

Bacterial Antibiotic Resistance from Chapter 9

Microbiology: A Systems Approach
1st Edition
Cowan & Talaro

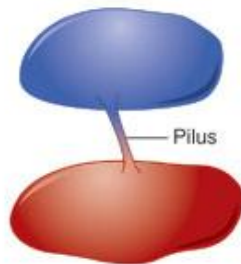
Types of intermicrobial exchange

conjugation	requires the attachment of two related species & formation of a bridge that can transport DNA
transformation	transfer of naked DNA
transduction	DNA transfer mediated by bacterial virus

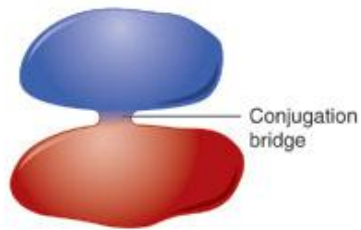
conjugation

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(a, b) **Process of Conjugation**

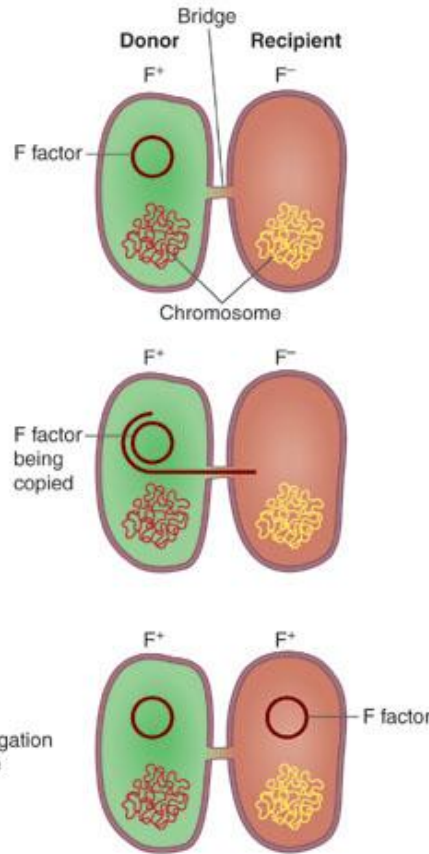


(a) The pilus of donor cell (top) attaches to receptor on recipient cell and retracts to draw the two cells together.



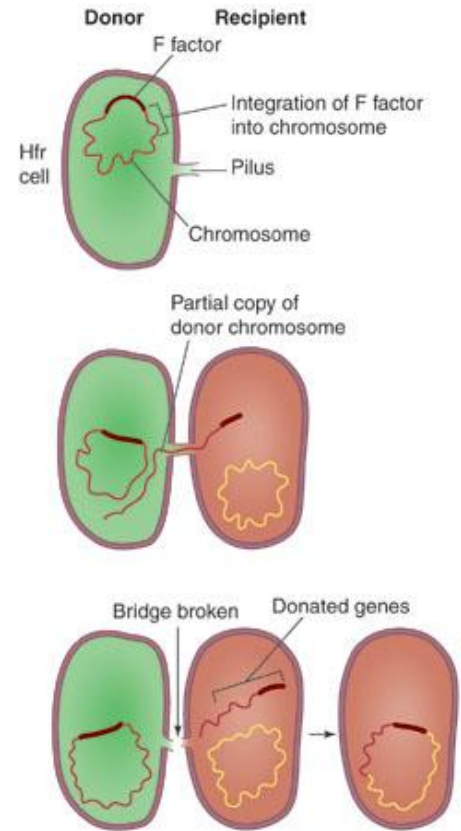
(b) An opening or pore forms between the cell walls, thereby creating a bridge to transmit genetic material.

(c) **F Factor Transfer**



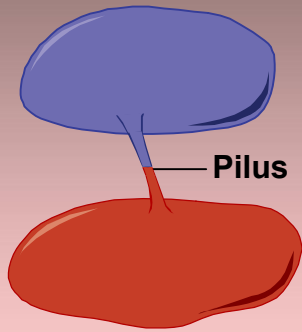
(c) Transfer of the F factor, or conjugative plasmid. A cell must have this plasmid to transfer chromosomal genes.

(d) **Hfr Transfer**

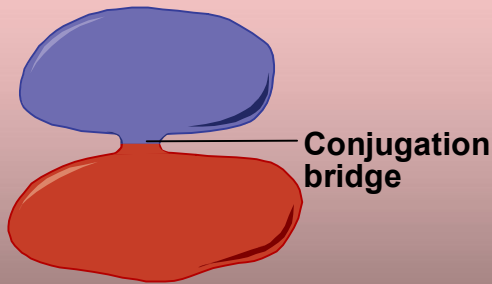


(d) High-frequency (Hfr) transfer involves transmission of chromosomal genes from a donor cell to a recipient cell. The donor chromosome is duplicated and transmitted in part to a recipient cell, where it is integrated into the chromosome.

(a, b) Process of Conjugation

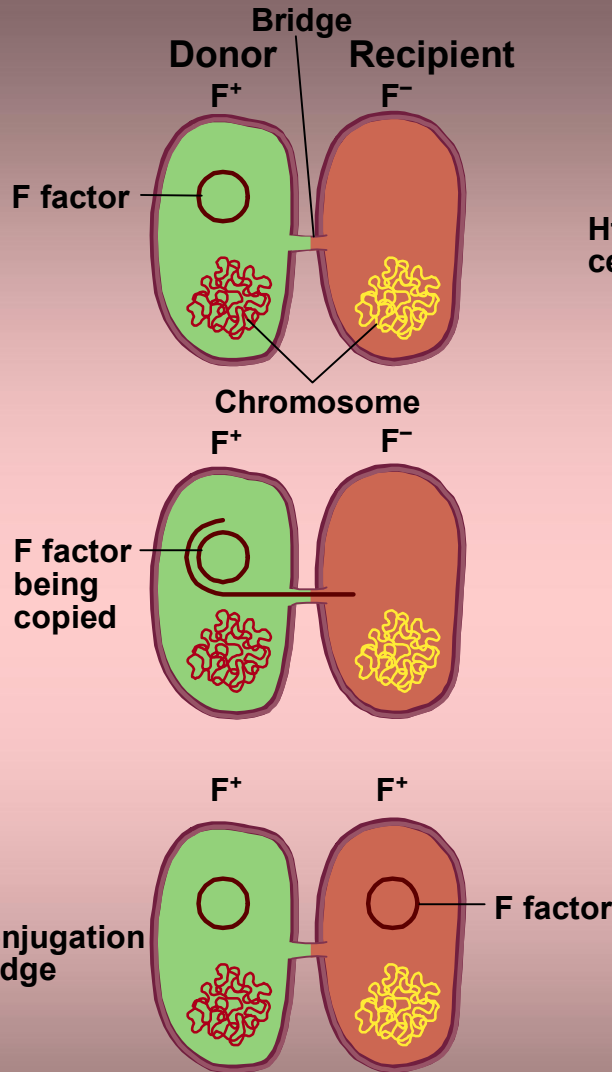


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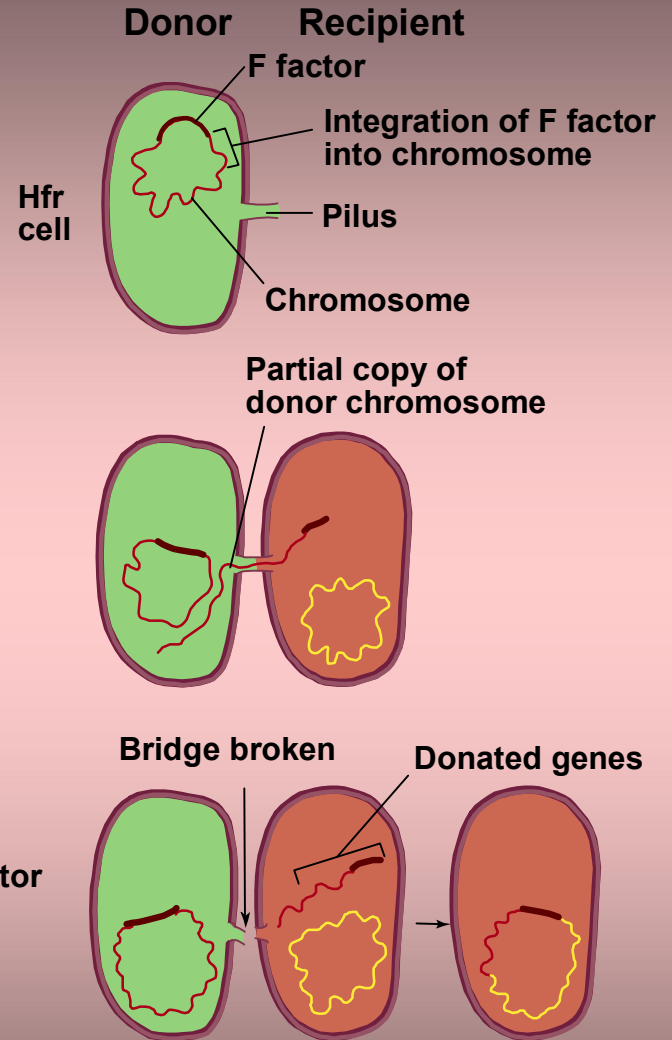
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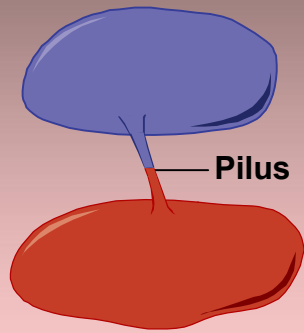
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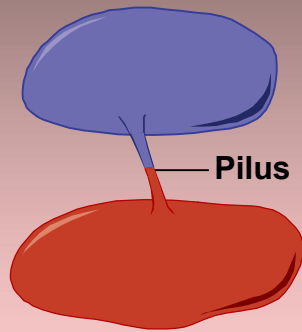
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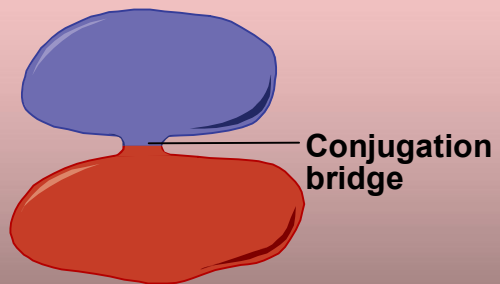


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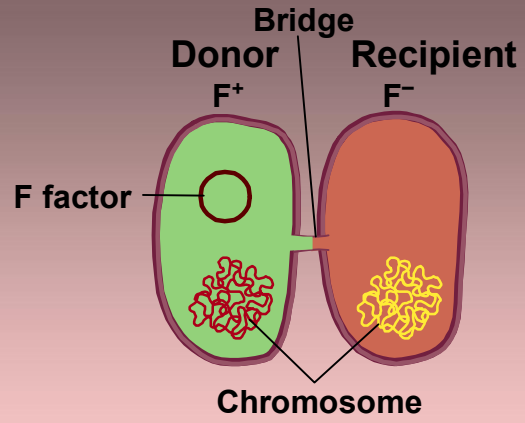


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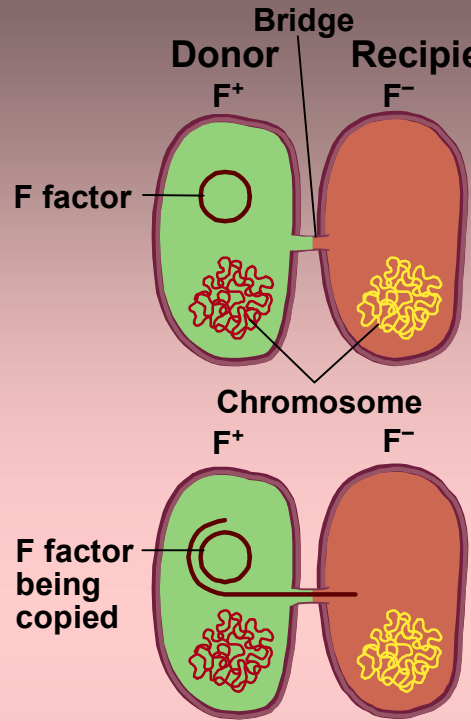


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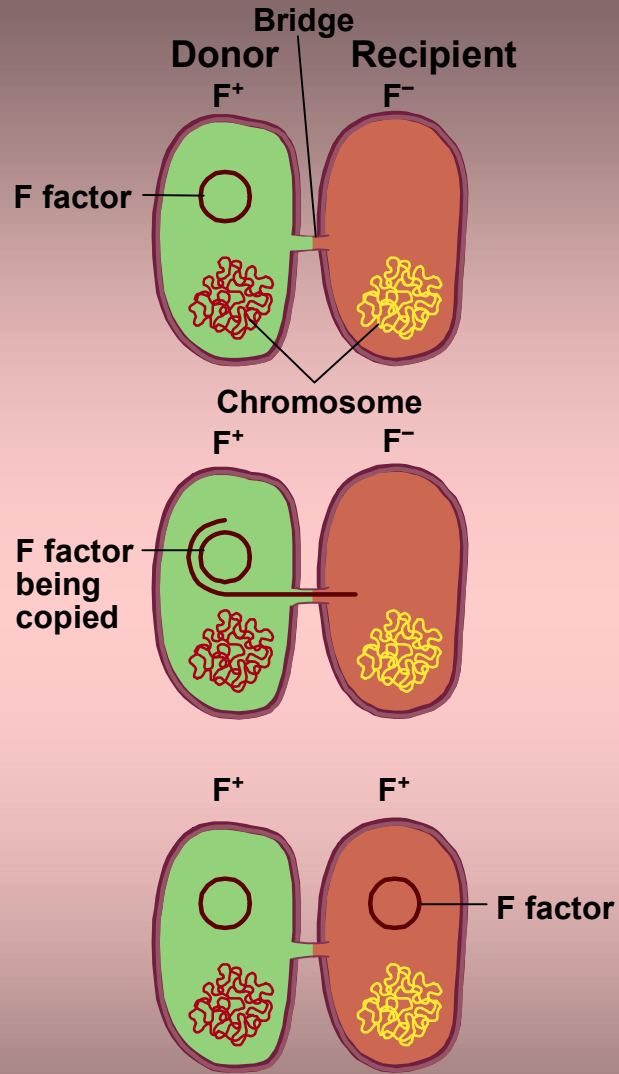
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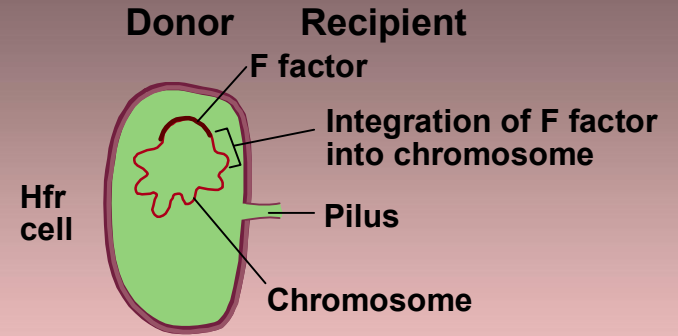


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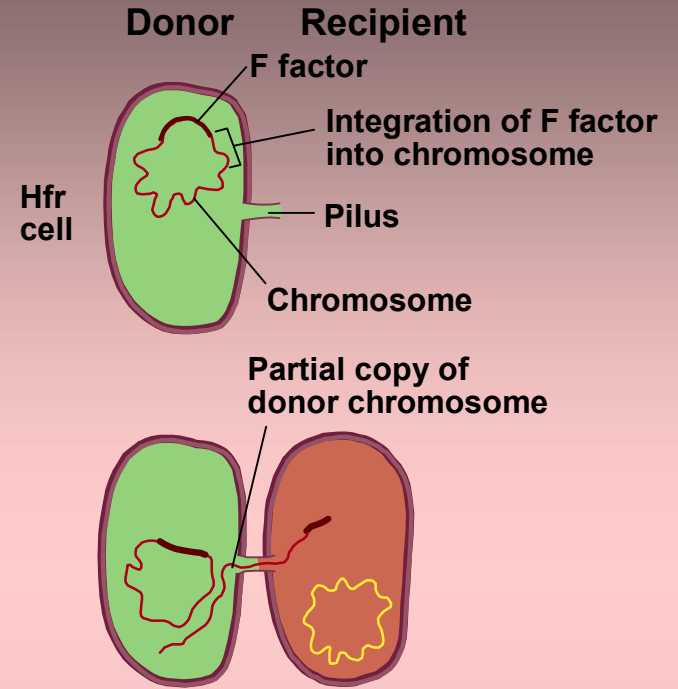
Conjugation

Video

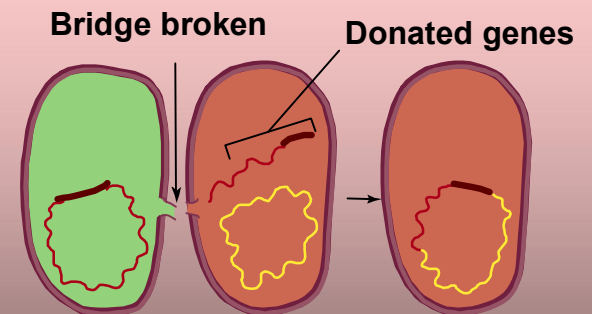
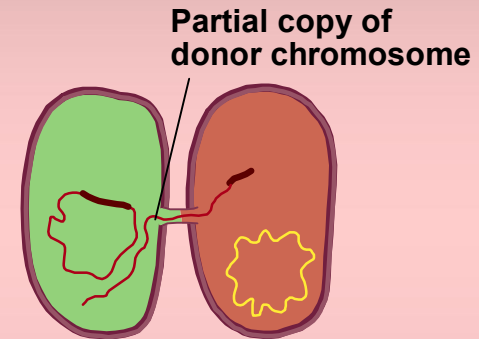
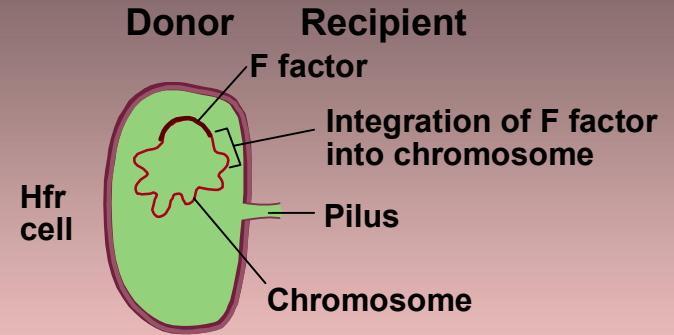
(d) Hfr Transfer



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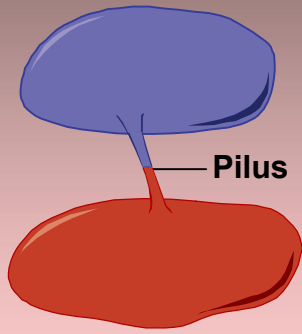


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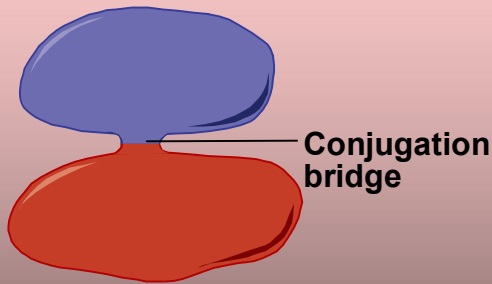
Hfr Conjugation

Video

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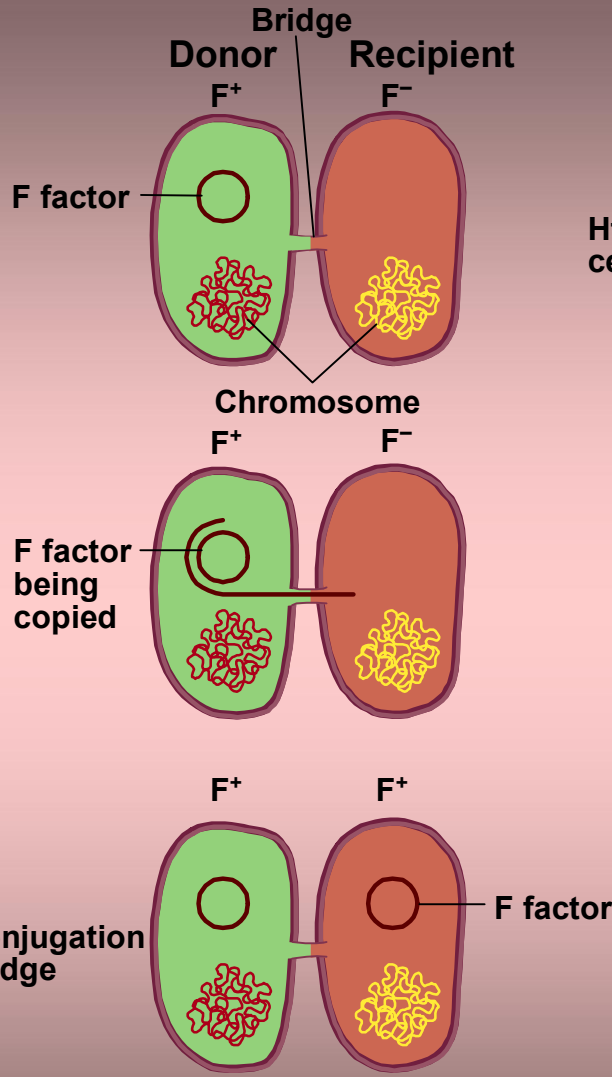


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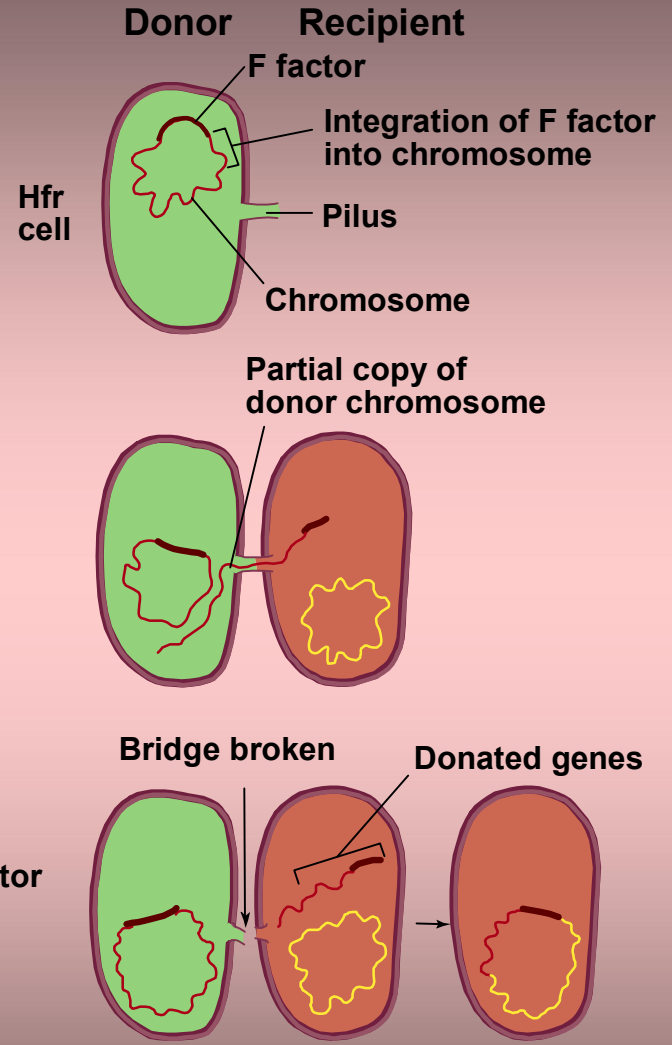
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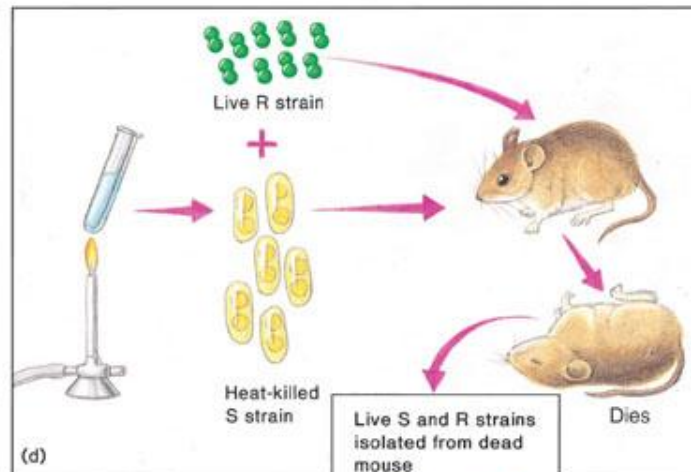
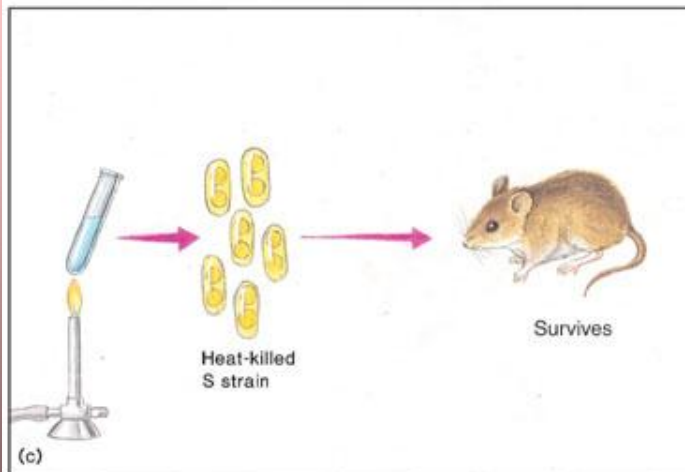
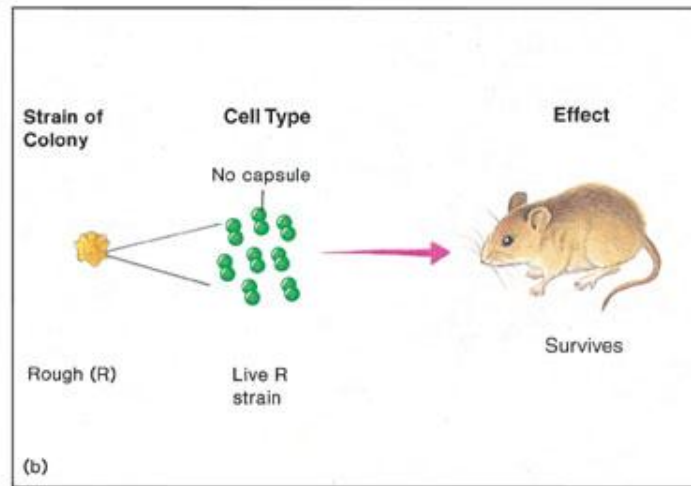
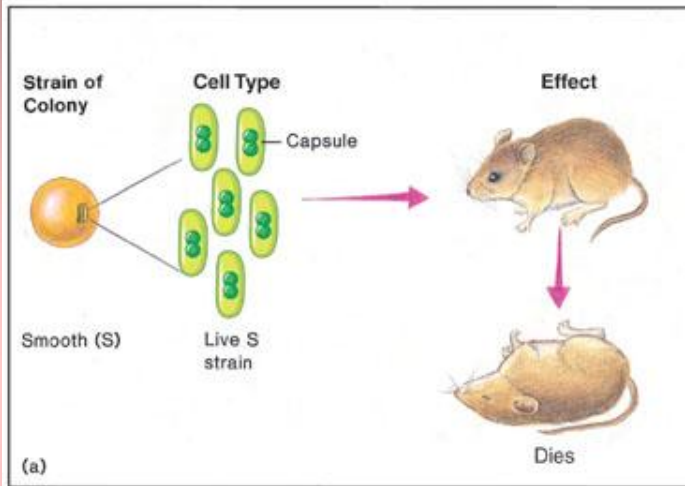
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"My God! They're at it again..."

transformation

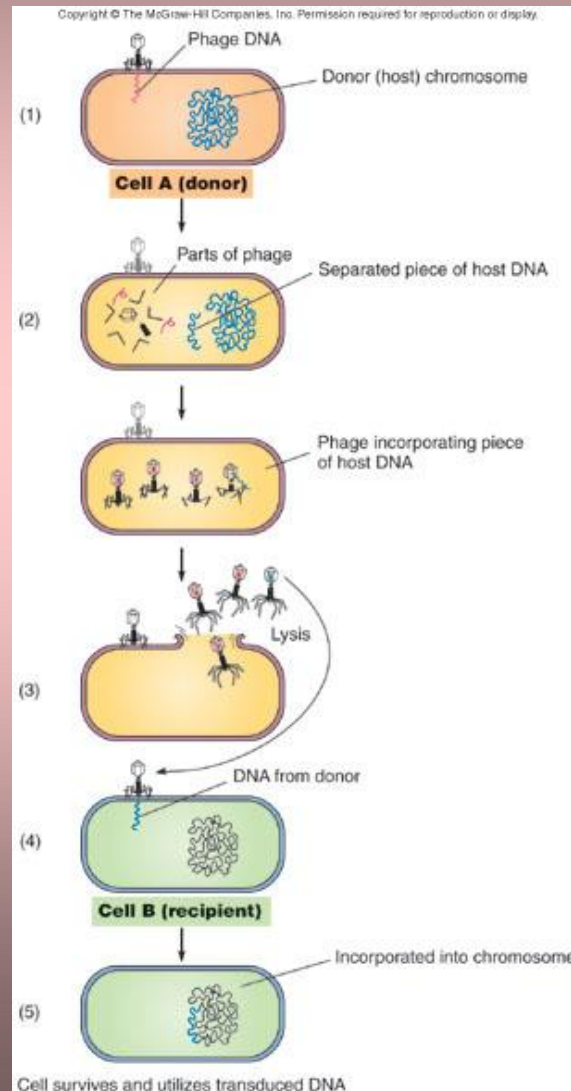
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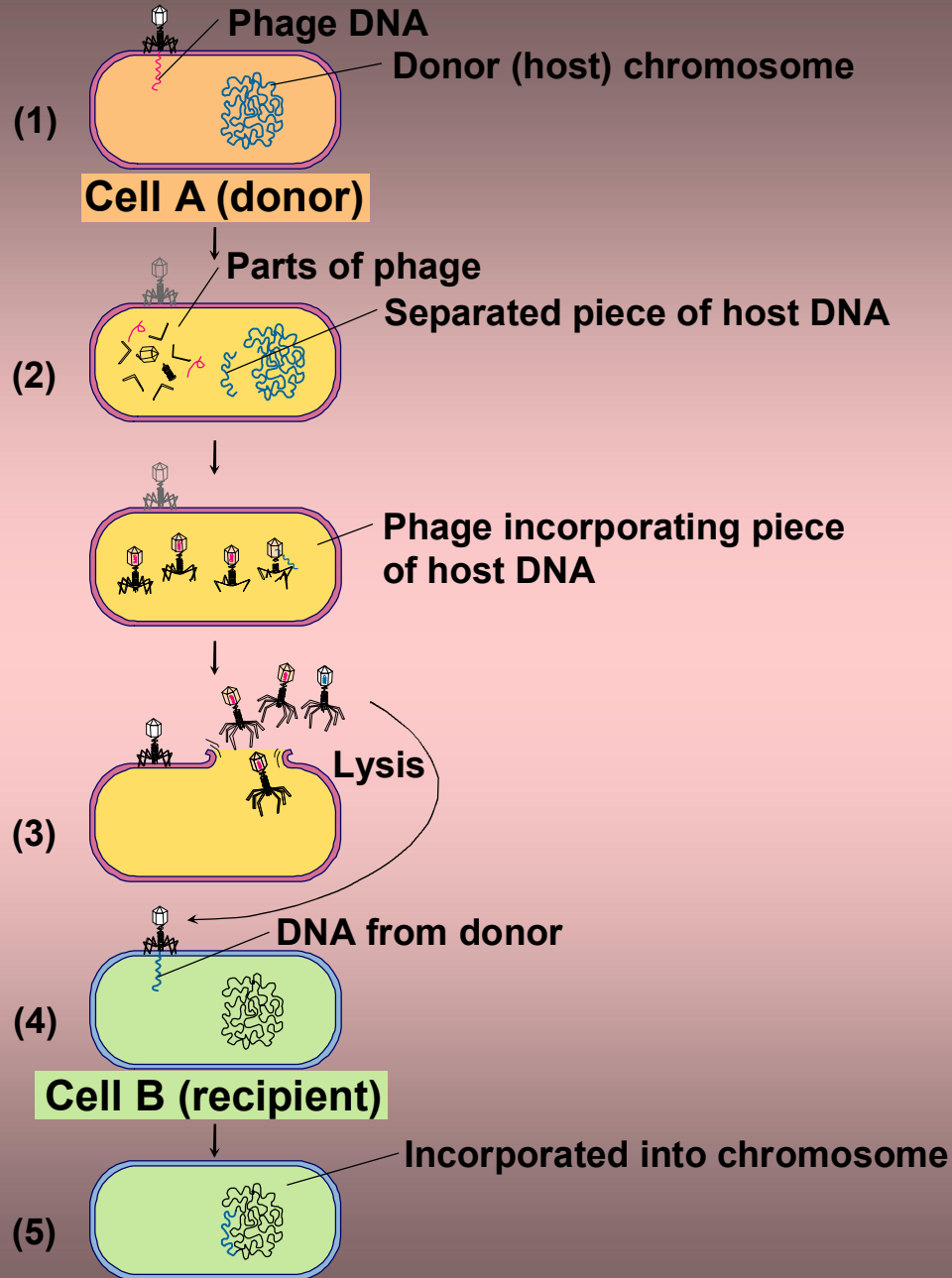


Transformation

Video

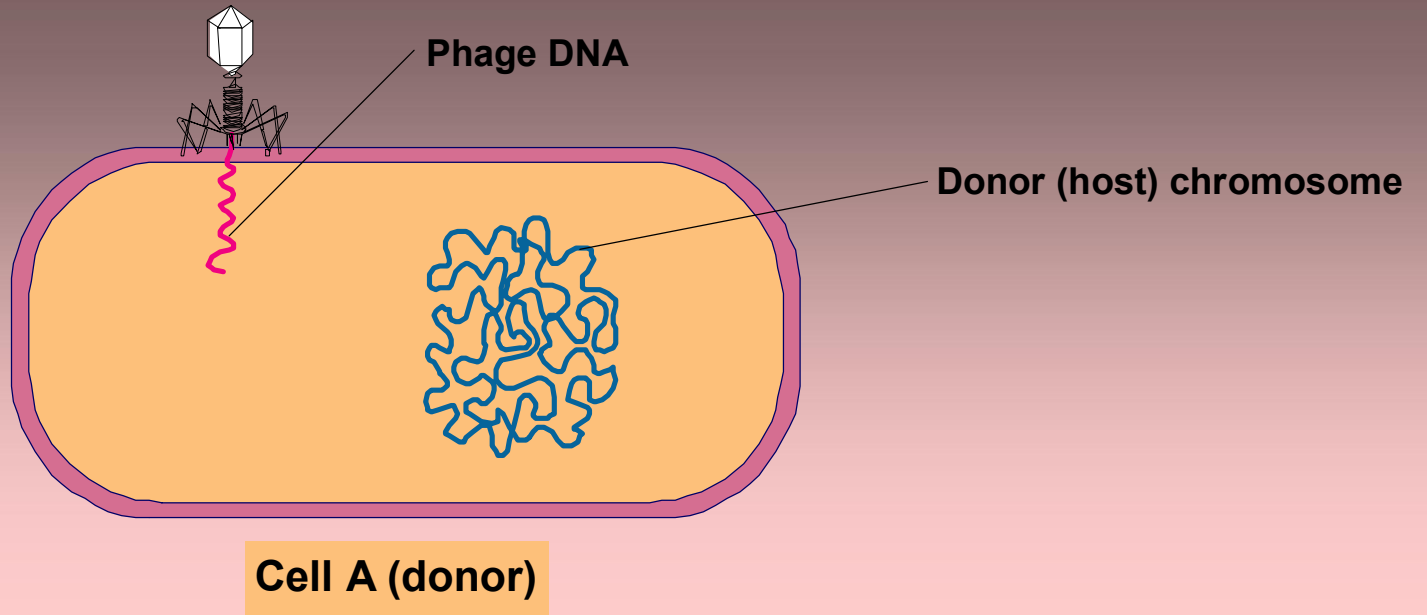
Generalized transduction

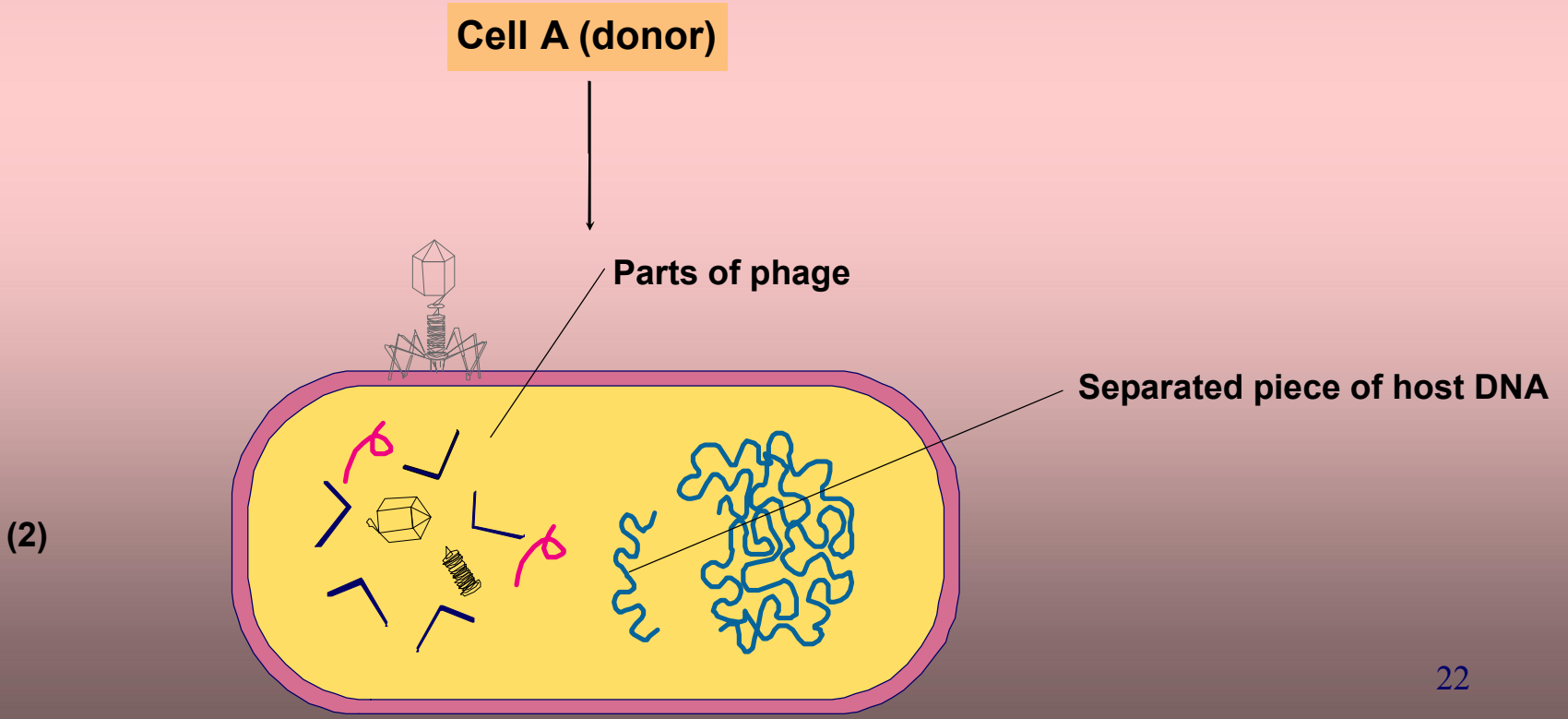
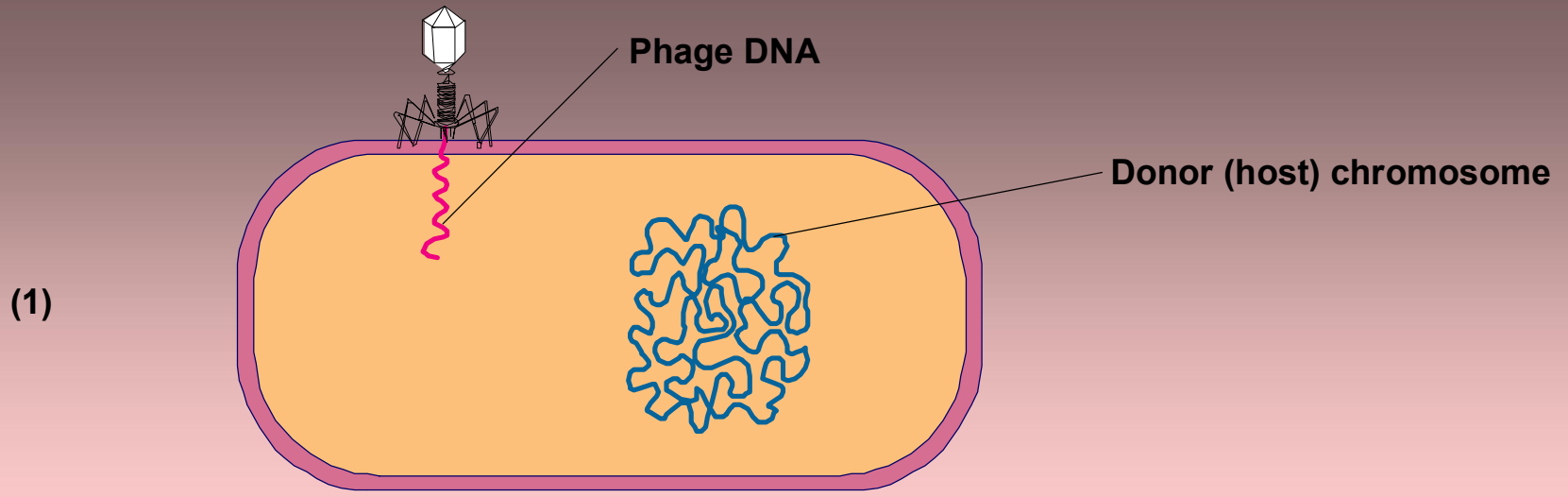




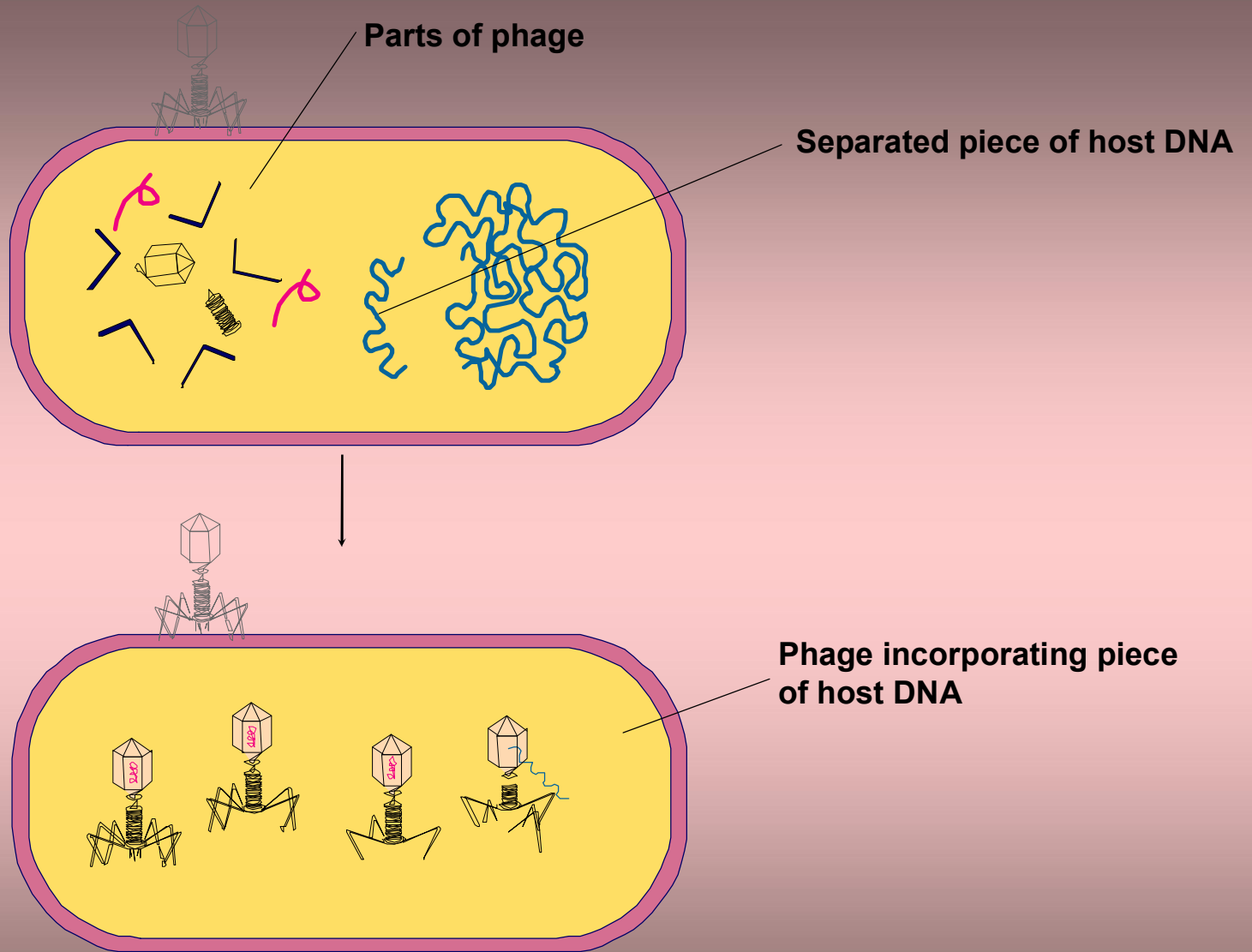
Cell survives and utilizes transduced DNA

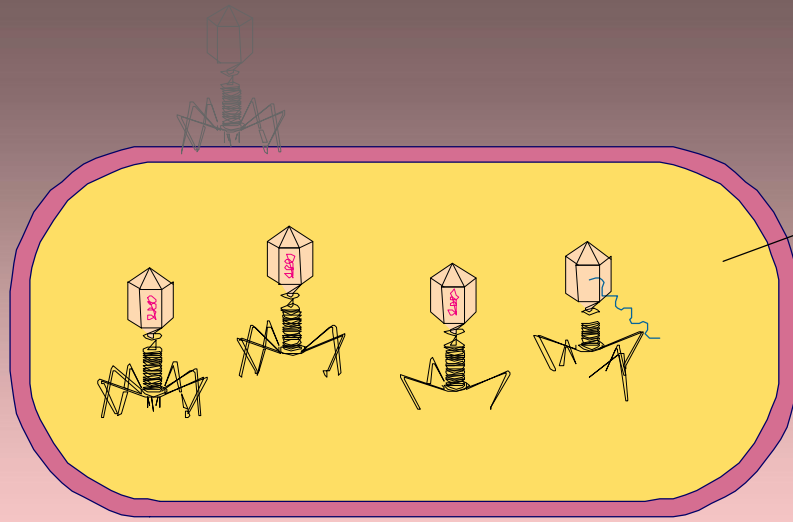
(1)



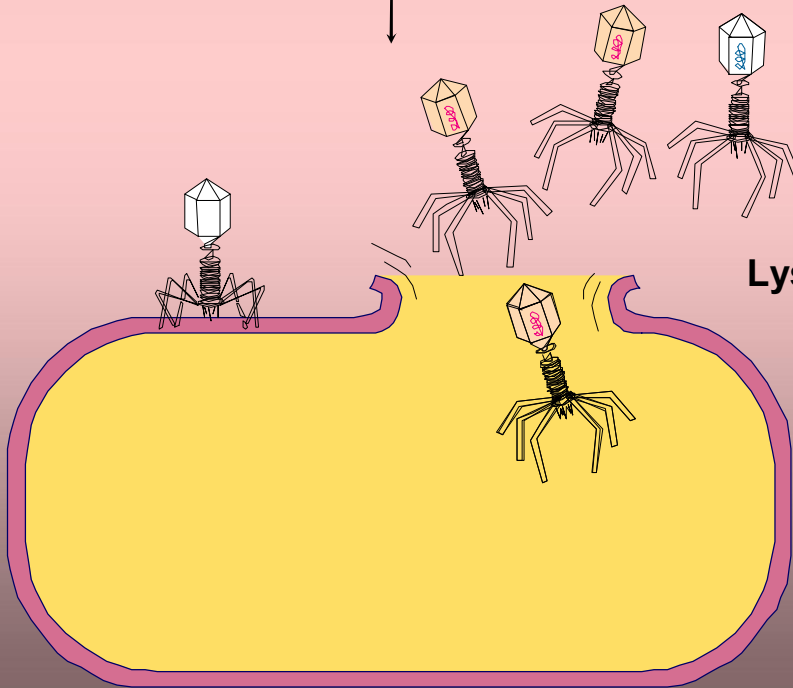


(2)





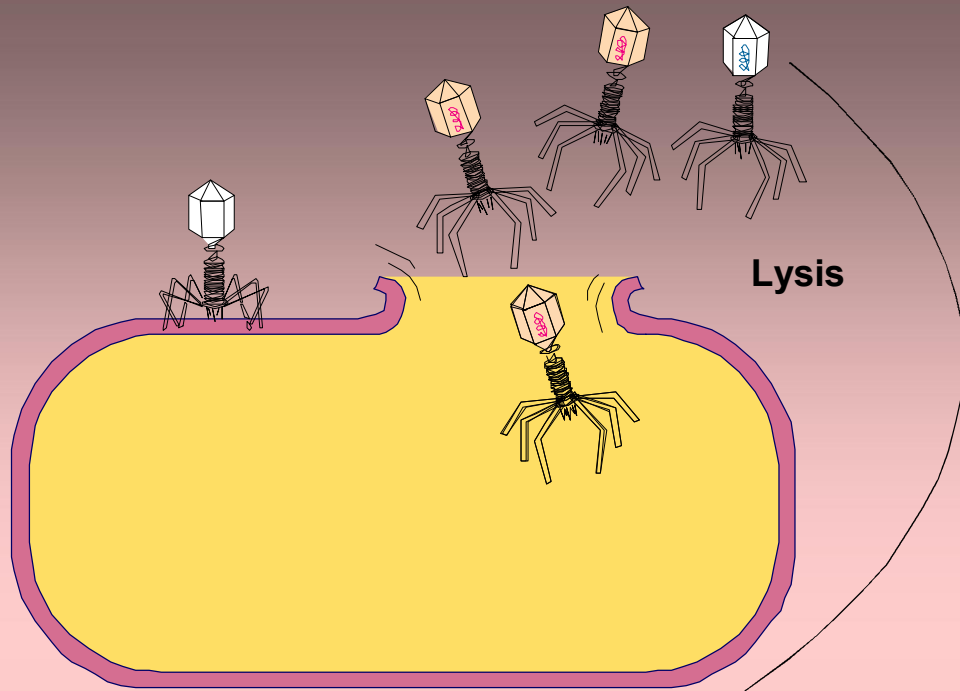
Phage incorporating piece of host DNA



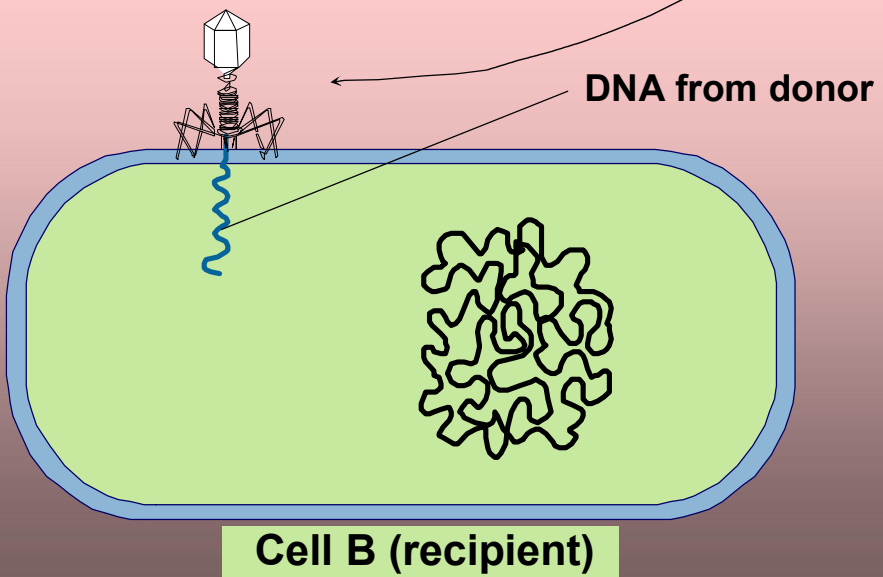
Lysis

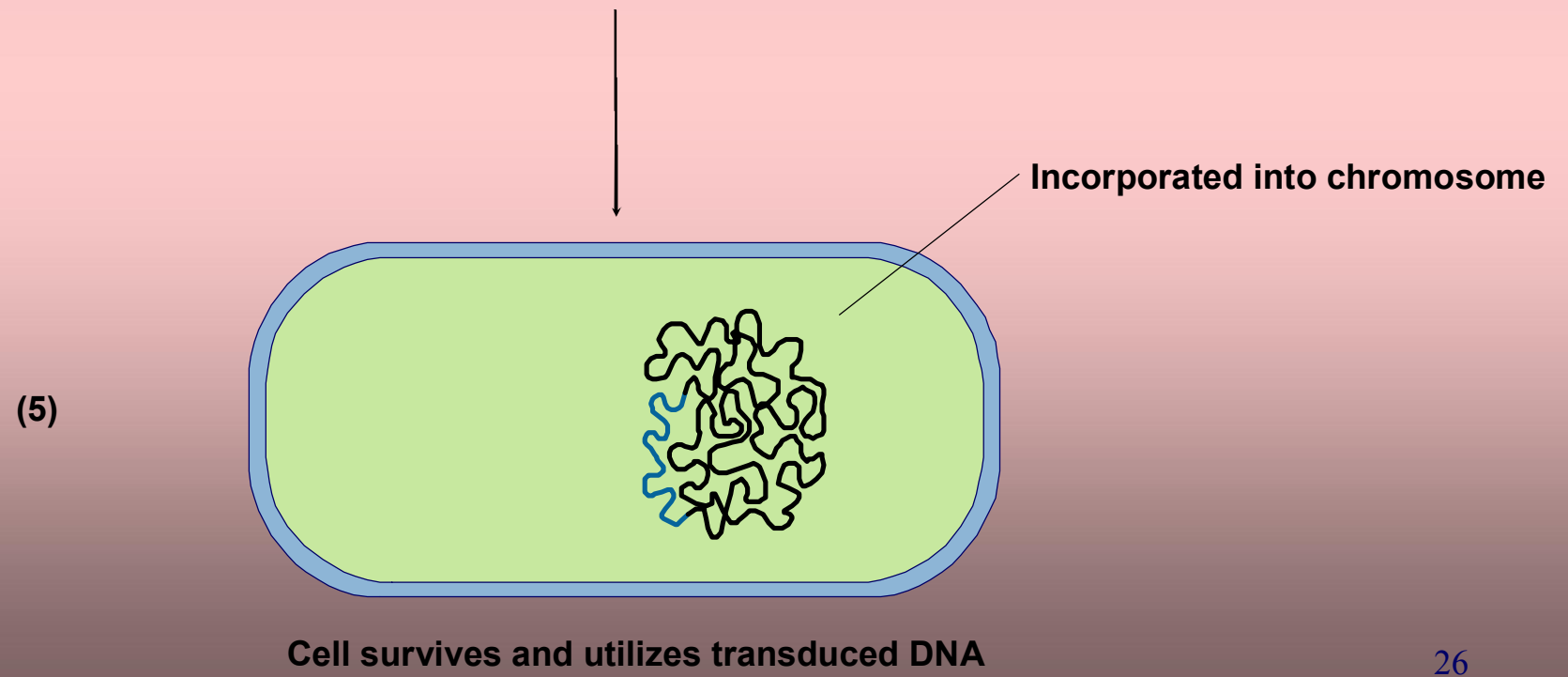
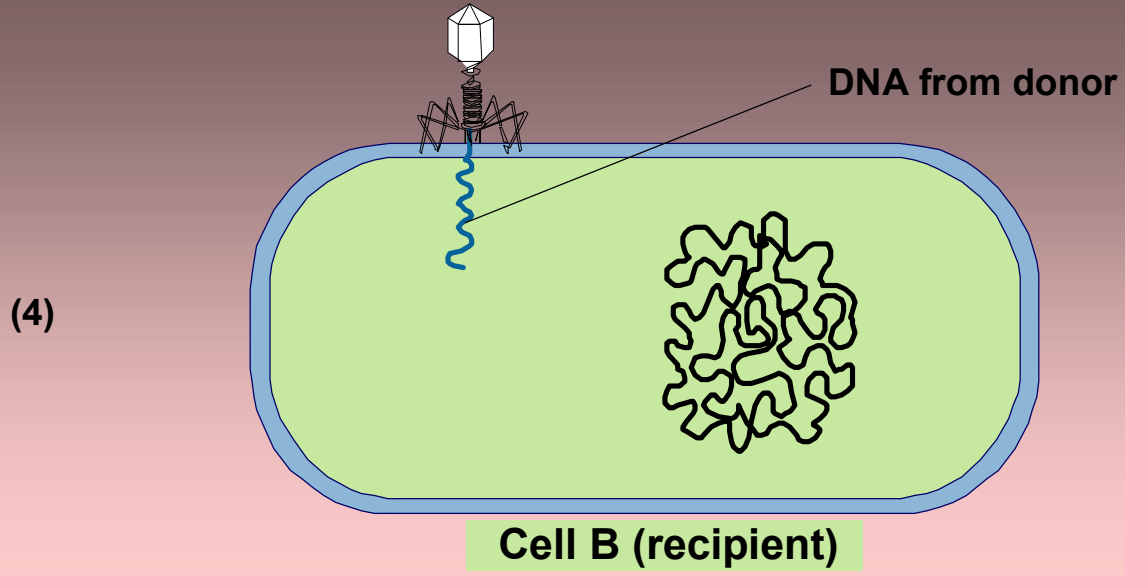
(3)

(3)



(4)

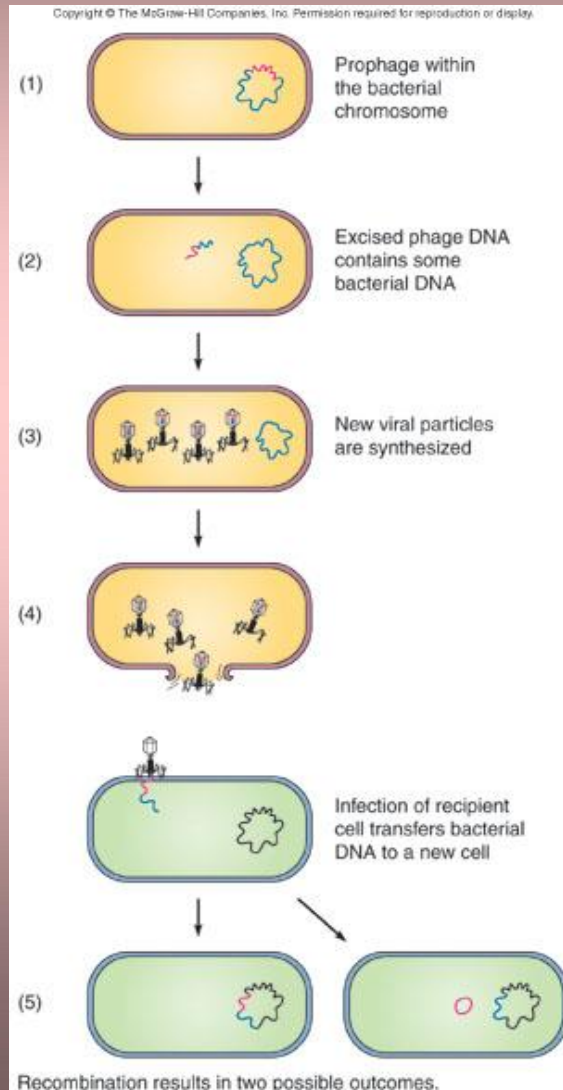




Transduction

Video

Specialized transduction



Specialized Transduction

Video

Pssst! Hey kid! Wanna be a Superbug...?
Stick some of this into your genome...
Even penicillin won't be able to harm you...!



It was on a short-cut through the hospital kitchens that Albert was first approached by a member of the Antibiotic Resistance.