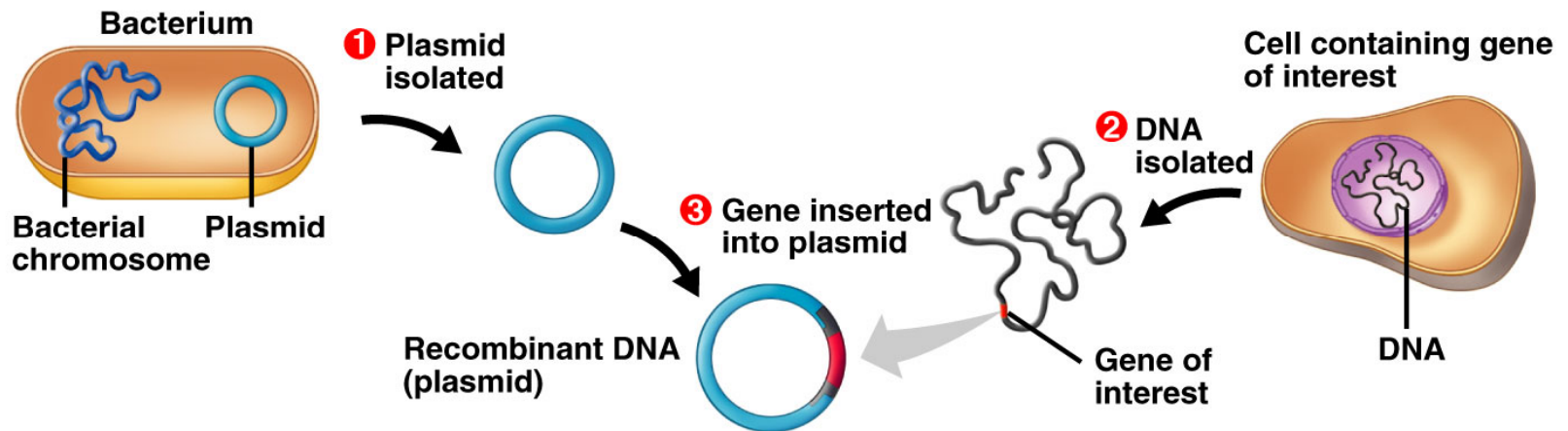


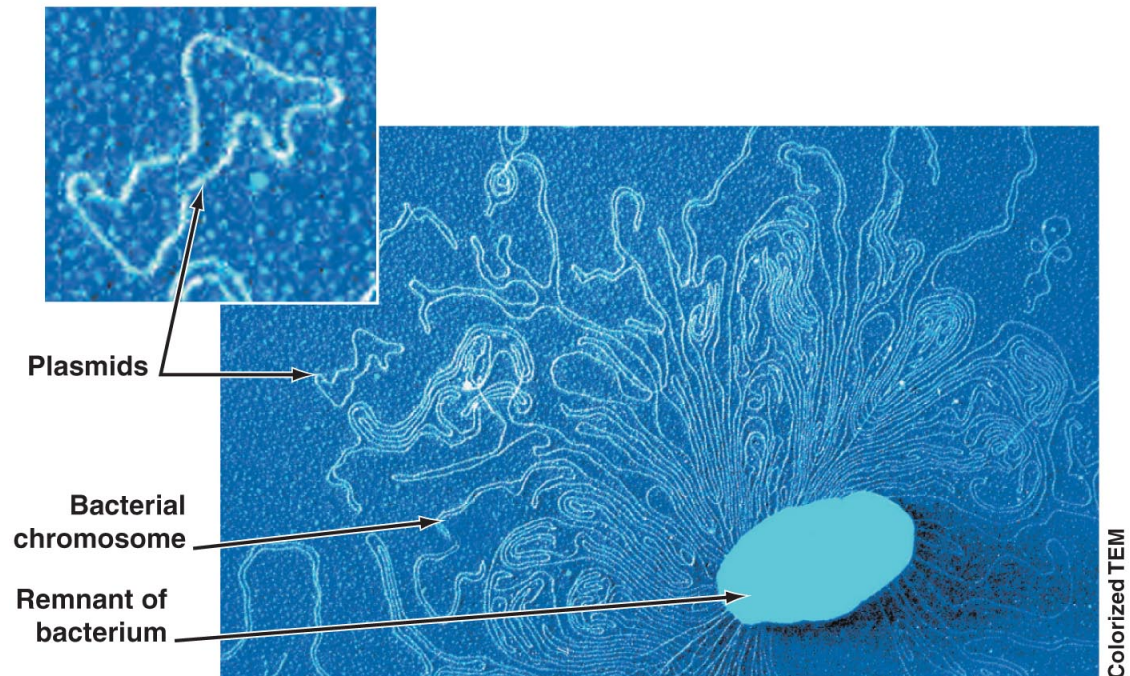
Biotechnology

Bio 11

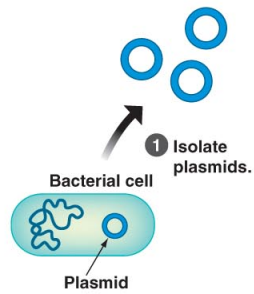
Plasmids and cloning



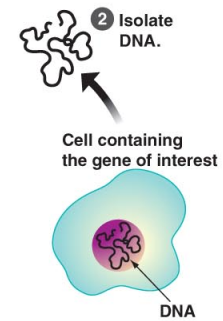
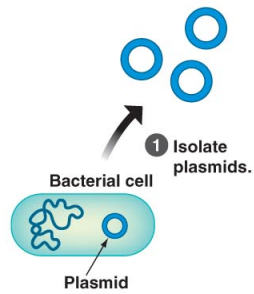
Bacterial Plasmid



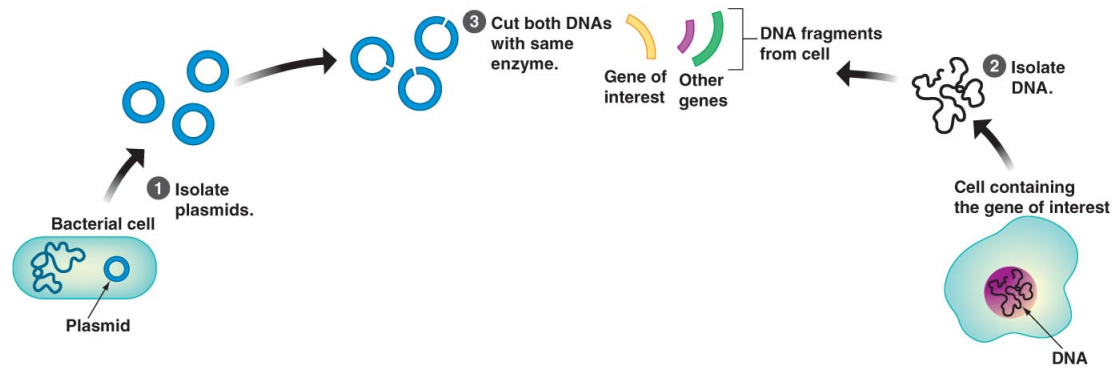
Cloning process



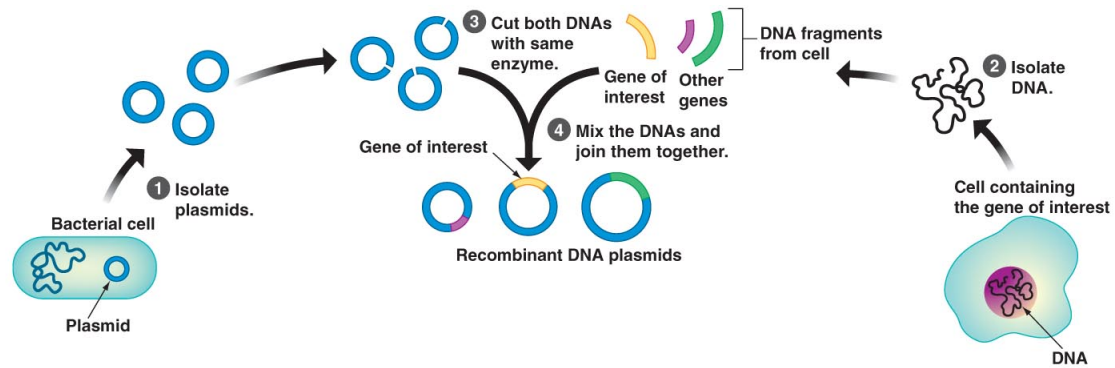
Cloning process



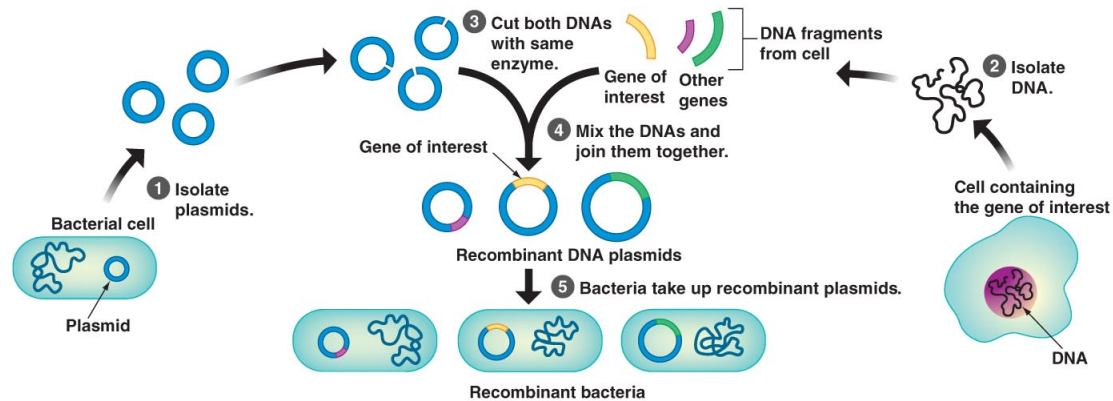
Cloning process



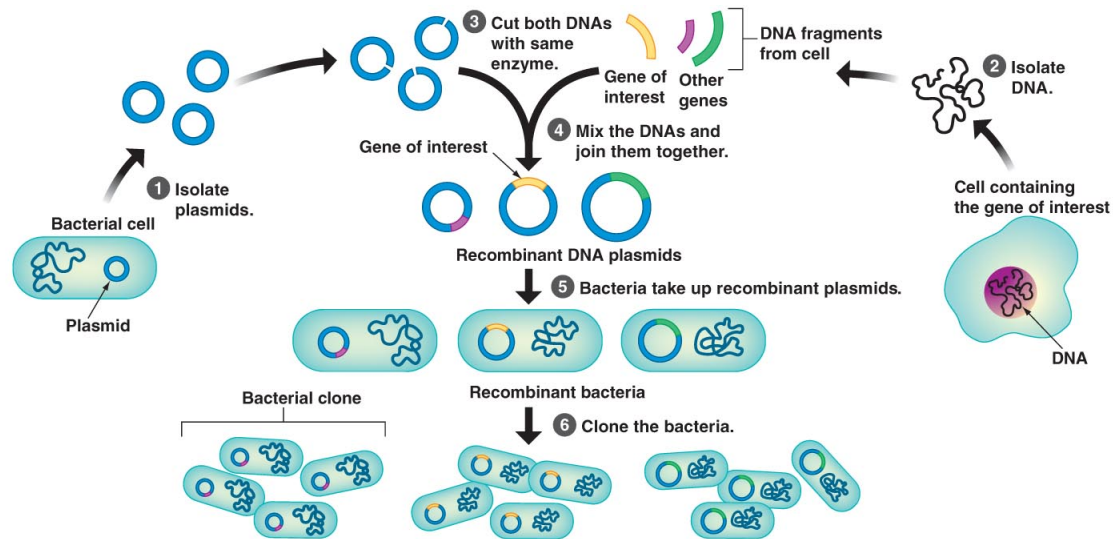
Cloning process



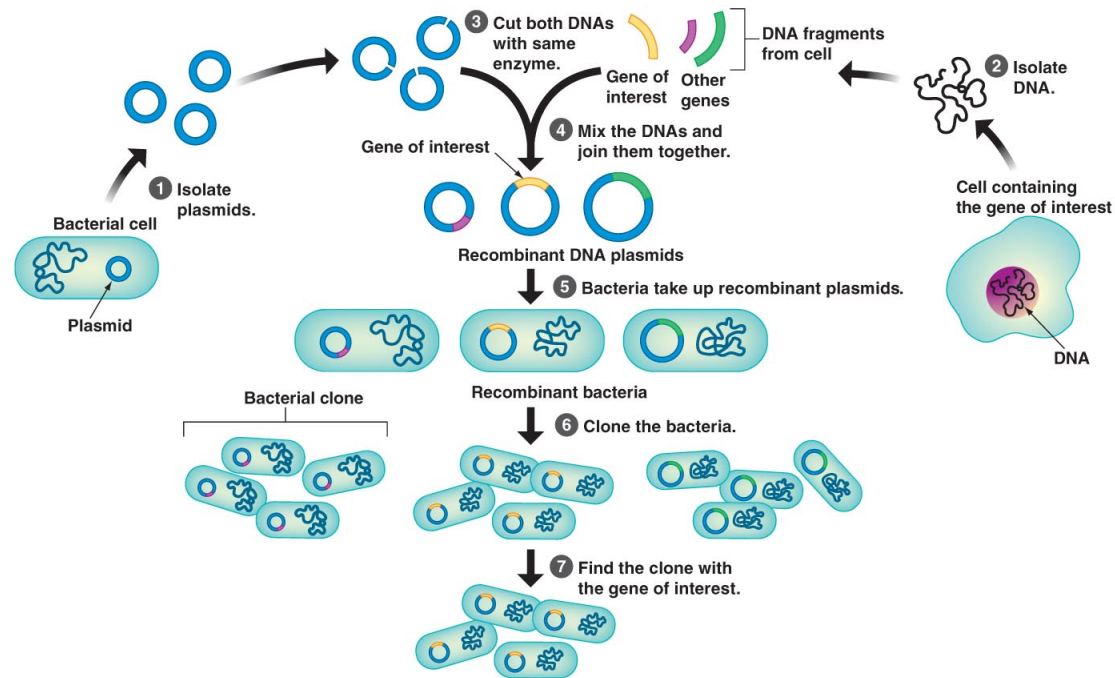
Transformation of the bacteria



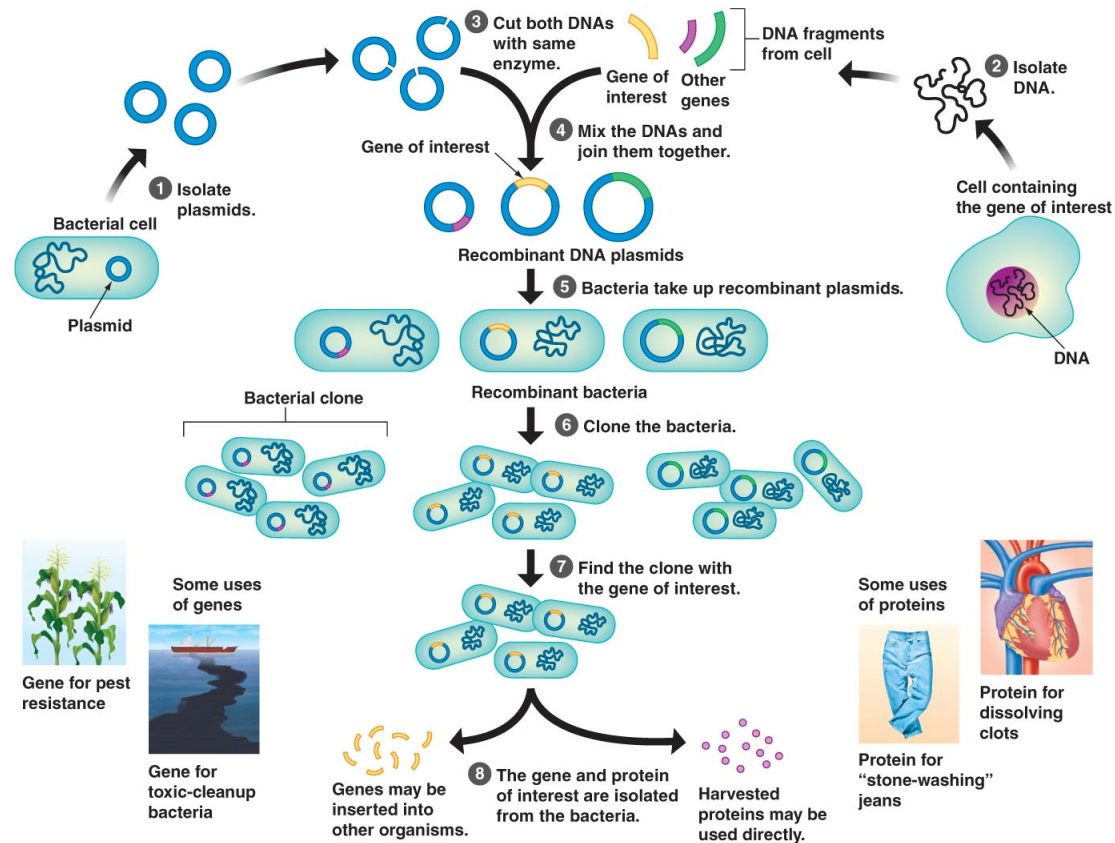
Growing up the transformants



Selecting for our plasmid



Can know produce products we need

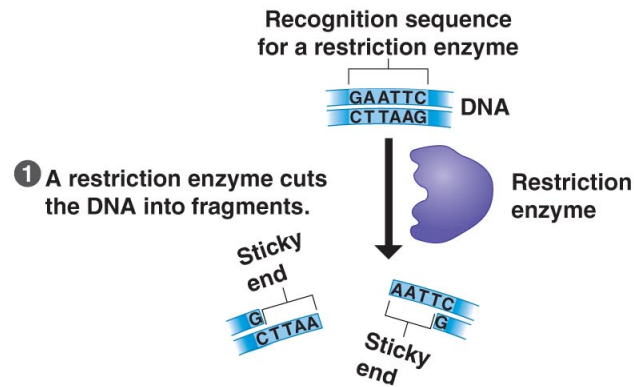


Protein products

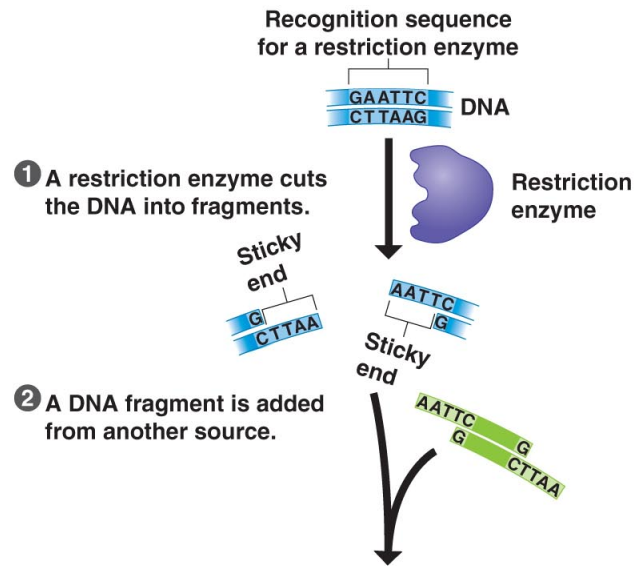
TABLE 12.6 SOME PROTEIN PRODUCTS OF RECOMBINANT DNA TECHNOLOGY

Product	Made In	Use
Human insulin	<i>E. coli</i>	Treatment for diabetes
Human growth hormone (HGH)	<i>E. coli</i>	Treatment for growth defects
Epidermal growth factor (EGF)	<i>E. coli</i>	Treatment for burns, ulcers
Interleukin-2 (IL-2)	<i>E. coli</i>	Possible treatment for cancer
Bovine growth hormone (BGH)	<i>E. coli</i>	Improving weight gain in cattle
Cellulase	<i>E. coli</i>	Breaking down cellulose for animal feeds
Taxol	<i>E. coli</i>	Treatment for ovarian cancer
Interferons (alpha and gamma)	<i>S. cerevisiae</i> ; <i>E. coli</i>	Possible treatment for cancer and viral infections
Hepatitis B vaccine	<i>S. cerevisiae</i>	Prevention of viral hepatitis
Erythropoietin (EPO)	Mammalian cells	Treatment for anemia
Factor VIII	Mammalian cells	Treatment for hemophilia
Tissue plasminogen activator (TPA)	Mammalian cells	Treatment for heart attacks

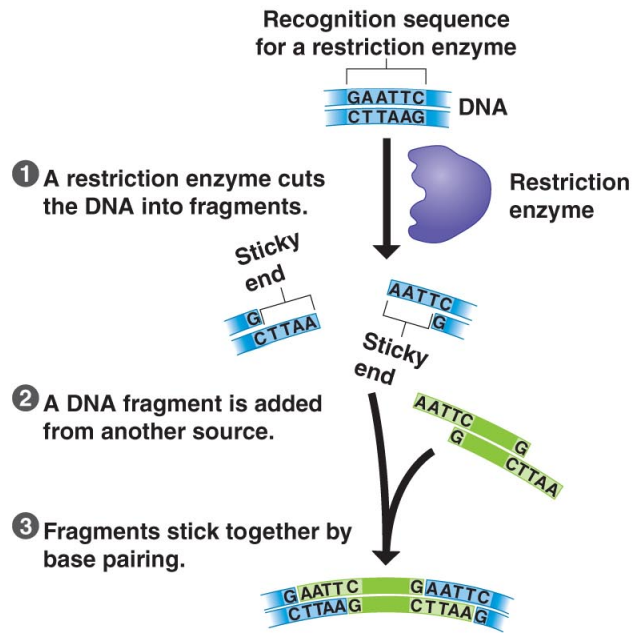
How do we manipulate the genes -- restriction enzymes



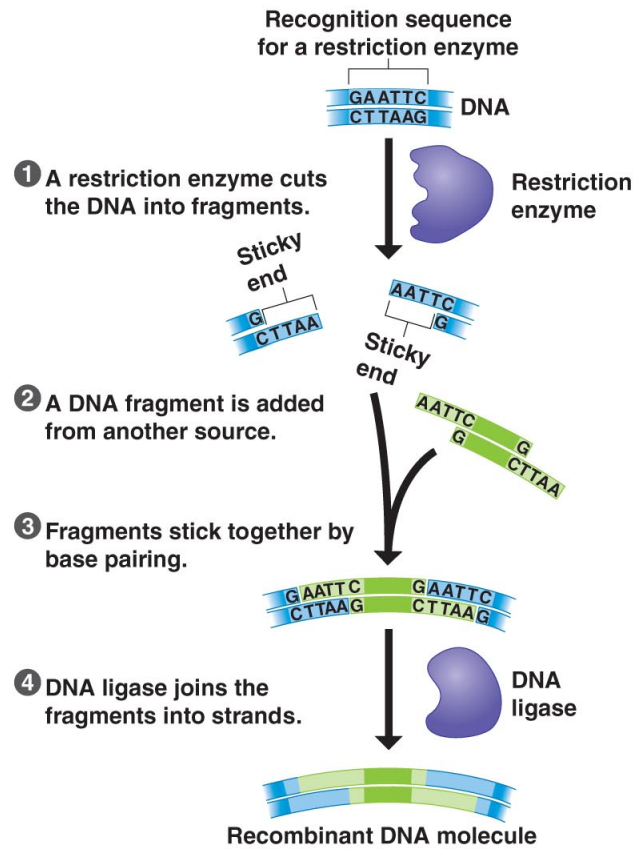
How do we manipulate the genes -- restriction enzymes



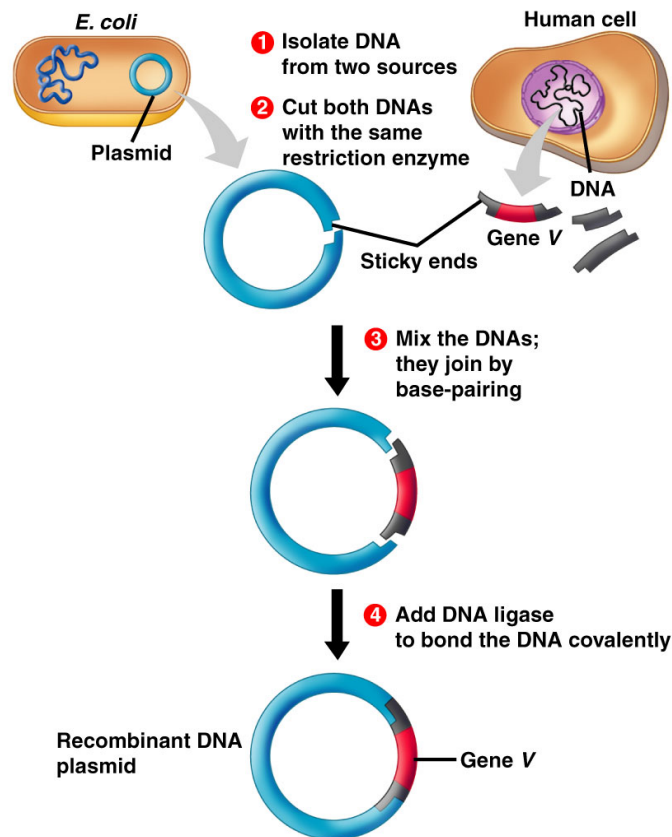
ligation



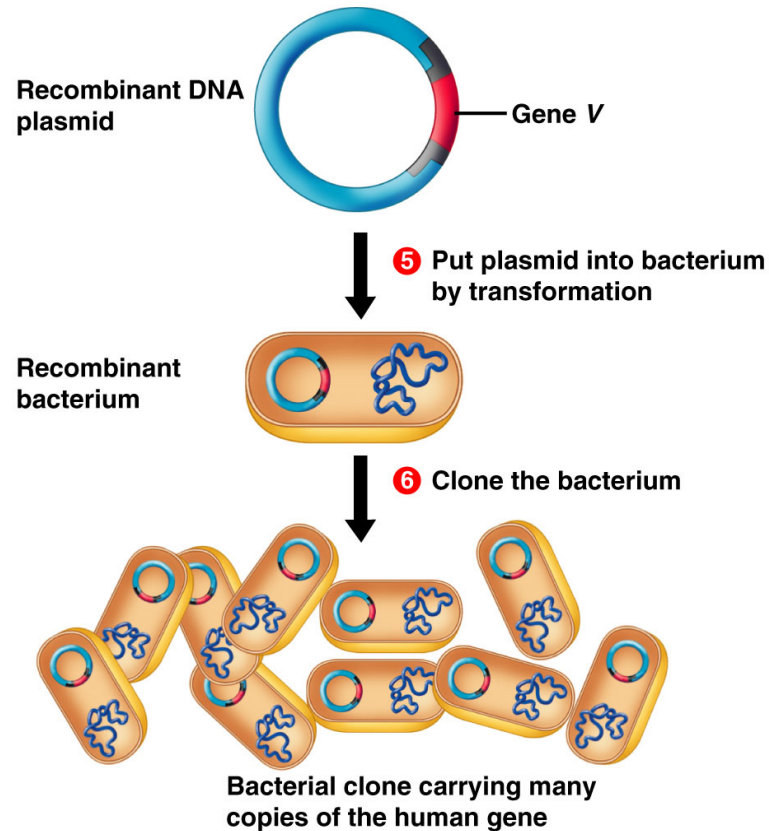
ligation



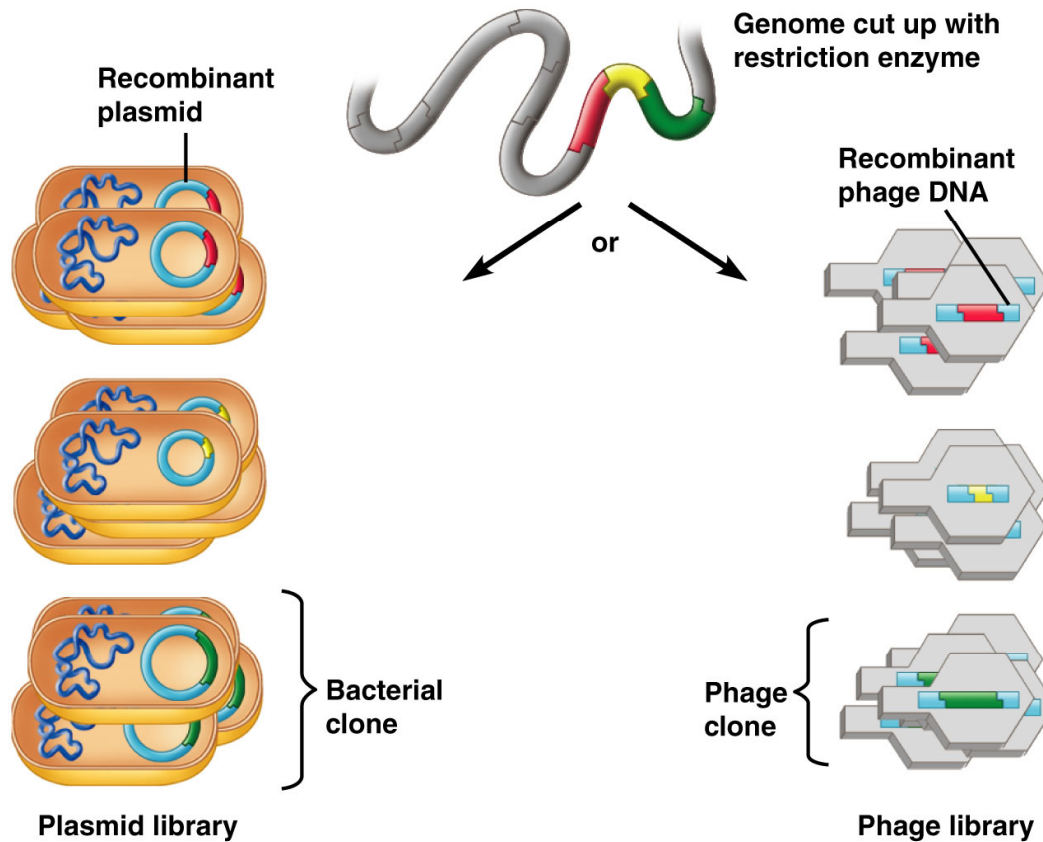
Plasmid now a hybrid



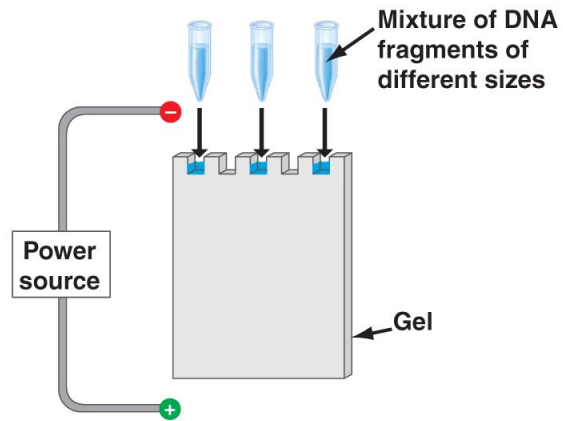
Replicates and will make protein of interest



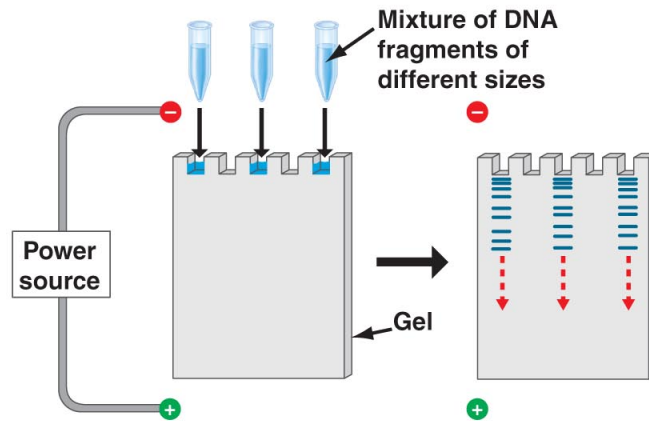
Making libraries to clone genes



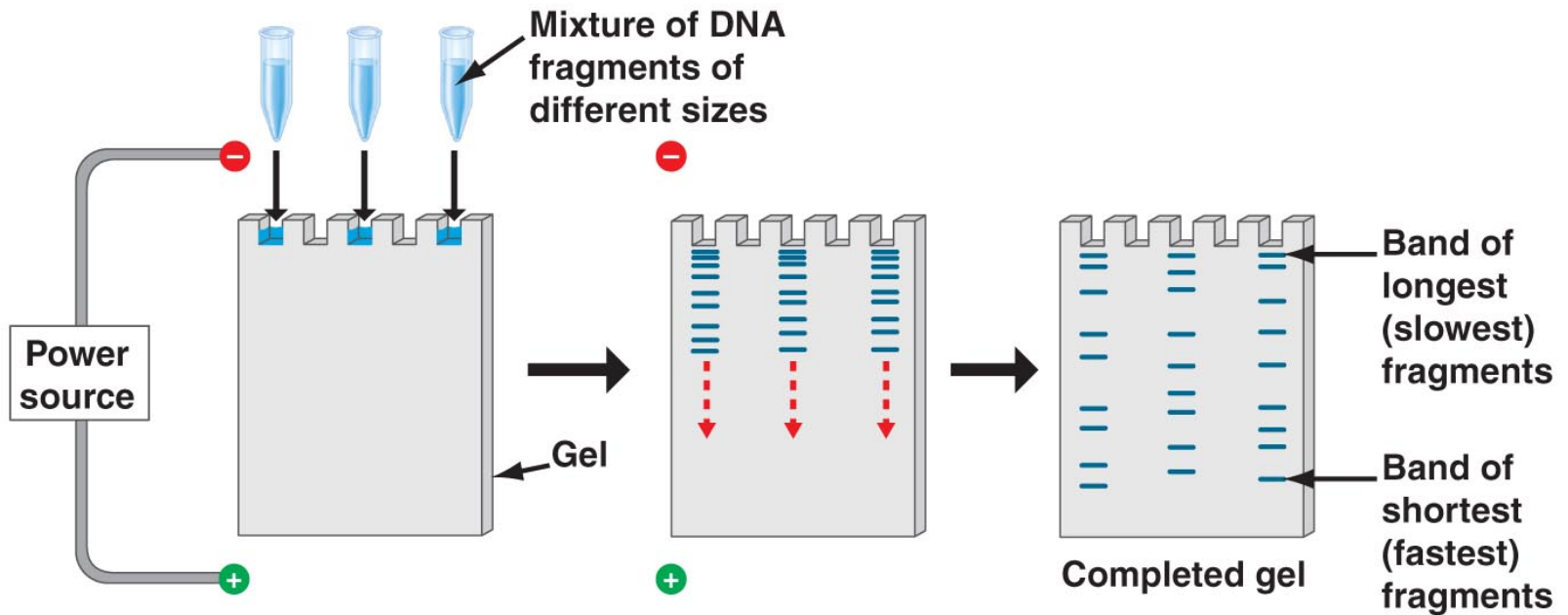
Running a gel



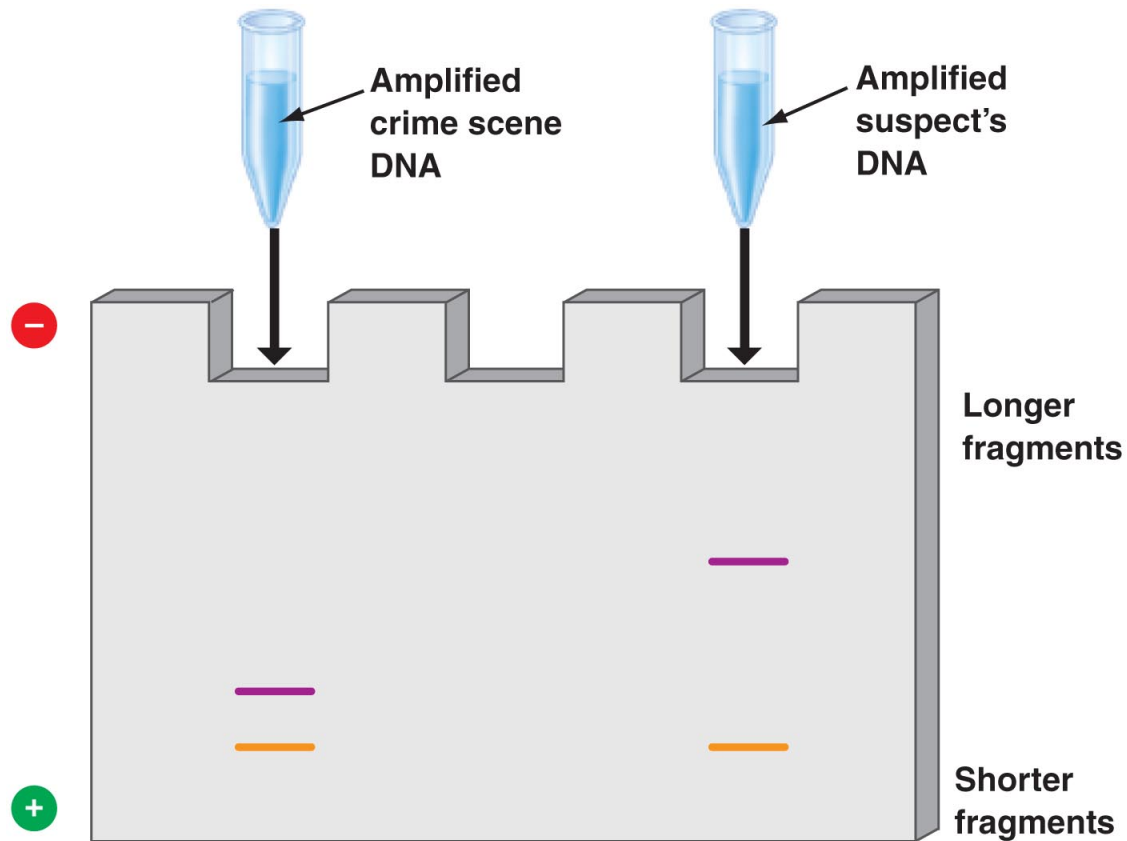
Running a gel



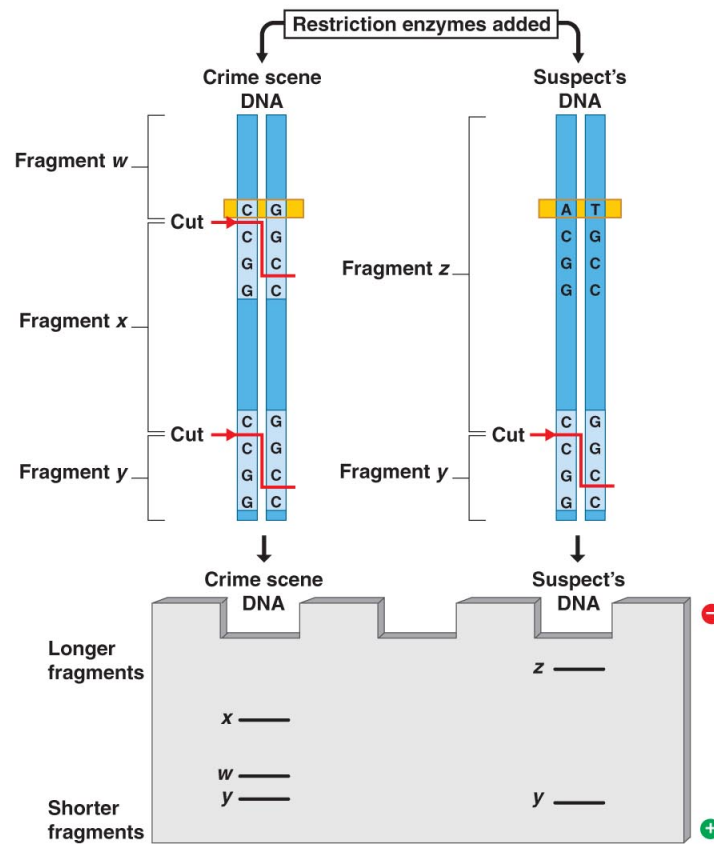
Running a gel



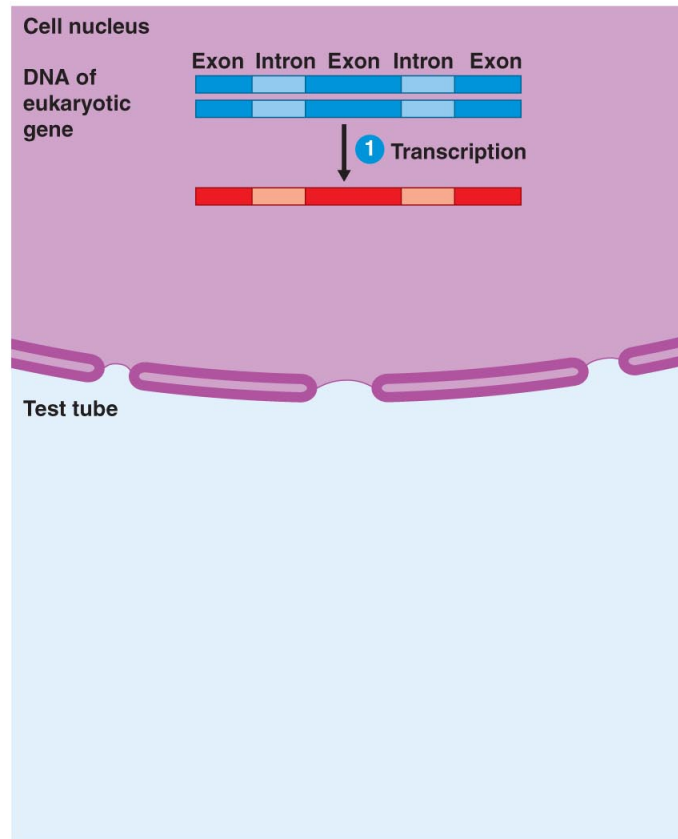
Running a gel



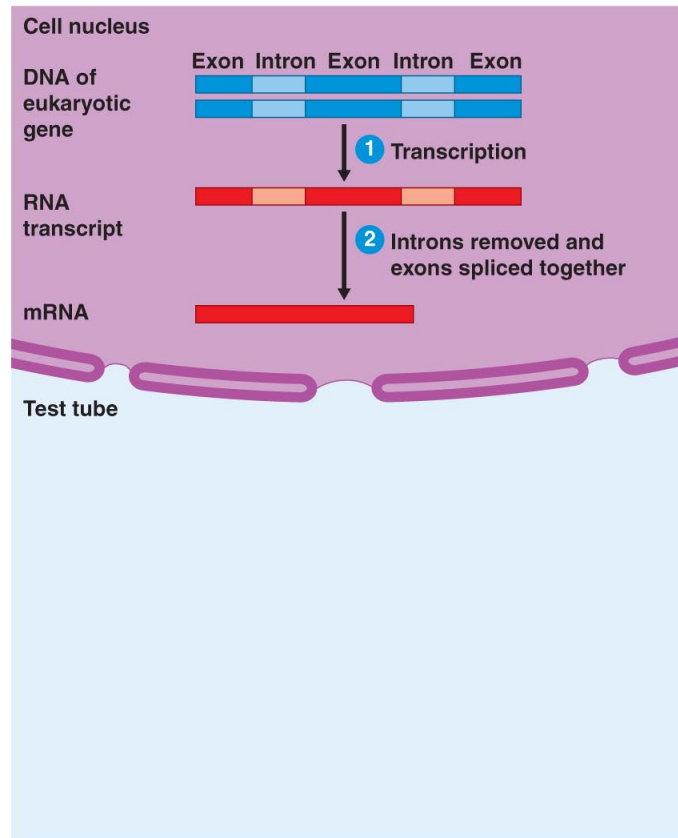
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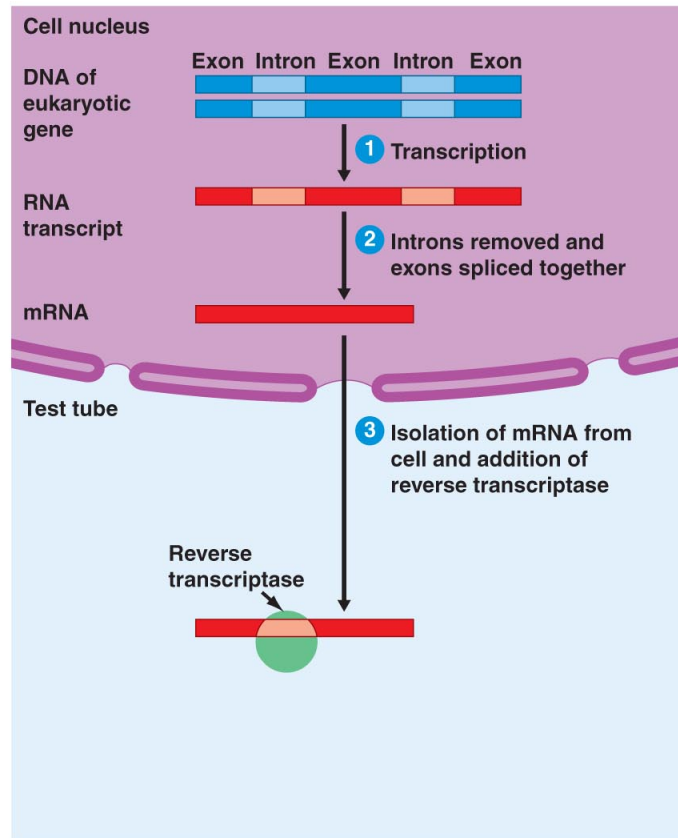
RNA can be changed to DNA- reversetranscriptase



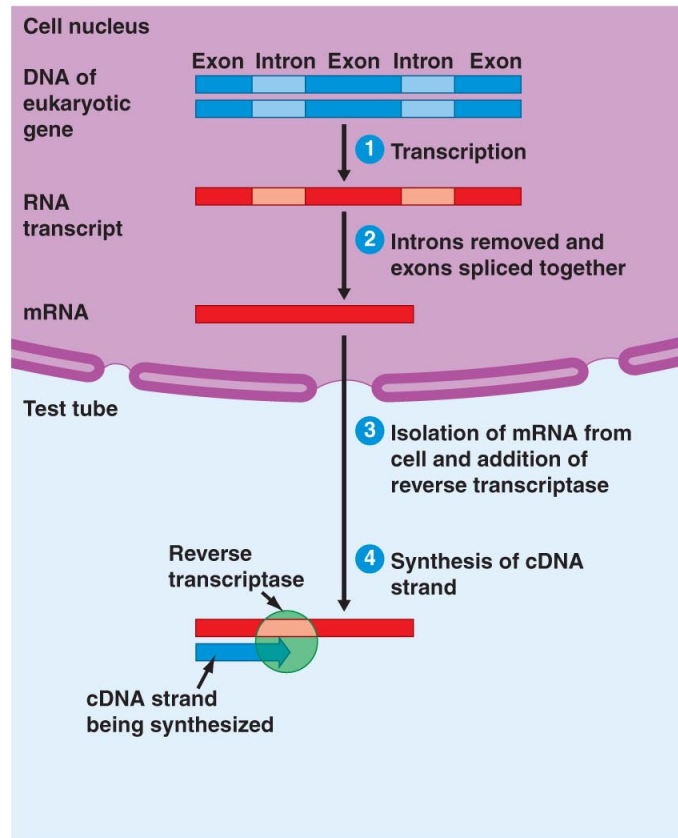
RNA can be changed to DNA- reversetranscriptase



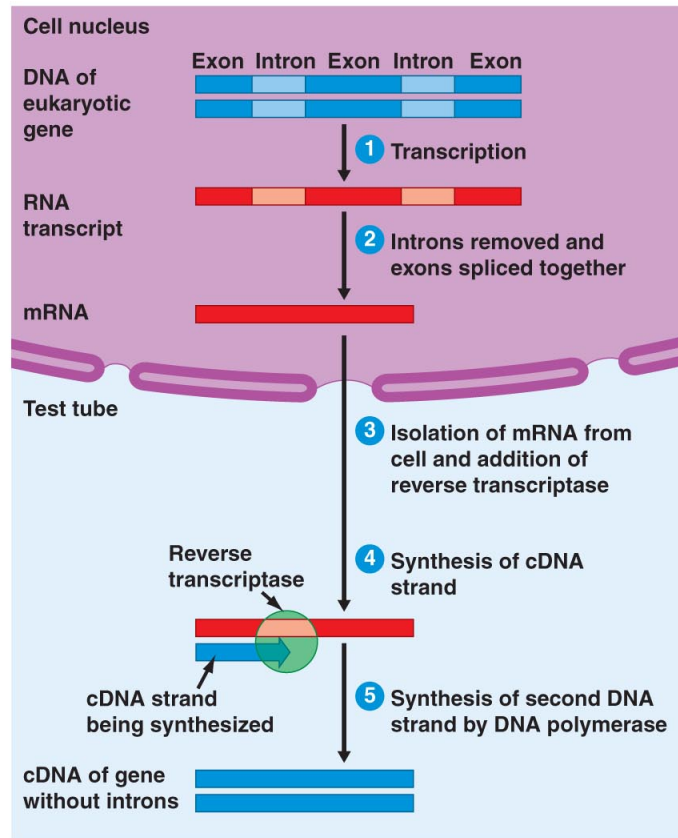
RNA can be changed to DNA- reverse transcriptase



RNA can be changed to DNA- reverse transcriptase



RNA can be changed to DNA- reverse transcriptase

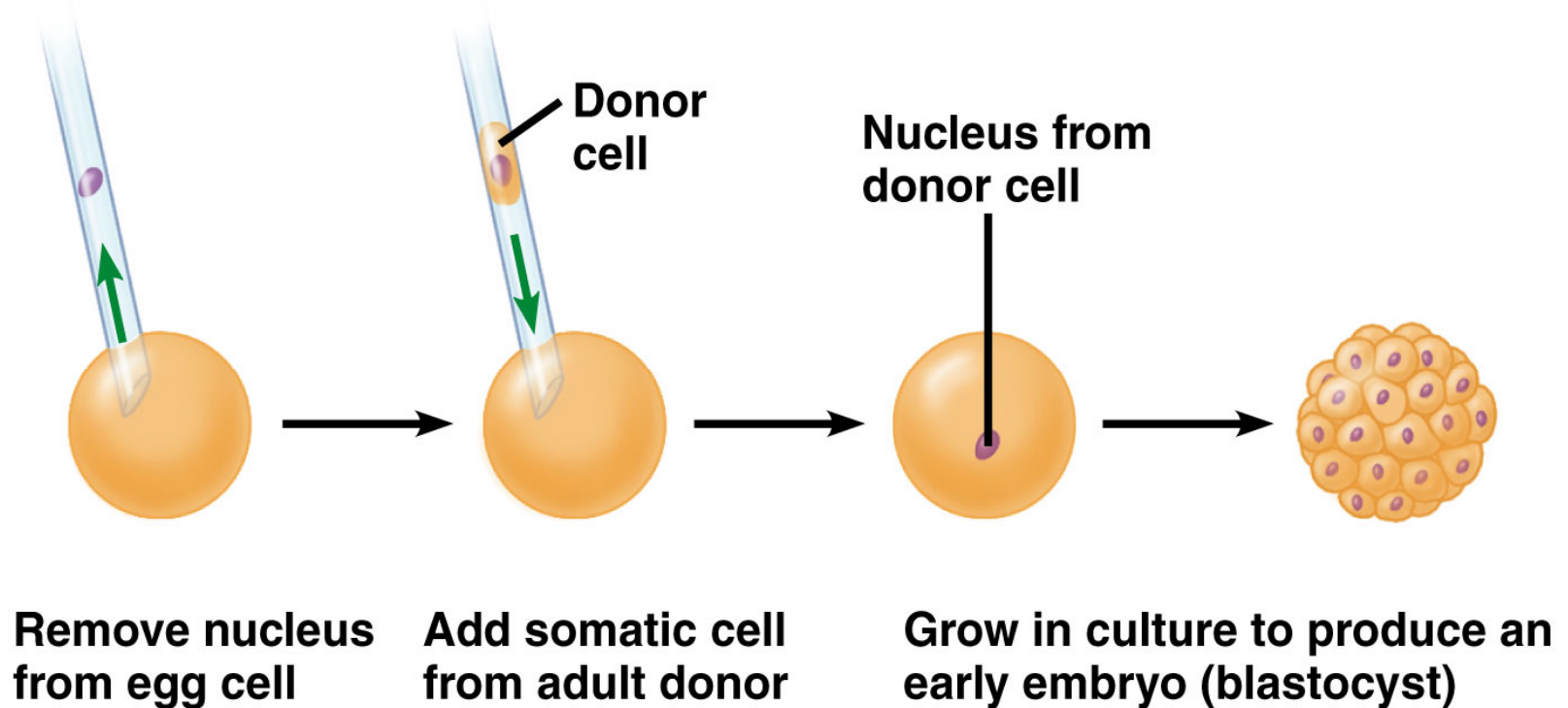


Clone sheep to produce what we need.

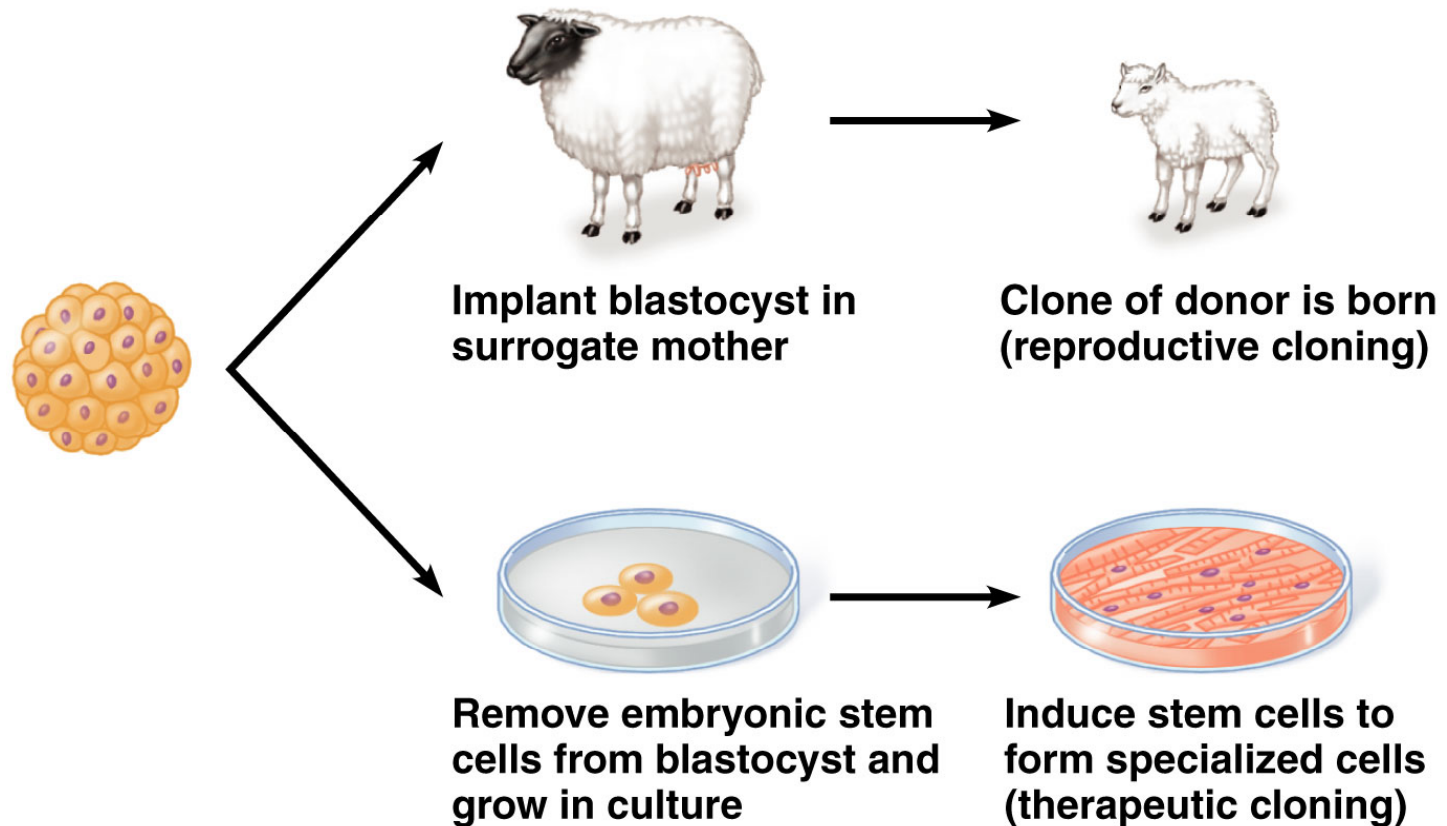


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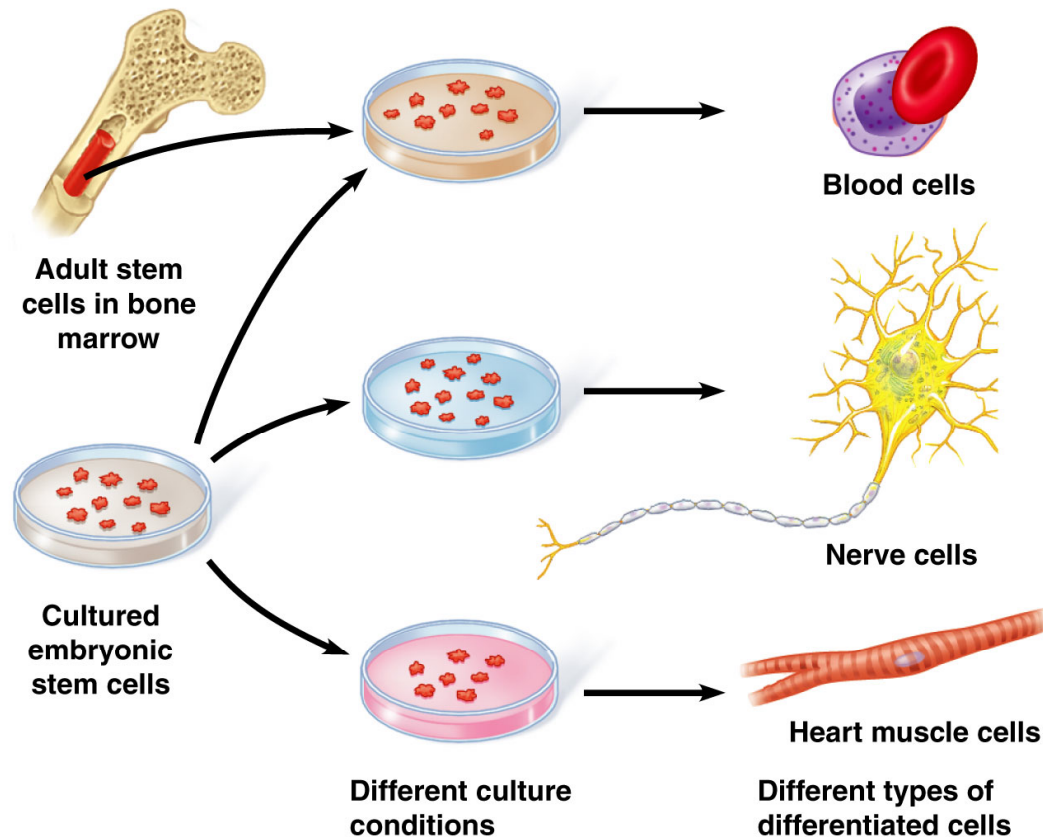
How Dolly was made



How Dolly was made



Adult vs. embryonic stem cells



First product

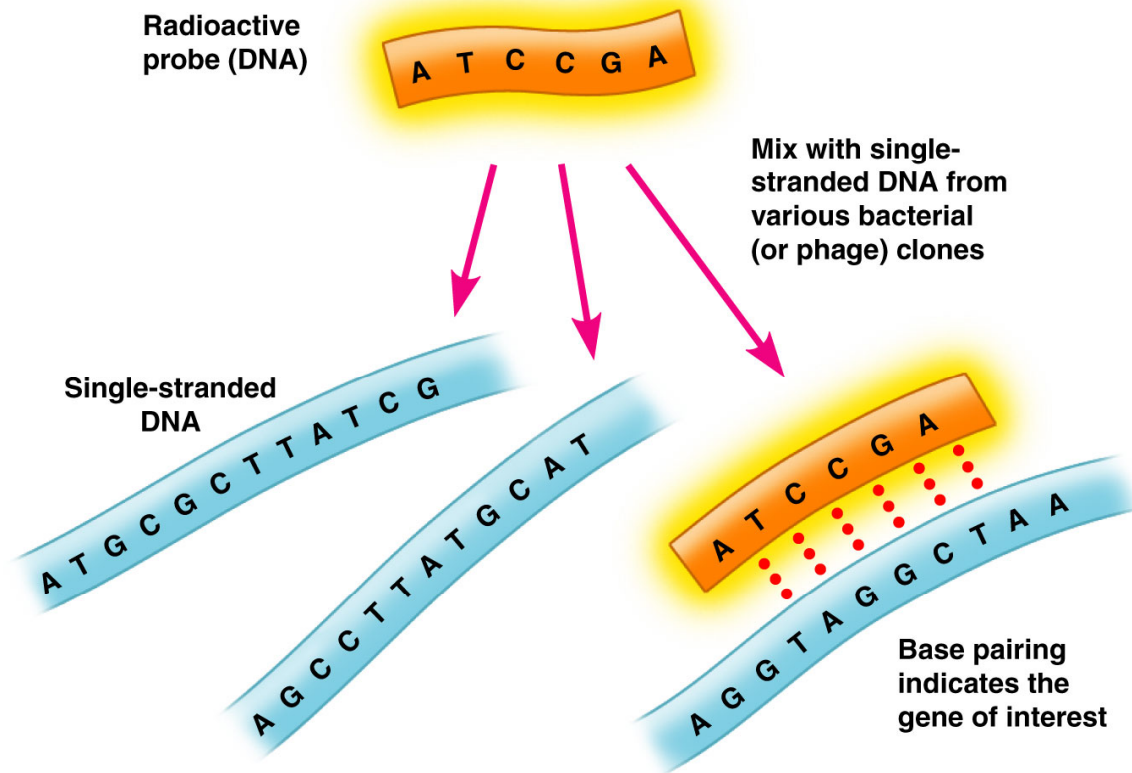


Fermentor

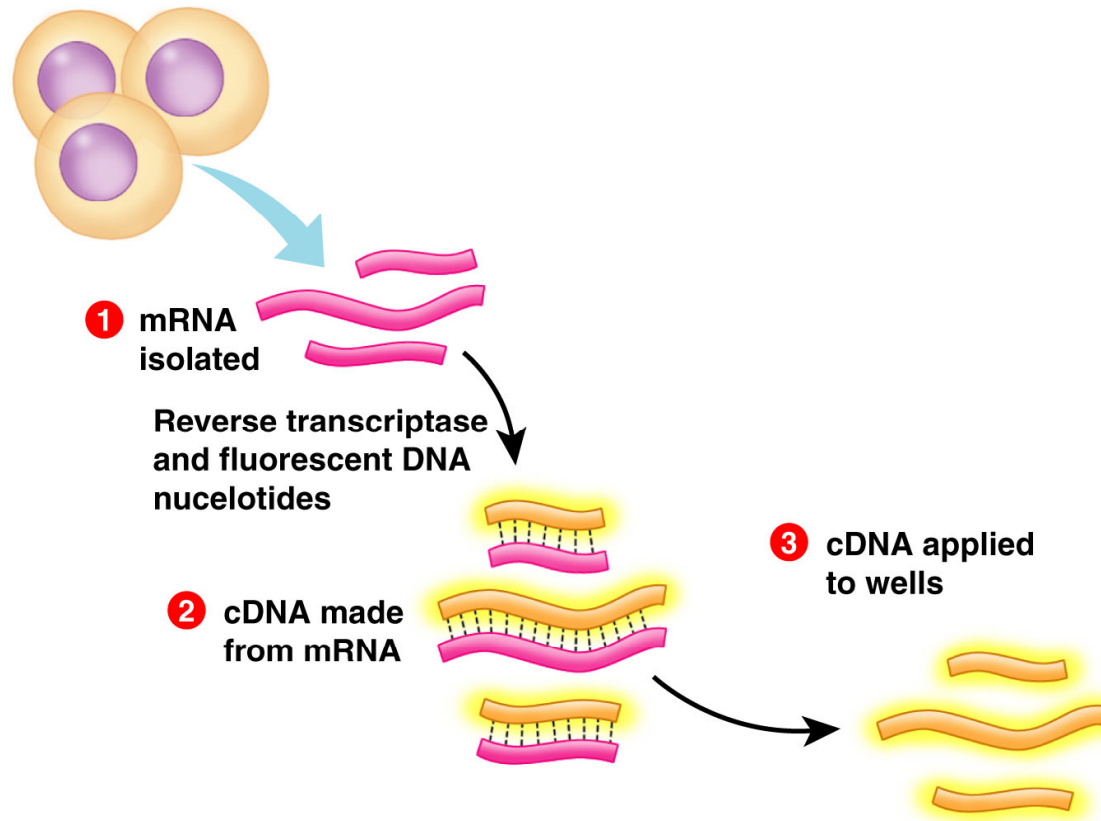


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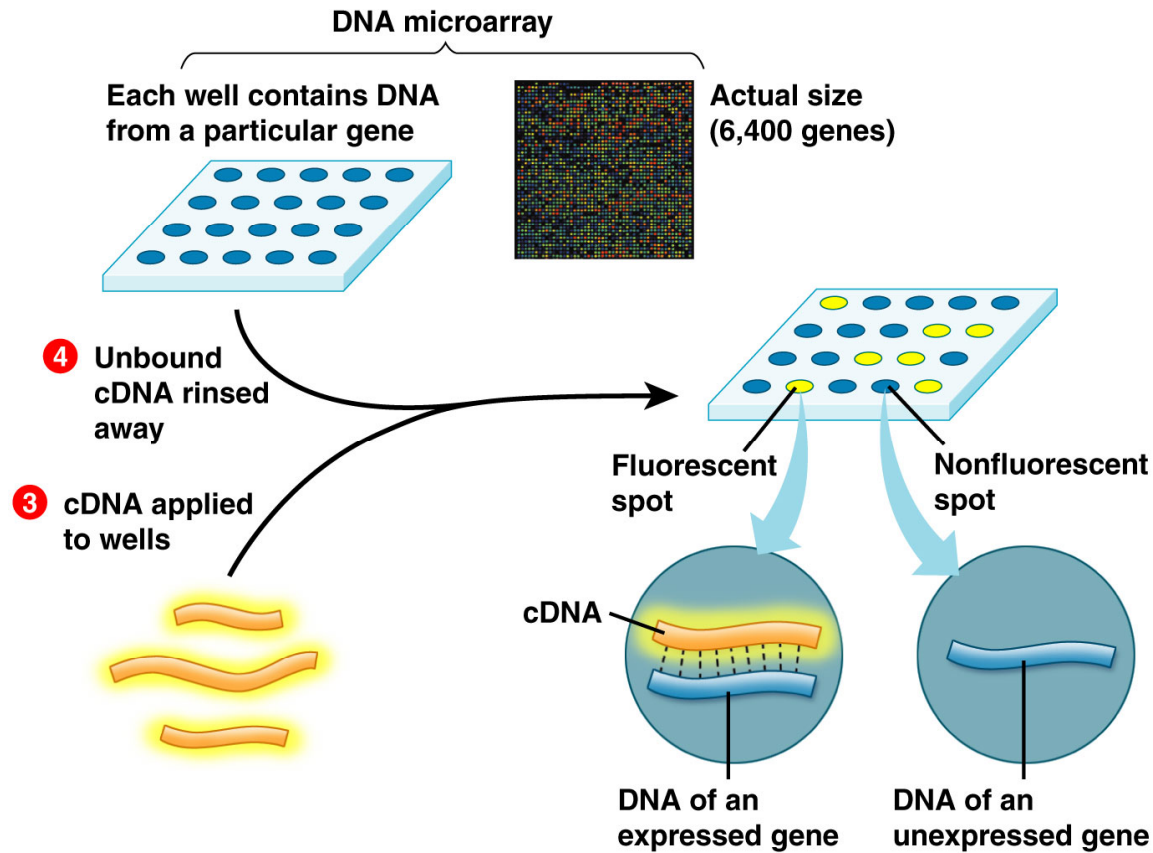
How do we probe for genes of interest?



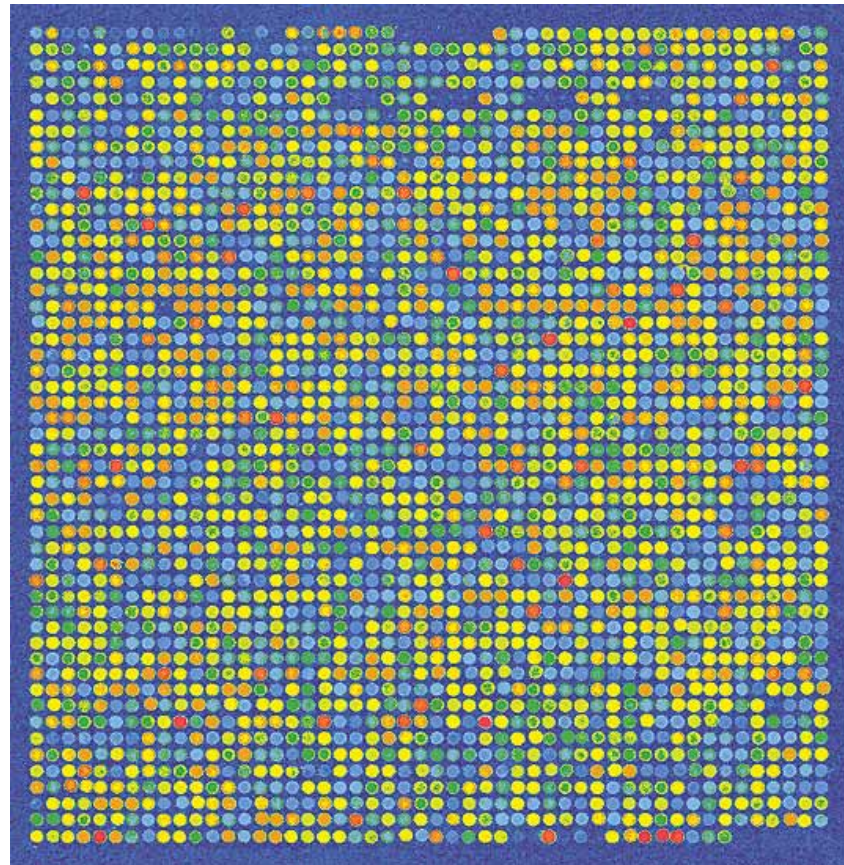
Microarray analysis



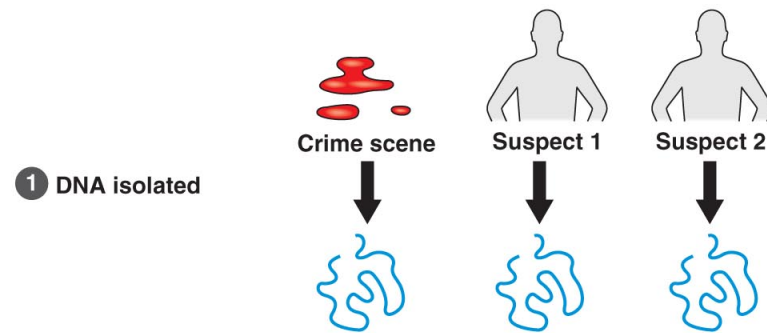
Microarray analysis



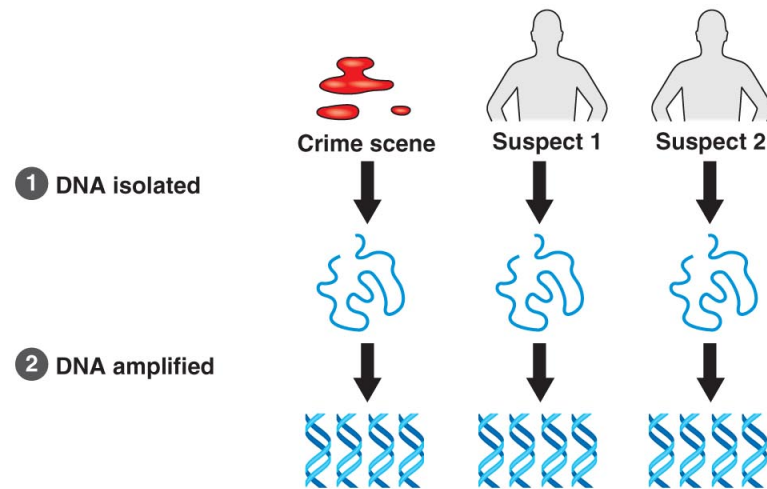
Microarray



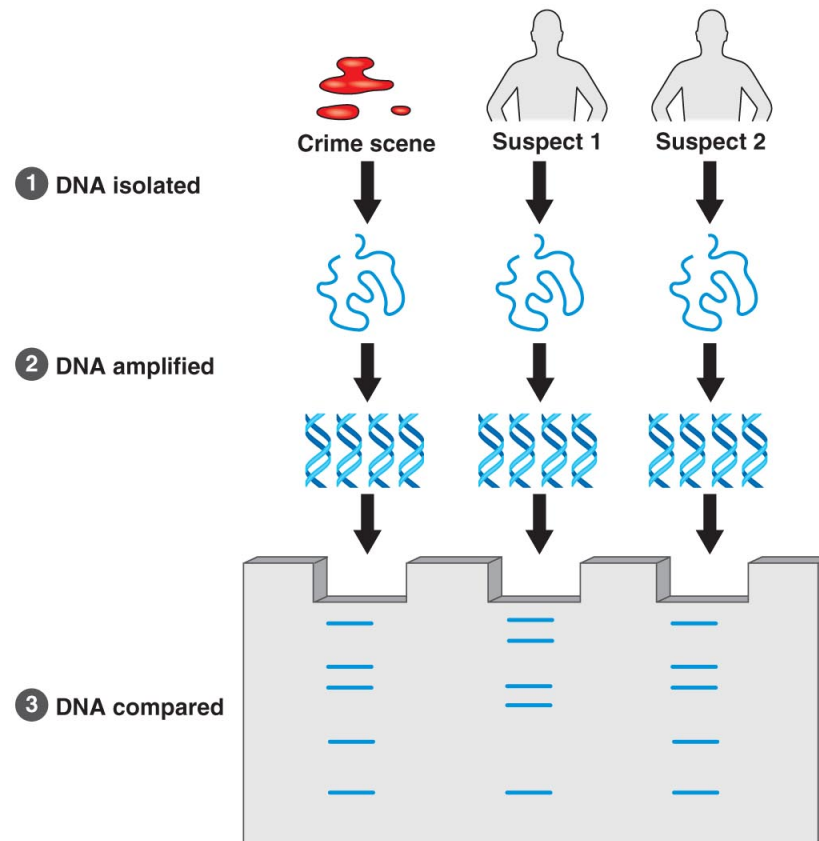
The scene of the crime



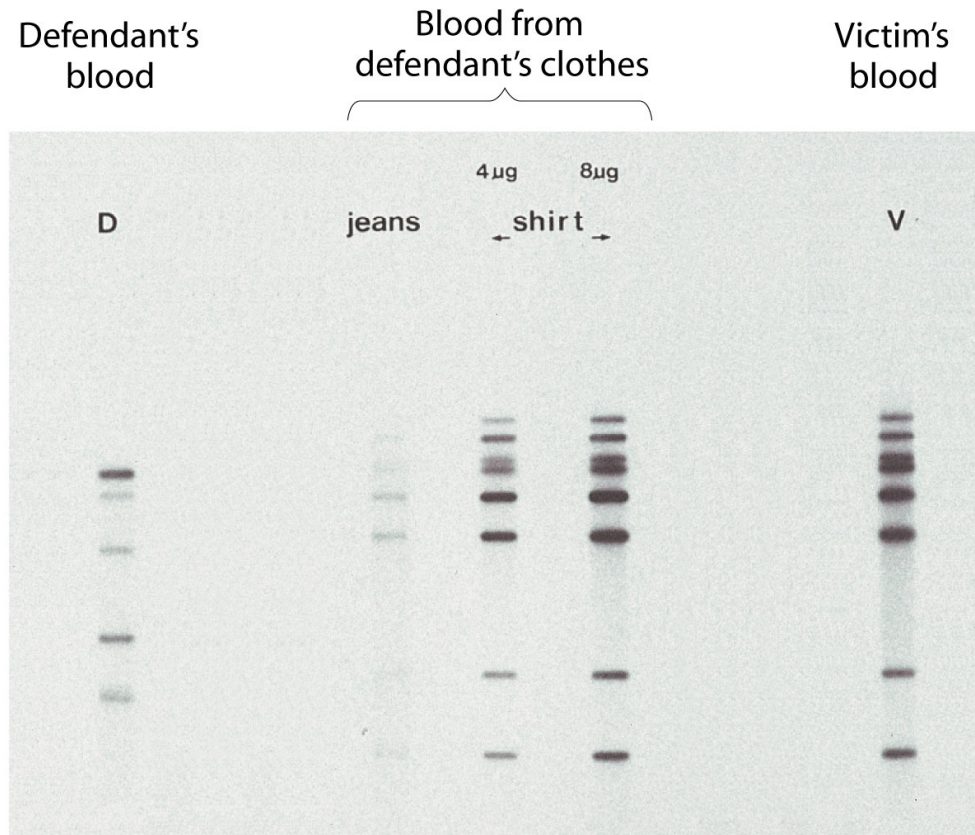
The scene of the crime



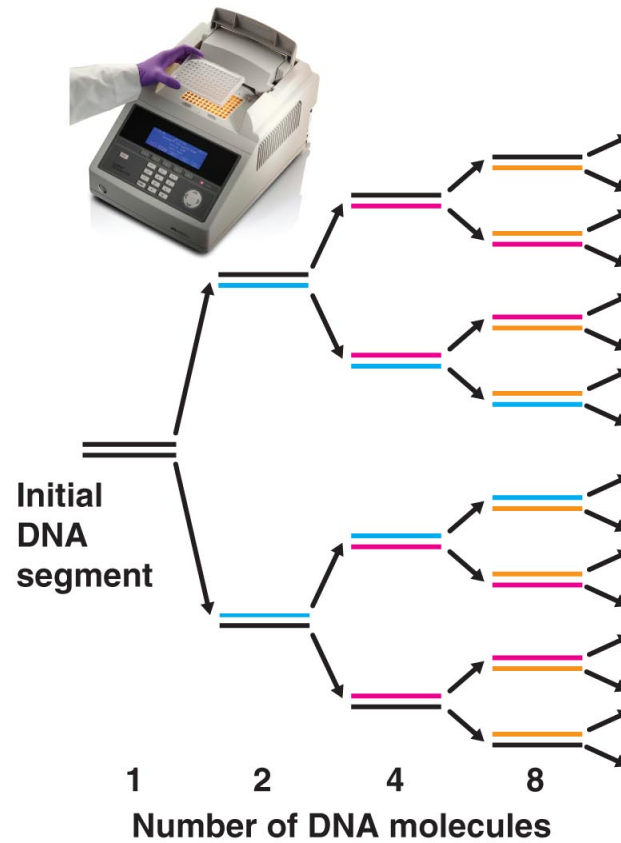
The scene of the crime



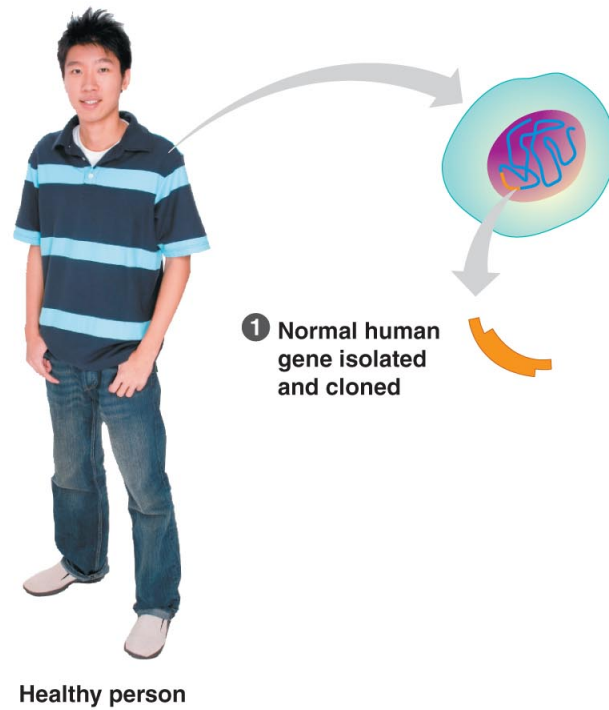
DNA evidence used to investigate a crime scene



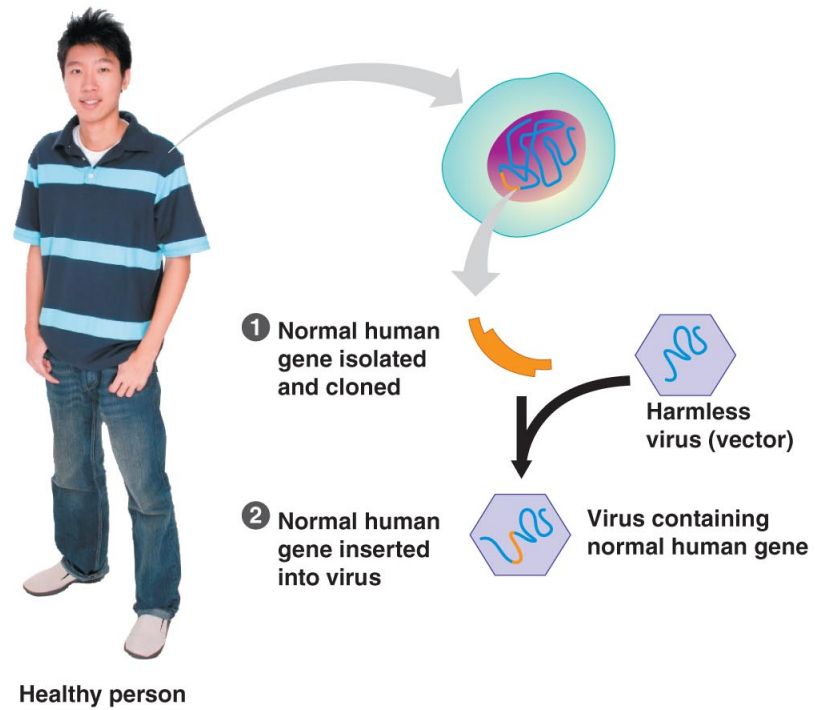
Now use PCR need less DNA



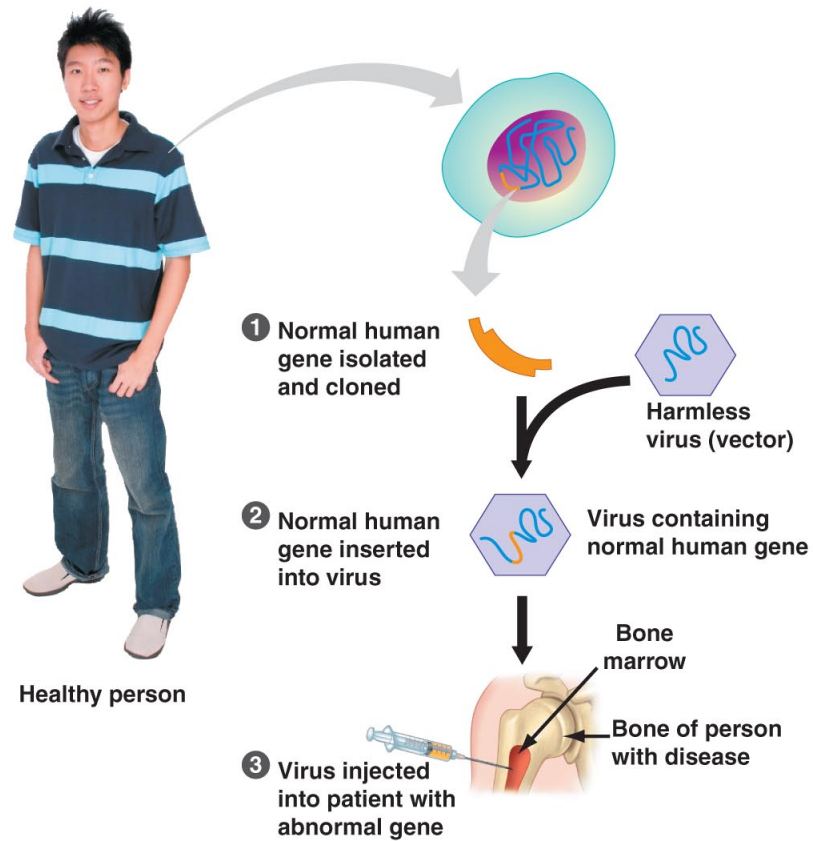
Gene therapy



Gene therapy



Gene therapy



DNA sequencing

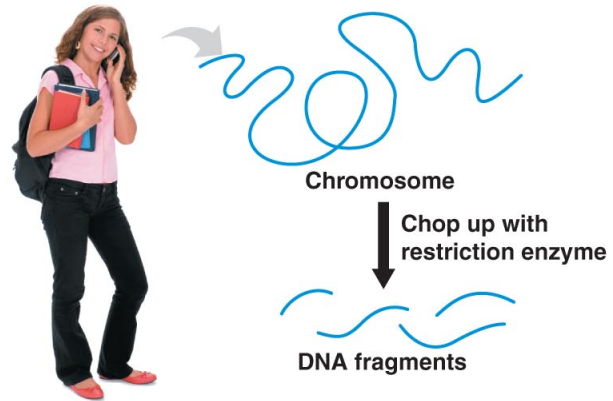


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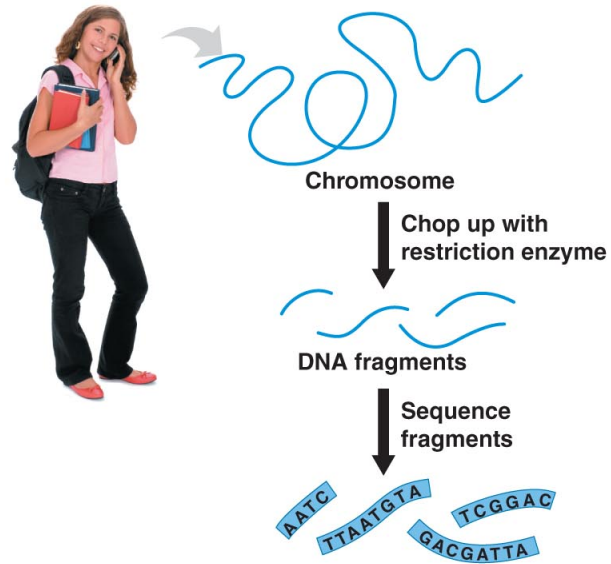
DNA sequencing



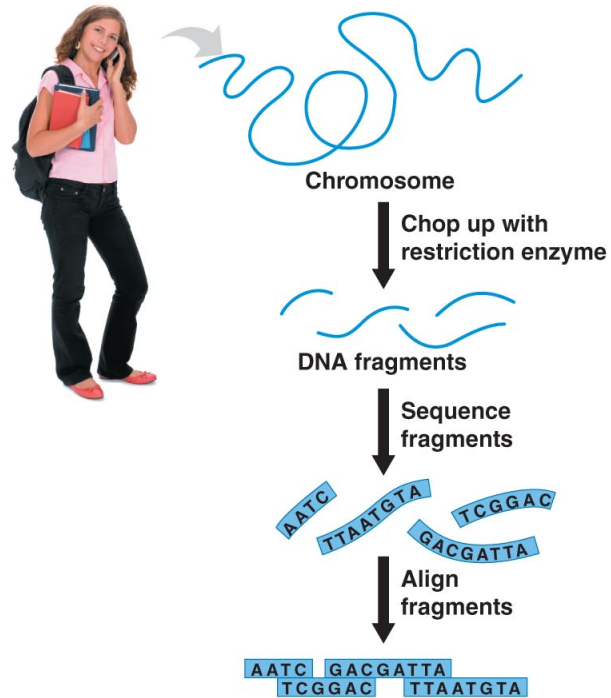
DNA sequencing



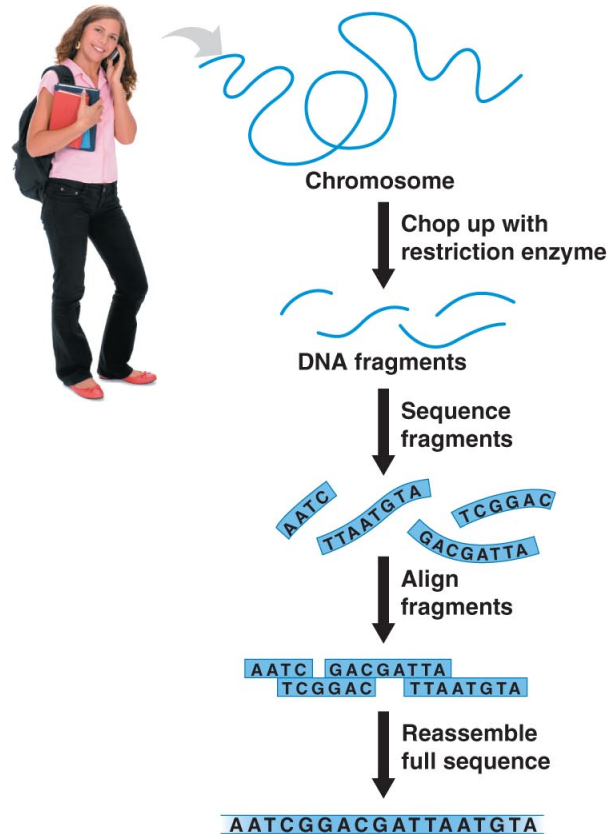
DNA sequencing



DNA sequencing








DNA sequencing



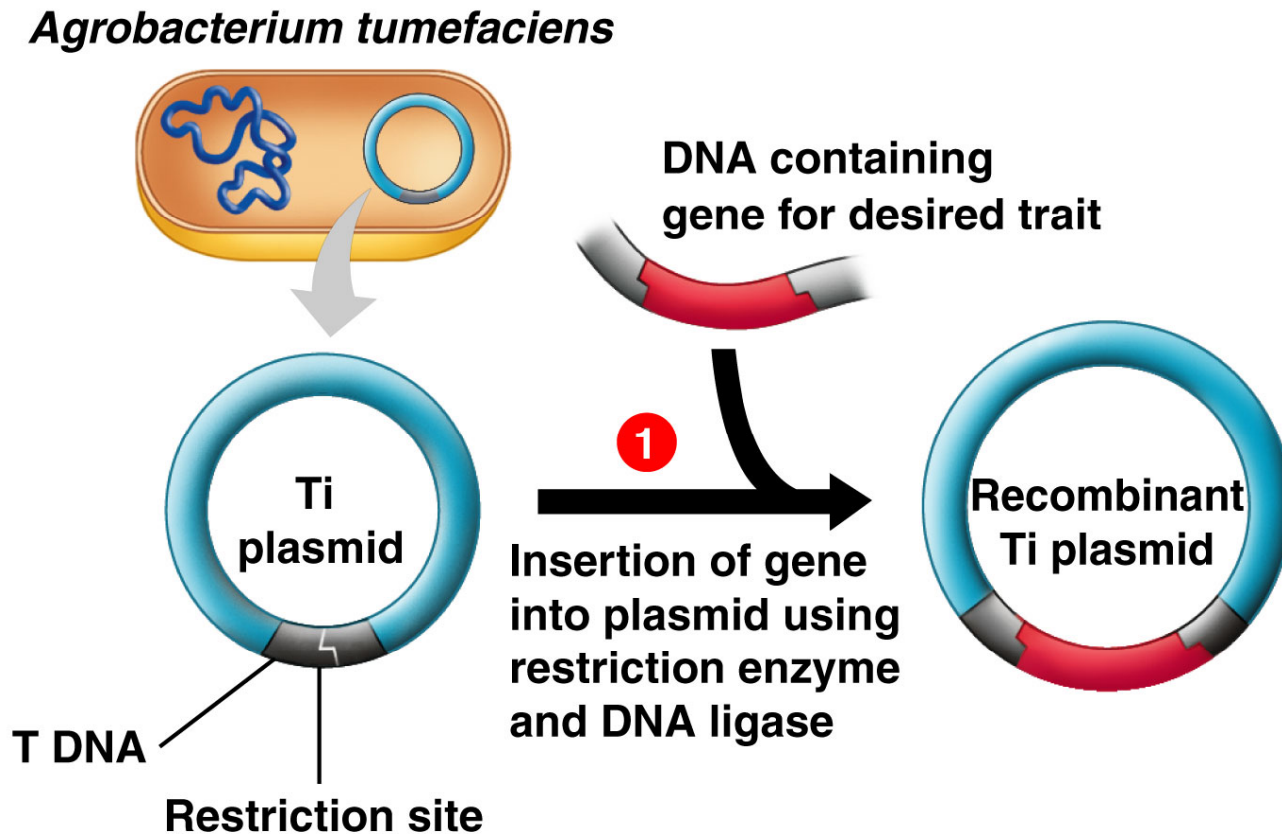
Terms

- Repetitive DNA
- Transposons
- telomeres

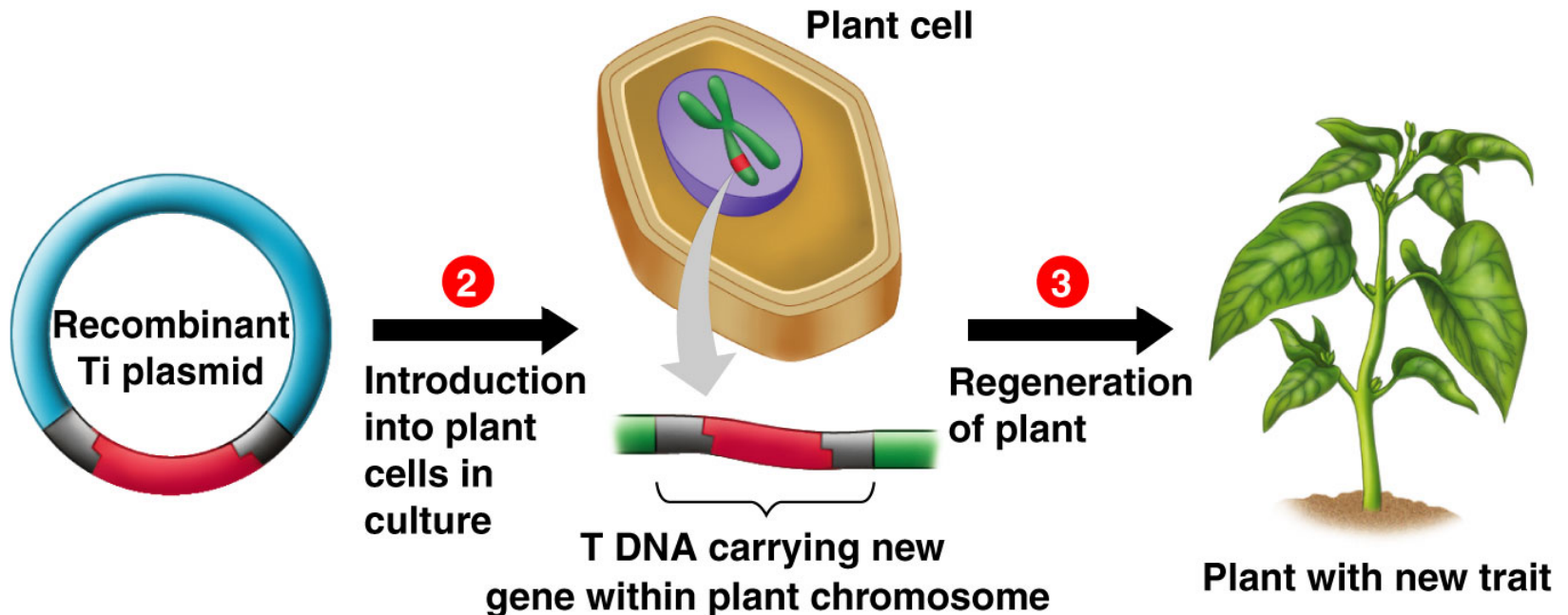
Some genomes that have been sequenced

Table 12.1		Some Important Sequenced Genomes		
Organism		Year Completed	Size of Genome (in base pairs)	Approximate Number of Genes
<i>Haemophilus influenzae</i> (bacterium)		1995	1.8 million	1,700
<i>Saccharomyces cerevisiae</i> (yeast)		1996	12 million	5,800
<i>Escherichia coli</i> (bacterium)		1997	4.6 million	4,400
<i>Caenorhabditis elegans</i> (roundworm)		1998	97 million	19,100
<i>Drosophila melanogaster</i> (fruit fly)		2000	180 million	13,700
<i>Arabidopsis thaliana</i> (mustard plant)		2000	120 million	25,500
<i>Oryza sativa</i> (rice)		2002	430 million	40,000
<i>Homo sapiens</i> (human)		2003	3.2 billion	20,000
<i>Rattus norvegicus</i> (lab rat)		2004	2.8 billion	20,000
<i>Pan troglodytes</i> (chimpanzee)		2005	3.1 billion	20,000
<i>Macaca mulatta</i> (macaque)		2007	2.9 billion	22,000
<i>Ornithorhynchus anatinus</i> (duck-billed platypus)		2008	1.8 billion	18,500
<i>Sorghum bicolor</i> (sorghum)		2009	730 million	34,500

Gene transformation in plants



Gene transformation in plants



GMOs--are they good or bad?



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