

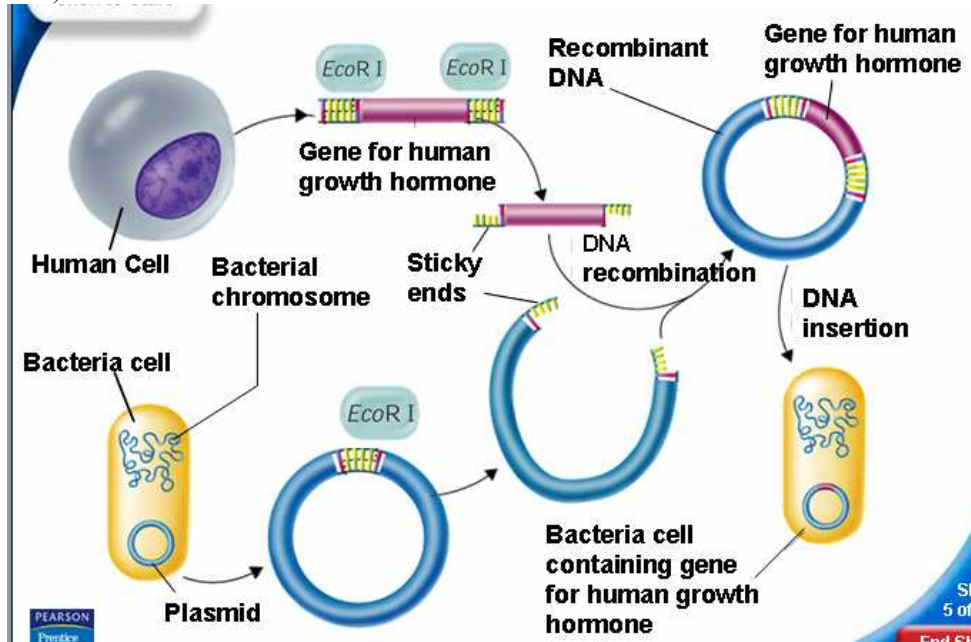
## 13-3 Cell Transformation

During transformation, a cell takes in DNA from outside the cell. The external DNA becomes a component of the cell's DNA.

Foreign DNA is first joined to a small, circular DNA molecule known as a plasmid.

Plasmids are found naturally in some bacteria and have been very useful for DNA transfer.

The plasmid has a **genetic marker**—a gene that makes it possible to distinguish bacteria that carry the plasmid (and the foreign DNA) from those that don't.



### Transforming Plant Cells

**How can you tell if a transformation experiment has been successful?**

If transformation is successful, the recombinant DNA is integrated into one of the chromosomes of the cell.

In nature, a bacterium exists that produces tumors in plant cells.

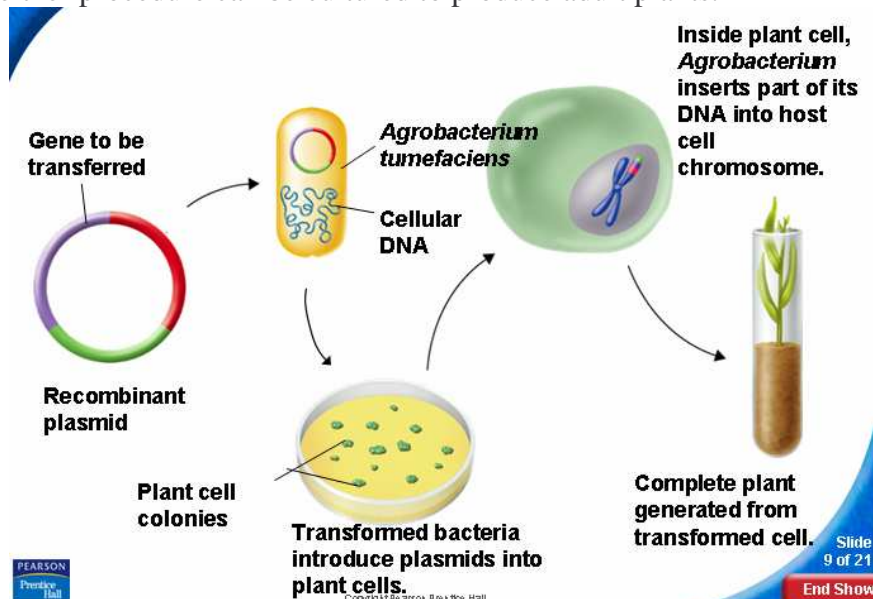
Researchers can inactivate the tumor-producing gene found in this bacterium and insert a piece of foreign DNA into the plasmid.

The recombinant plasmid can then be used to infect plant cells.

When their cell walls are removed, plant cells in culture will sometimes take up DNA on their own.

DNA can also be injected directly into some cells.

Cells transformed by either procedure can be cultured to produce adult plants.



## Transforming Animal Cells

Many egg cells are large enough that DNA can be directly injected into the nucleus.

Enzymes may help to insert the foreign DNA into the chromosomes of the injected cell.

DNA molecules used for transformation of animal and plant cells contain marker genes.

DNA molecules can be constructed with two ends that will sometimes recombine with specific sequences in the host chromosome.

The host gene normally found between those two sequences may be lost or replaced with a new gene.

