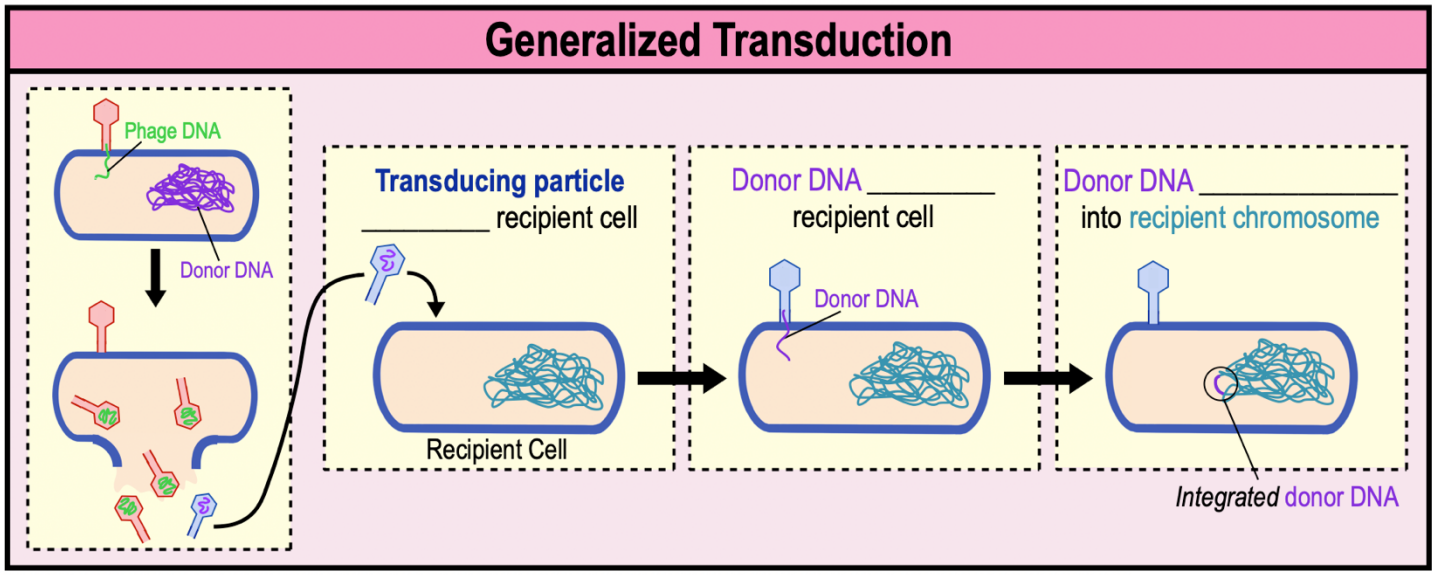
1) Generalized Transduction

●*Recall:* _____ **Transduction**: transducing particle ONLY contains *bacterial* (not phage) DNA.

□ Can transfer any of the *general* genes of the donor bacterial cell.

●Phage infects *donor* cell where it constructs new phage particles & _____ particles (by mistake).

□ Transducing particle *attaches* to recipient & *injects* donor DNA that _____ into the cell's chromosome.



PRACTICE: Generalized transduction includes all of the following steps except which of these answers?

a) Donor DNA integrates into the recipient cell's chromosome.
b) The recipient cell takes in naked DNA from the environment.
c) The donor cell is infected by a bacteriophage.
d) The donor cell creates transduction particles containing donor cell DNA.

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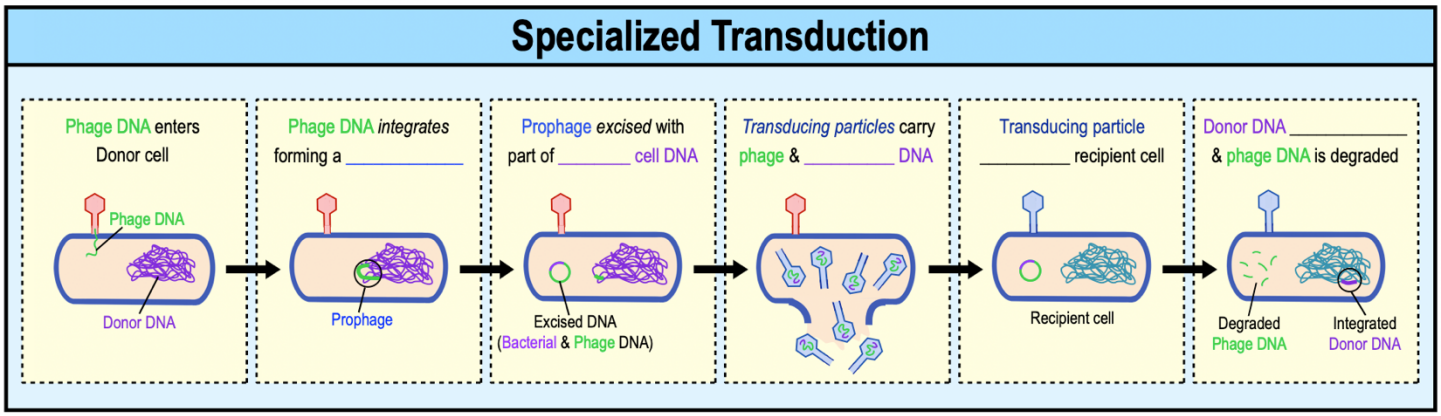
2) Specialized Transduction

- *Recall:* _____ **Transduction:** transducing particle contains BOTH bacterial & phage DNA.
  - □ Only transfers *very specific* (or specialized) genes of the donor bacterial cell.
- Phage DNA integrated into the *donor* cell's chromosome generates a _____.
  - □ **Prophage:** phage DNA that is _____ in a cell's chromosome.
- When prophage is excised, part of the donor cell's _____ DNA is excised with it.
  - □ Phage assembly produces transducing particles carrying _____ *phage* & *bacterial/donor DNA*.
  - □ Injected bacterial DNA may _____ into the recipient's chromosome & phage DNA is degraded.



PRACTICE: Which of the following processes results in a transducing particle?

a) Transformation.
b) Transduction
c) Conjugation.
d) DNA replication.

PRACTICE: A prophage is:

a) Viral DNA that has been incorporated into the bacterium's DNA.
b) A phage carrying bacterial DNA.
c) Donor DNA that has been incorporated into the recipient's DNA.
d) A phage carrying bacterial and viral DNA.

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PRACTICE: Which of these answers is a major difference between generalized and specialized transduction?

a) The types of genes that are transferred between donor and recipient bacteria.
b) The type of DNA found in the transducing particles.
c) The presence of prophage DNA.
d) All of the above are major differences between generalized and specialized transduction.

PRACTICE: In both generalized and specialized transduction only one cell survives this process. Which cell does not survive the process of transduction and why?

a) The recipient cell lyses after it binds with the transducing particle.
b) The donor cell lyses after being infected by the bacteriophage.
c) The transducing cell degrades after phage DNA incorporates into the cell's chromosome.
d) All of the cells survive the process of transduction.

PRACTICE: How are the processes of bacterial transformation and bacterial transduction similar?

a) Transformation and transduction transfer DNA between cells via a bacteriophage carrier.
b) Only competent cells can perform transformation and transduction.
c) Both transformation and transduction are a form of horizontal gene transfer.
d) All of the above are similarities between transformation and transduction.