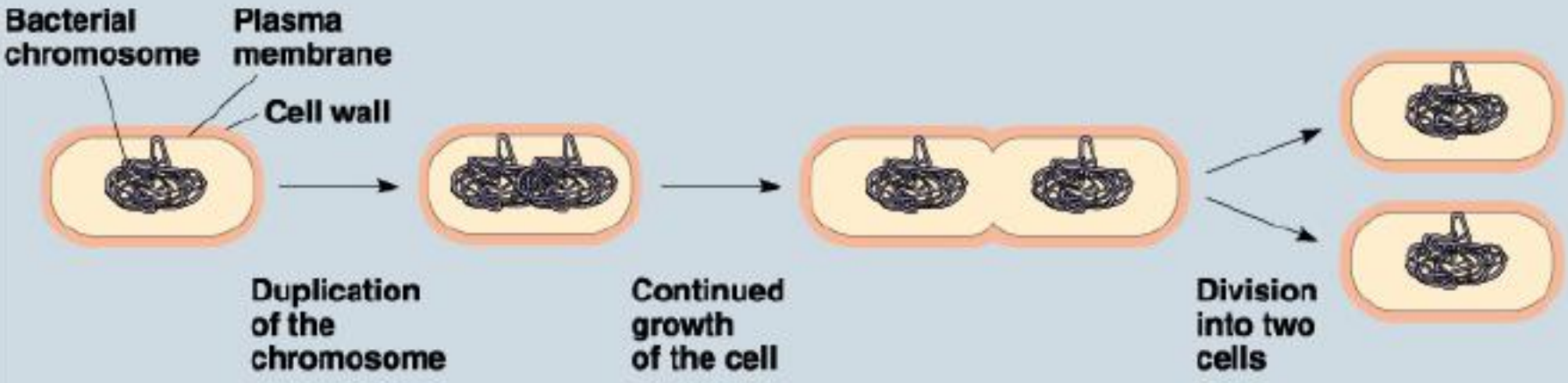
Bacteria Reproduction

- Binary Fission
- Conjugation
- Trasduction
- Trasformation
- Spore Formation

Binary Fission in Bacteria

asexual reproduction

→ all prokaryotic organisms can do this



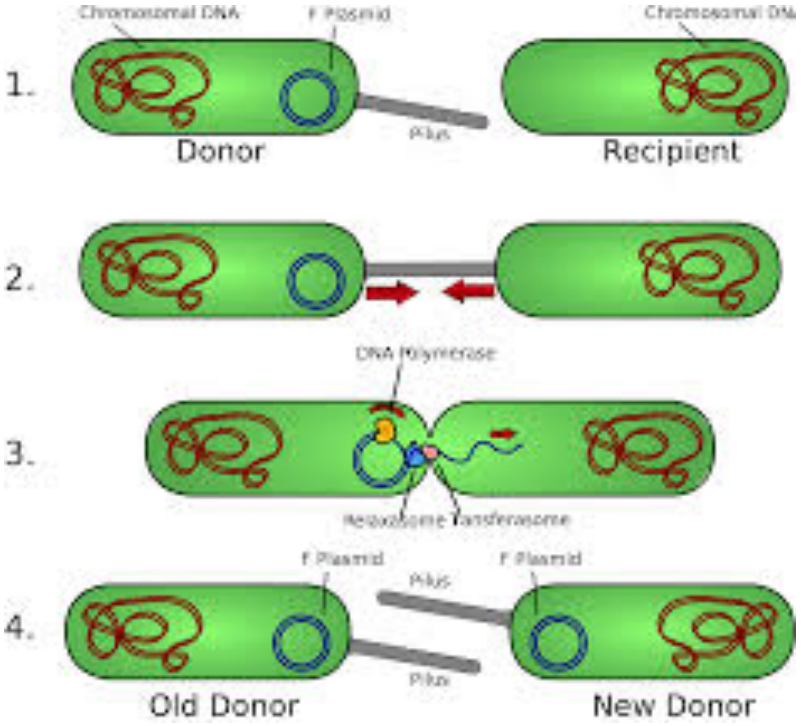
Cellular organism copies it's genetic information then splits into two identical daughter cells

Conjugation

form a sexual reproduction

- **Bacterial conjugation** is the transfer of genetic material (plasmid) between bacterial cells by direct cell-to-cell contact or by a bridge-like connection between two cells, conjugation is a mechanism of horizontal gene transfer as are transformation and transduction although these two other mechanisms do not involve cell-to-cell contact.

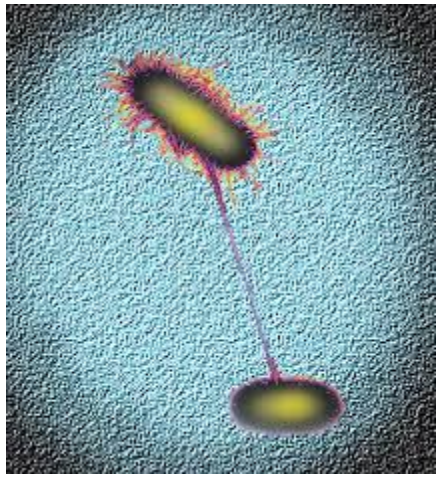
frammenti di DNA esterni al cromosoma
→ liberi
→ facoltativi



Bacterial conjugation is often regarded as the bacterial equivalent of sexual reproduction or mating since it involves the exchange of genetic material.

During conjugation the *donor* cell provides a conjugative or mobilizable genetic element that is most often a plasmid.

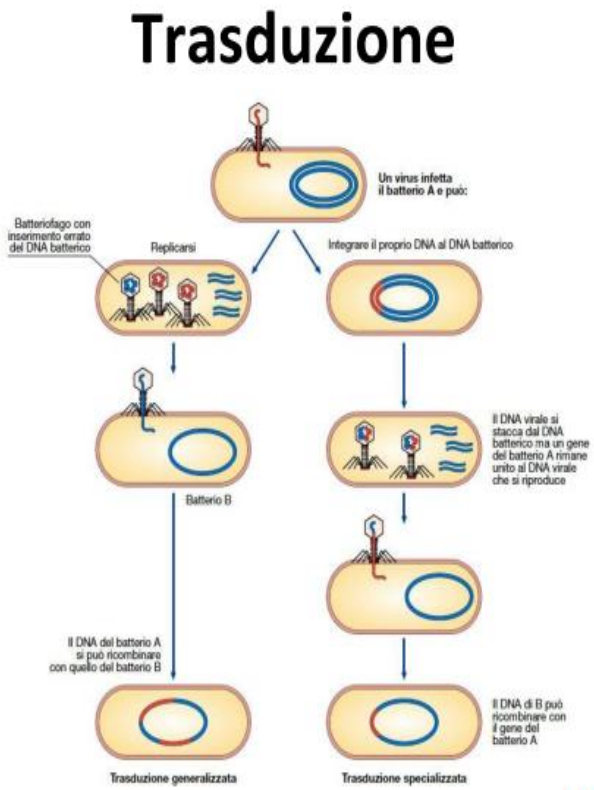
The genetic information transferred is often beneficial to the recipient. Benefits may include antibiotic resistance or the ability to use new metabolites.



https://youtu.be/YycVGqBs1p0

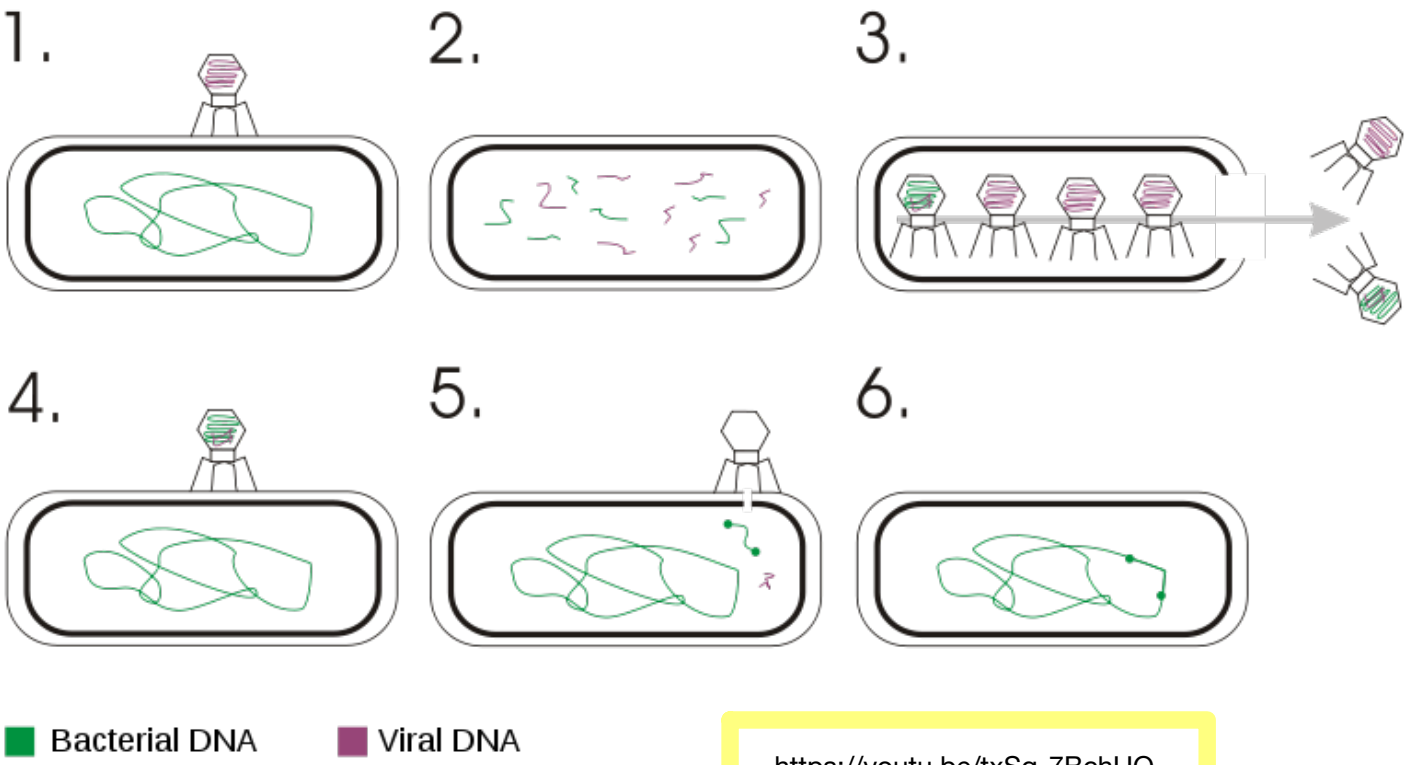
Transduction as a method for transferring genetic material

Transduction is the process by which DNA is transferred from one bacterium to another by a virus. It also refers to the process whereby foreign DNA is introduced into another cell via a viral vector. Transduction does not require physical contact between the cell donating the DNA and the cell receiving the DNA (which occurs in conjugation), and it is DNase resistant. enzimi che scindono il DNA Transduction is a common tool used by molecular biologists to stably introduce a foreign gene into a host cell's genome.



Uno dei vaccini contro il COVID utilizza uno di questi strumenti. AstraZeneca USA comuni adenovirus per trasferire il gene della proteina spike nelle nostre cellule per poter produrre i geni

Transduction happens through either the lytic cycle or the lysogenic cycle. If the lysogenic cycle is adopted, the phage chromosome is integrated (by covalent bonds) into the bacterial chromosome, where it can remain dormant for thousands of generations. If the lysogen is induced (by UV light for example), the phage genome is excised from the bacterial chromosome and initiates the lytic cycle, which culminates in lysis of the cell and the release of phage particles.



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Transformation

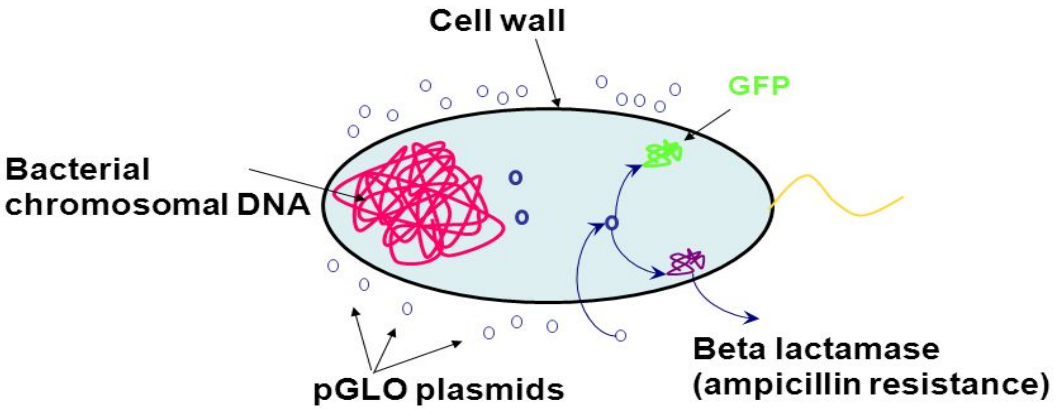
In molecular biology, **transformation** is the genetic alteration of a cell, resulting from the direct uptake and incorporation of exogenous genetic material (exogenous DNA) from its surroundings and taken up through the cell membrane. Transformation occurs naturally in some species of bacteria, but it can also be effected by artificial means in other cells.

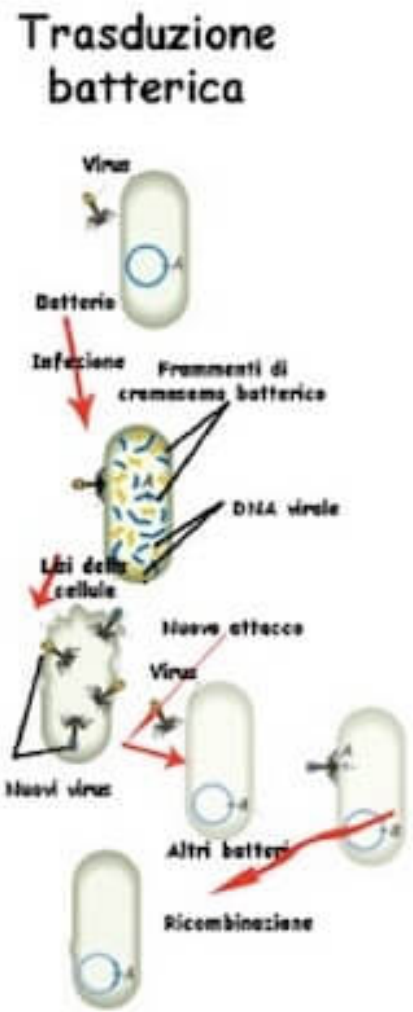
https://youtu.be/9Wnd7PchbCw

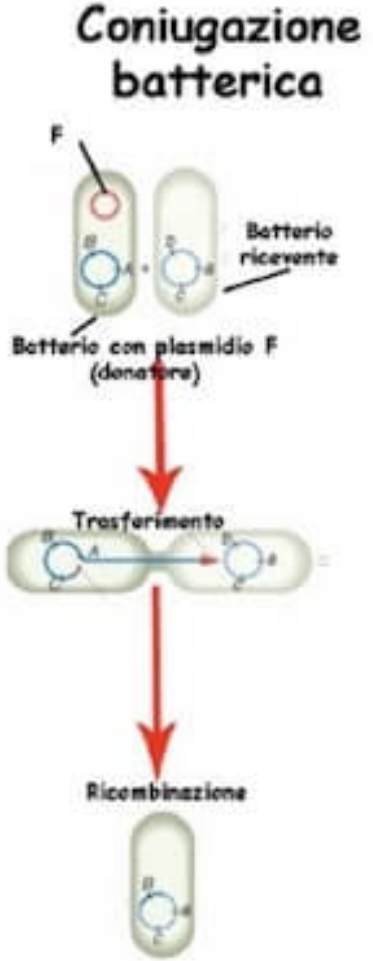
For transformation to happen, bacteria must be in a state of competence, which might occur as a time-limited response to environmental conditions such as starvation and cell density.
Transformation is one of three processes by which exogenous genetic material may be introduced into a bacterial cell, the other two being conjugation (transfer of genetic material between two bacterial cells in direct contact) and transduction (injection of foreign DNA by a bacteriophage virus into the host bacterium).

Trasformazione batterica

Uptake of DNA nudo, spesso un plasmide circolare







https://www.bing.com/videos/search?q=bacterial+conjugation+trasformation&&view=detail&mid=34D8FF58B1CA0A254BBF34D8FF58B1CA0A254BBF&&FORM=VDRVRV