Cloning DNA

- Researchers cut up DNA from different sources, then paste the resulting fragments together

- **Cloning vectors** can carry foreign DNA into host cells

A Individual bacterial cells from a DNA library are spread over the surface of a solid growth medium. The cells divide repeatedly and form colonies—clusters of millions of genetically identical daughter cells.

B A piece of special paper pressed onto the surface of the growth medium will bind some cells from each colony.

C The paper is soaked in a solution that ruptures the cells and releases their DNA. The DNA clings to the paper in spots mirroring the distribution of colonies.

D A probe is added to the liquid bathing the paper. The probe hybridizes with (sticks to) only the spots of DNA that contain complementary base sequences.

E The bound probe makes a spot. Here, one radioactive spot darkens x-ray film. The position of the spot on the film is compared to the positions of all the original bacterial colonies. Cells from the colony that made the spot are cultured, and the DNA they contain is harvested.

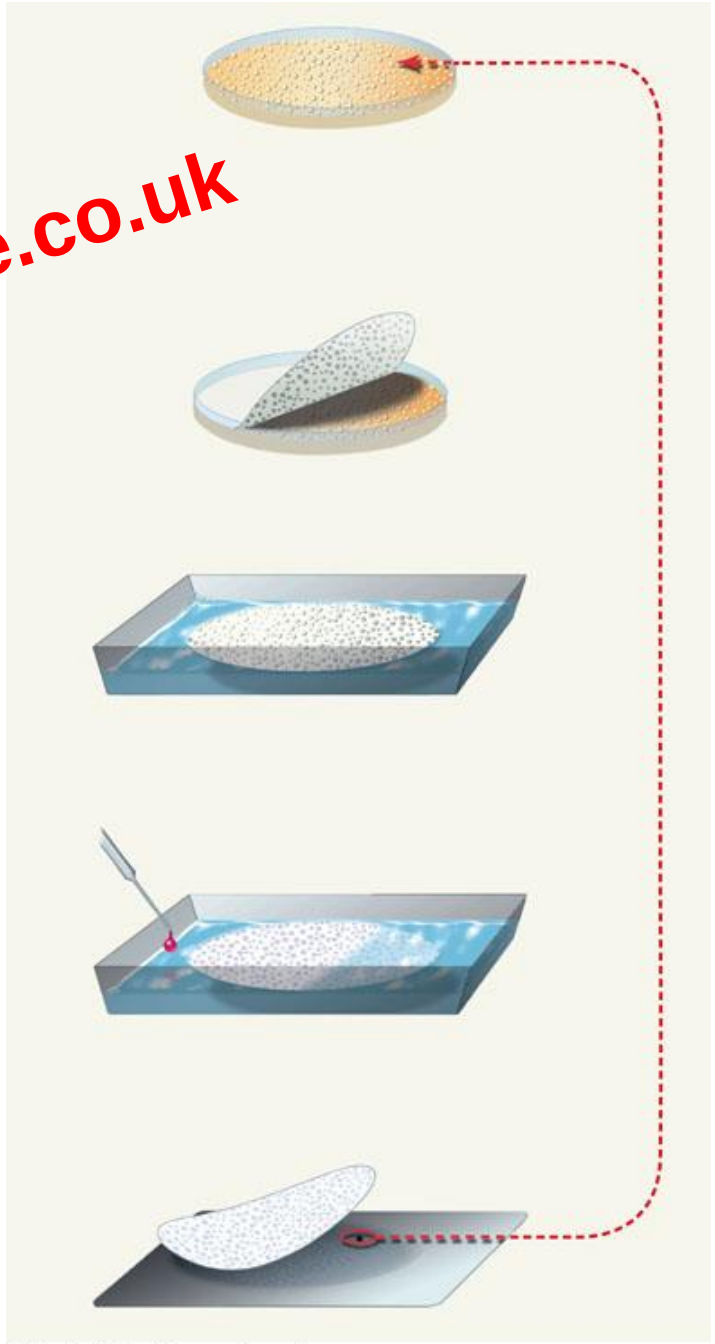

Fig. 16-5, p. 244

Big-Time Amplification: PCR

- The **polymerase chain reaction (PCR)** uses **primers** and heat-resistant DNA polymerase to mass-produce a particular section of DNA without having to clone it in living cells

- **polymerase chain reaction (PCR)**
  - Method that rapidly generates many copies of a specific section of DNA

- **primer**
  - Short, single strand of DNA designed to hybridize with a DNA fragment

Creating DNA Fingerprints

- PCR is used to amplify DNA from regions of several chromosomes **that have STRs**
- Electrophoresis is used to separate the fragments and create a unique DNA fingerprint
- DNA fingerprints have many applications
  - Legal cases, forensics, population studies