

Genetically Modified Organisms

GMO's are organisms in which the DNA has been intentionally modified by techniques of genetic engineering.

This is distinct from genetic modification that is accomplished via conventional breeding methods (selective breeding of plants and animals).

GMO's are produced for various reasons, the most controversial of which is GMO's as food.

Genetically modified organisms can be produced by transgenesis or cisgenesis.

Both transgenesis and cisgenesis are examples of horizontal gene transfer.

1

Vertical Gene Transfer versus Horizontal Gene Transfer

Both of these can occur naturally, and both can be exploited for genetic modification.

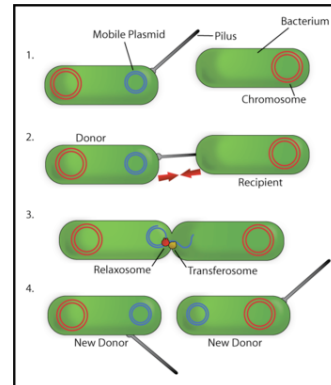
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Mechanisms for Horizontal Gene Transfer

- **Conjugation**
 - Transfer between bacteria connected by pilus
- **Transduction**
 - Transfer from a bacteriophage to a bacterium
- **Transformation**
 - Uptake of genetic material from environment
- **Gene Transfer Agents**
 - Virus-like agents produced in alphaproteobacteria, including *Agrobacteria*

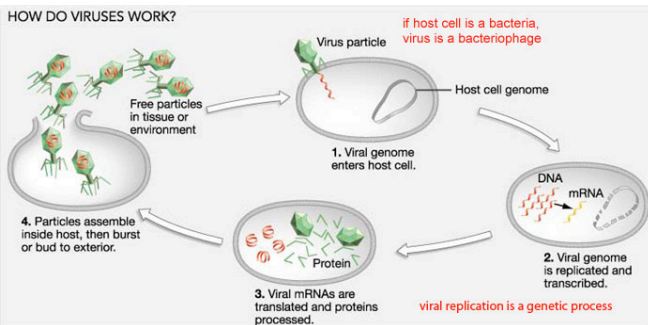
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Conjugation



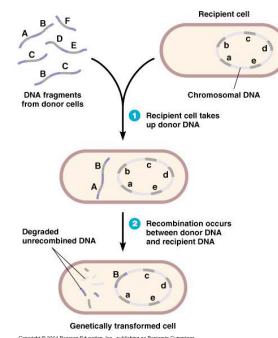
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Transduction

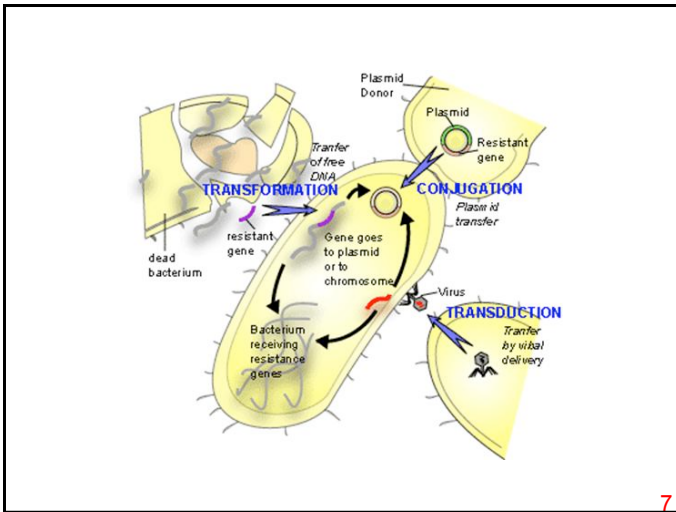


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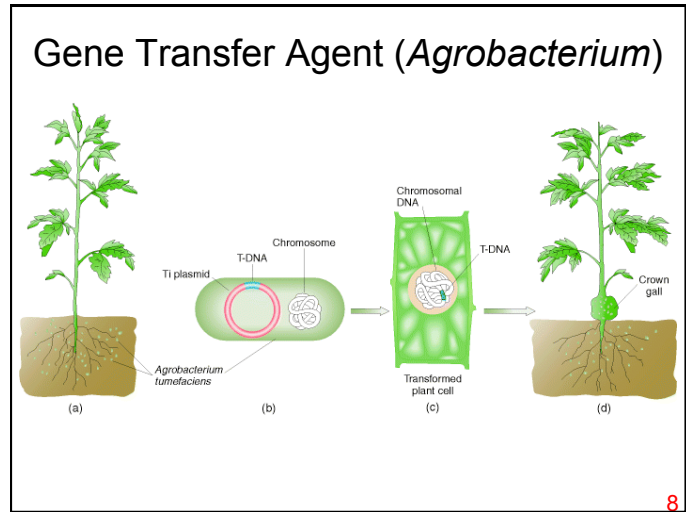
Transformation



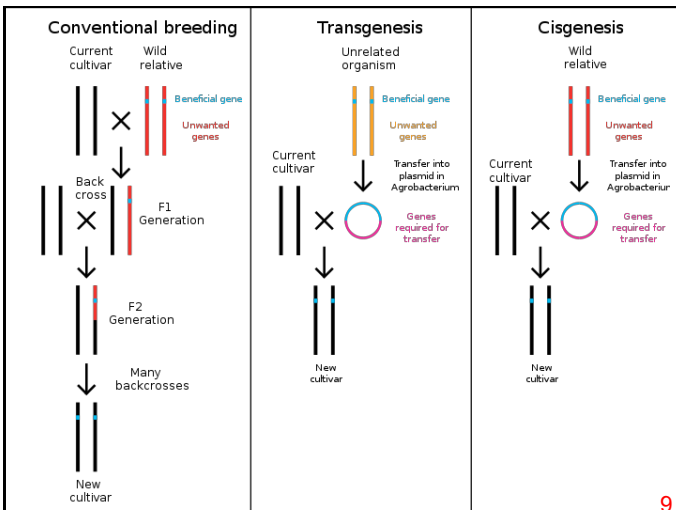
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9