

Activity 47: Recombinant DNA

Learning Objectives

Define the terms vector, plasmid, restriction enzyme, and recombinant DNA

Describe the steps in the process of gene cloning

Estimated Completion Time 45 Minutes

Instructor Information

This can be used as a first example of recombinant DNA. Many more interesting examples are available; especially interesting are the recombinant fluorescent protein animals.

ANSWERS TO QUESTIONS

1. The plasmid is the vector, and the restriction enzyme is EcoRI.
2. The restriction enzyme is breaking the DNA strands in both cases.
3. The base-pair sequences on both the plasmid break and the donor DNA contain complementary base sequences (since they were cut by the same restriction enzyme), so they can combine with each other due to H-bonding of complementary base pairs.
4. Protein synthesis occurs when the donor DNA is transcribed into mRNA by the host bacteria and is translated into the protein at the ribosome.
5. The process of recombining DNA as illustrated in Figure 1 also produces an exact gene copy.
6. When a whole organism is cloned, the entire genome is copied, not just a single gene. It is much easier to clone a single protein versus an entire organism.

Activity 47: Skill Development

1. DNA from one organism is recombined with a vector and placed in another organism.
2. A plasmid is a circular piece of DNA that can move between bacteria.
3. Answers will vary, but the most common will be mice, rabbit, pigs, cats, or monkey.