

13-3 Cell Transformation

Recombinant DNA



Host Cell DNA

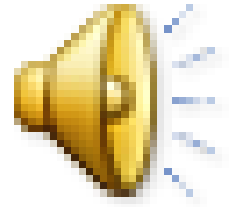
Target gene




Modified Host Cell DNA



Transforming Bacteria



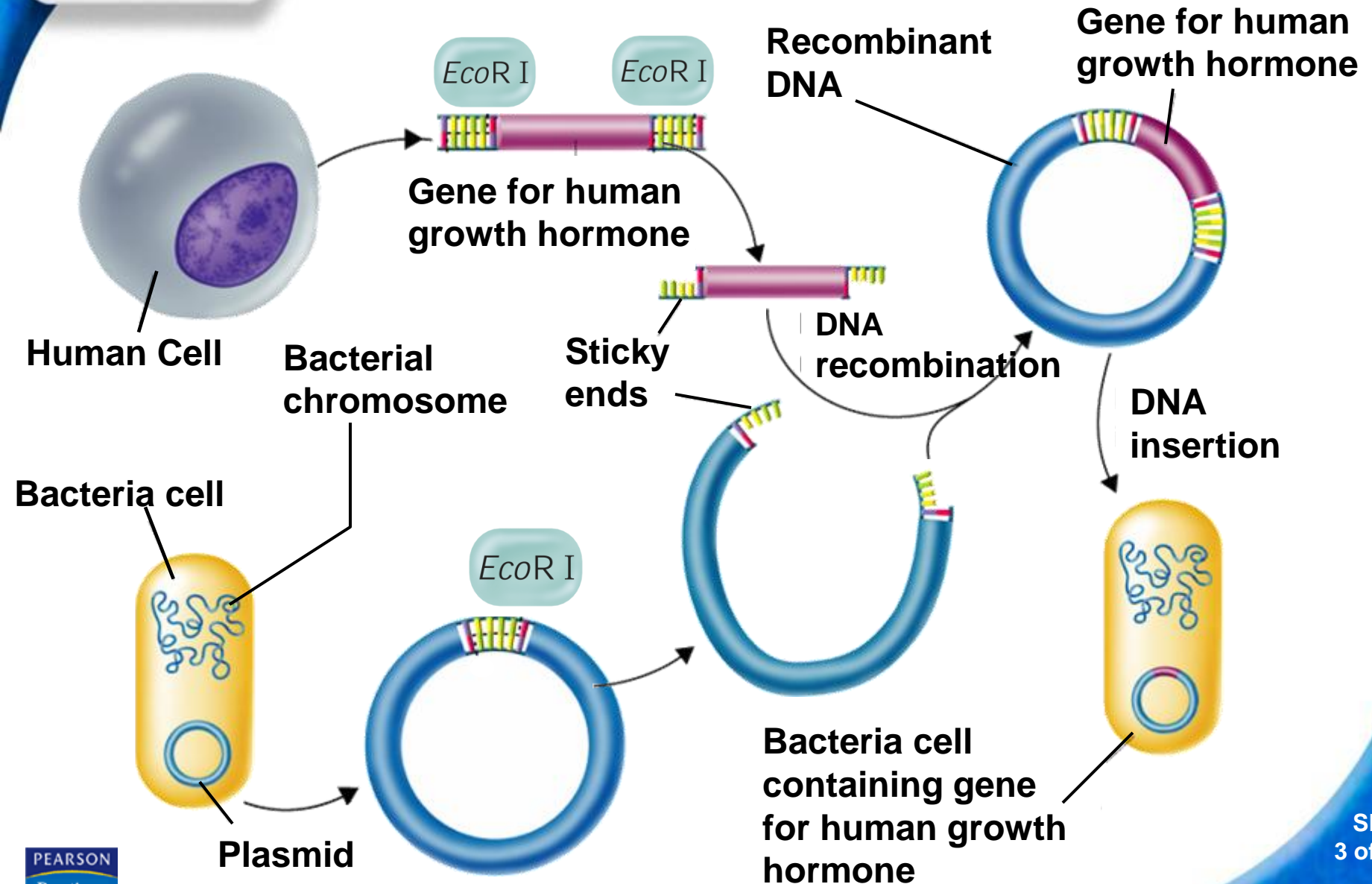
 During transformation, a cell takes in DNA from outside the cell. The external DNA becomes a component of the cell's DNA.

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

13-3 Cell Transformation → Transforming Bacteria

movie
click to start



Transforming Plant Cells



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.

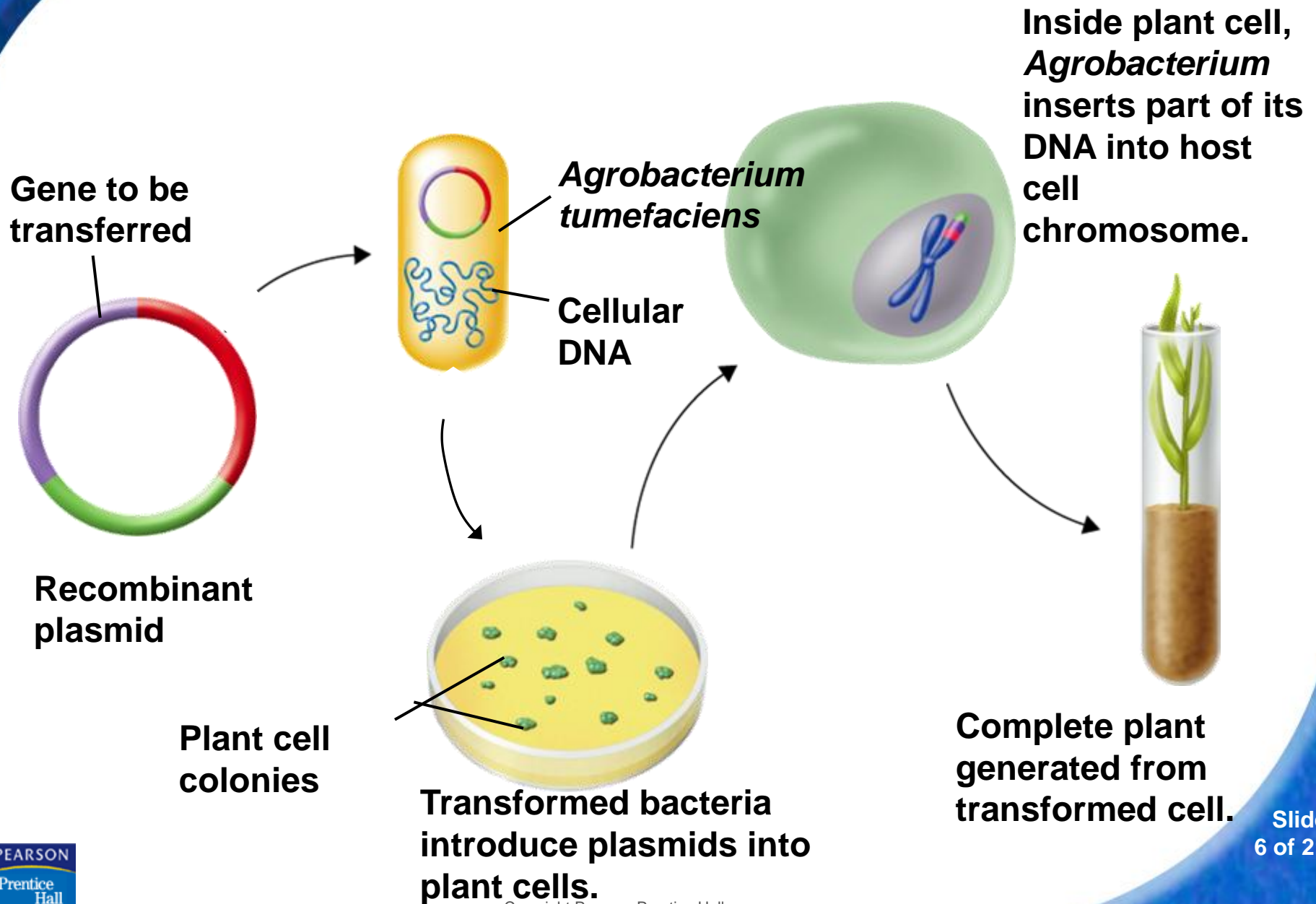
The recombinant plasmid can then be used to infect plant cells.

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.

13-3 Cell Transformation ➡ Transforming Plant Cells



Transforming Animal Cells

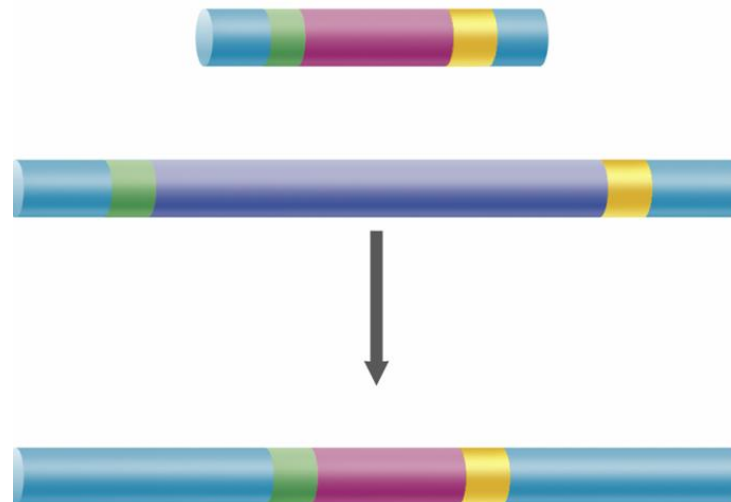
Many egg cells are large enough that DNA can be directly injected into the nucleus.

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

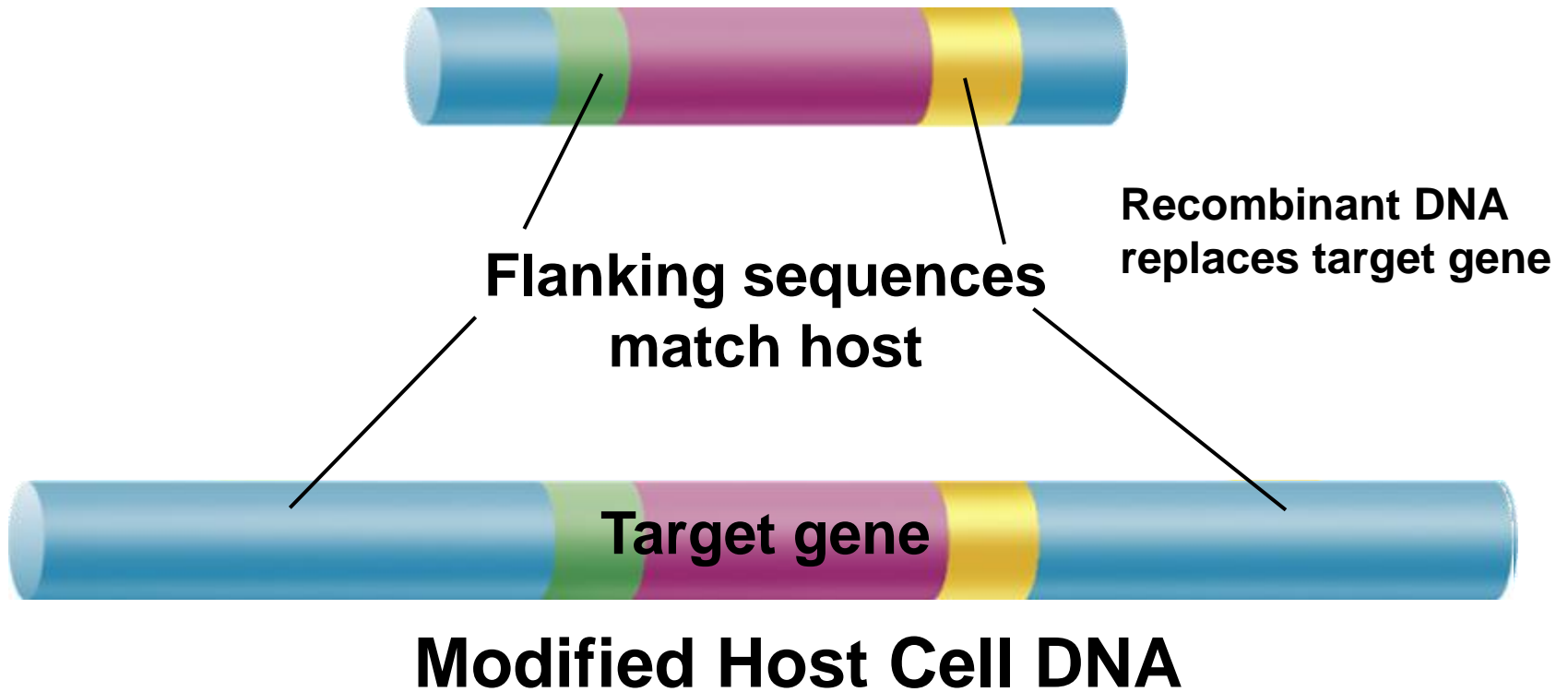
DNA molecules used for transformation of animal and plant cells contain marker genes.

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.



Recombinant DNA



13-3 Cell Transformation →



Engineering Bacteria

http://www.teachersdomain.org/asset/biot11_vid_genengdna/

Bacterial Transformation

http://www.teachersdomain.org/asset/biot11_vid_transbact/

Library of Genetic Engineering Video

http://www.teachersdomain.org/browse/?fq_hierarchy=k12.sci.life.gen_engineering

Documentary on Gen Modified Foods

<http://www.youtube.com/watch?v=Bx3vu7fd2n8>

13-3 Section QUIZ

Continue to:

Section QUIZ

- or -

Click to Launch:



13-3 Section QUIZ

1 Plasmids can be used to transform

- a. bacteria only.
- b. plant cells only.
- c. plant, animal, and bacterial cells.
- d. animal cells only.

13-3 Section QUIZ

2 An unknowing pioneer in the concept of cell transformation was

a. Luther Burbank.

b. Frederick Griffith.

c. Oswald Avery.

d. James Watson.

13-3 Section QUIZ

3

One reason plasmids are useful in cell transformation is that they

- a. are found in all types of cells.
- b. prevent gene replication.
- c. counteract the presence of foreign DNA.
- d. have genetic markers indicating their presence.

13-3 Section QUIZ

4

A common method of determining whether bacteria have taken in a recombinant plasmid containing a gene for resistance is to

- a. introduce them into plant cells.
- b. introduce them into animal cells.
- c. treat them with an antibiotic.
- d. mix them with other bacteria that do not have the plasmid.

5 Successful transformation of an animal or a plant cell involves

- a. the integration of recombinant DNA into the cell's chromosome.
- b. changing the cell's chromosomes into plasmids.
- c. treating the cell with antibiotics.
- d. destroying the cell wall in advance.