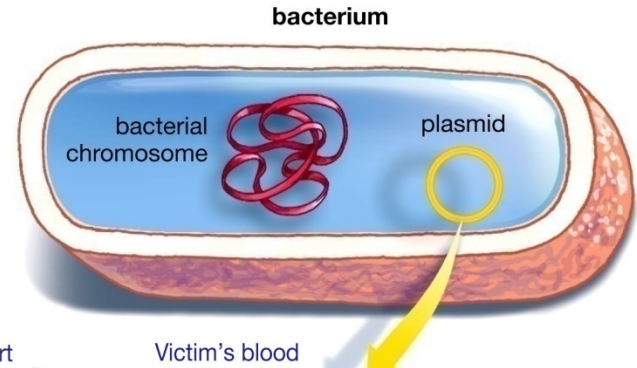


MINI LESSON#3

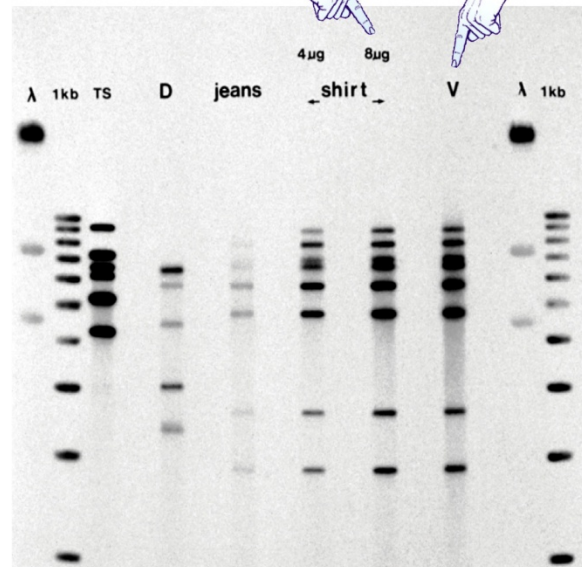
GENETIC ENGINEERING

Genetic Engineering Biotechnology



Murderer's shirt

Victim's blood



What is Genetic Engineering?

Genetic engineering is a process of changing the DNA of living things for useful purposes.

Ex: Recombinant DNA
Cloning



- Taking DNA from one organism and inserting it into another can create a **new trait** it would most likely not have developed on its own

EX: **Make chickens with no feathers.** Scientists engineered chickens to be featherless by REMOVING the gene in chickens that produces feathers



Cabbage plant +
 scorpion venom =
bug-proof veggies

Scientists added a gene for producing scorpion venom to cabbage plants to kill pesky caterpillars that eat crops!





Give tomatoes the ability to make anti-freeze.

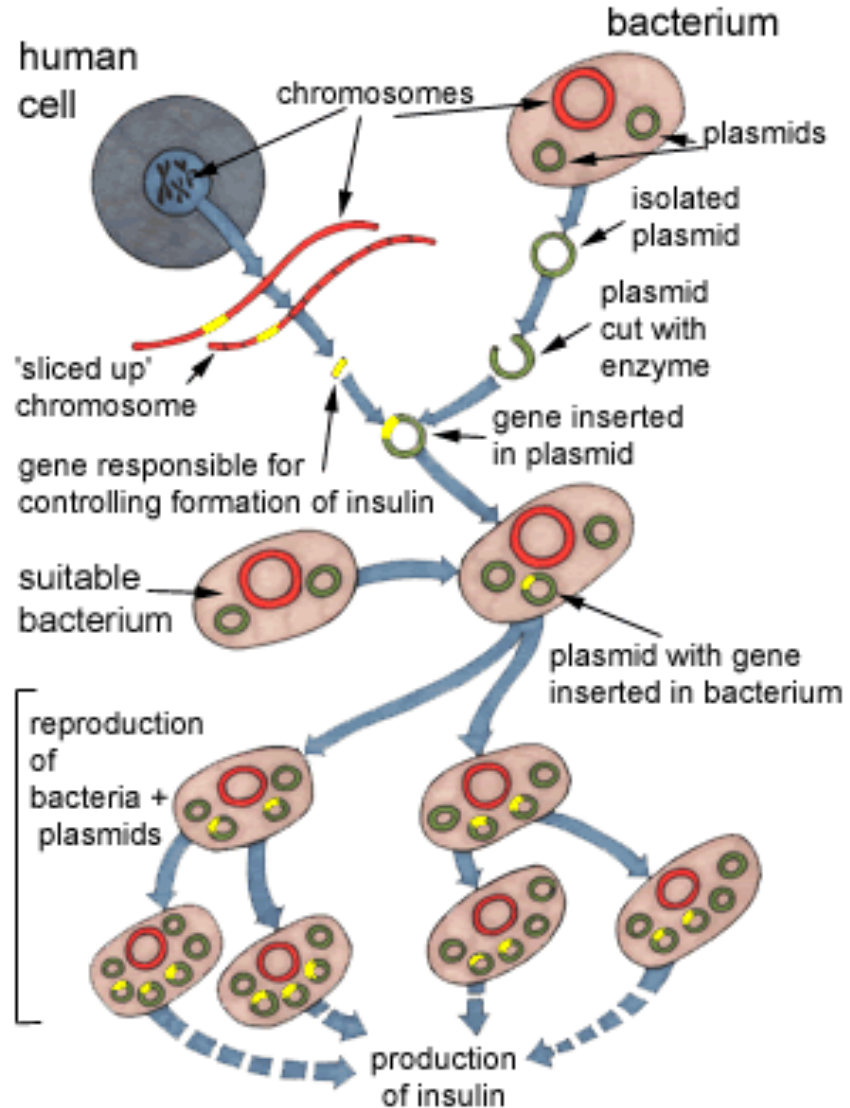
• Placing the “anti-freeze gene” from a fish in tomatoes so the tomatoes can still grow in cold weather.



Recombinant DNA

Combining DNA from different organisms

** -Makes it possible to **change the genetic makeup** of living organisms



Restriction Enzymes

Enzymes that **cut DNA** at specific sequences.

SmaI enzyme

Target Sequence: CCCGGG

End type: blunt



EcoRI enzyme

Target Sequence: GAATTC

End type: sticky



Blunt Ends -



Sticky Ends

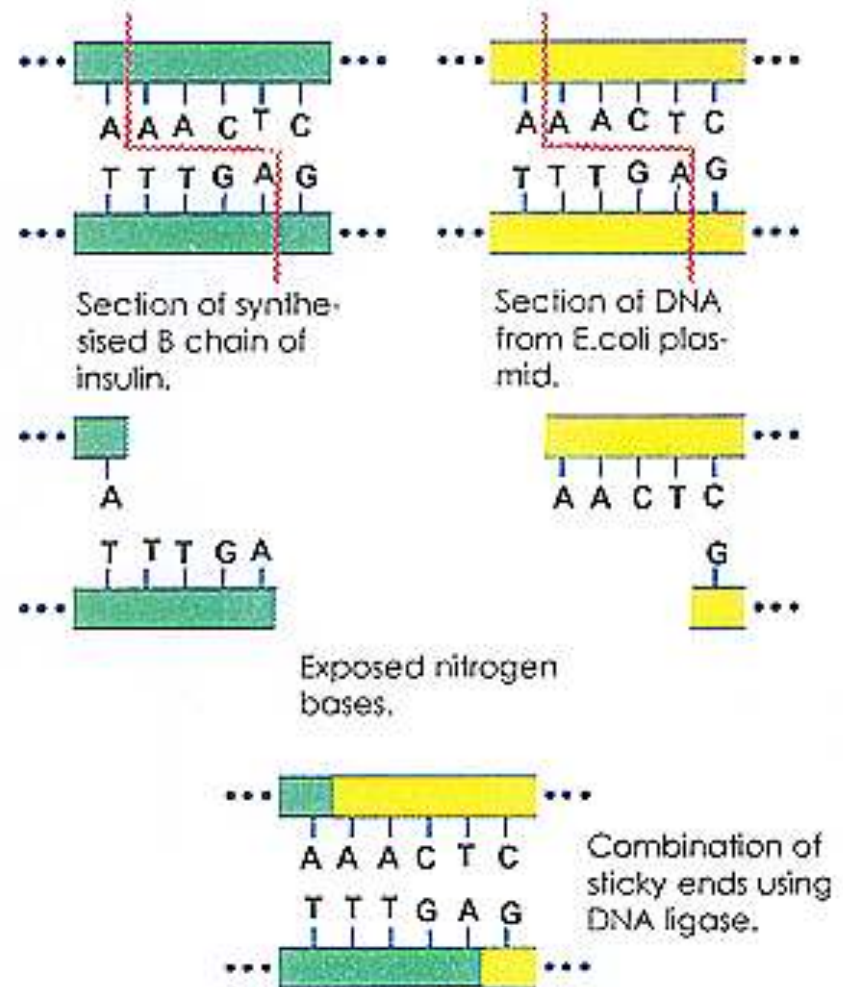


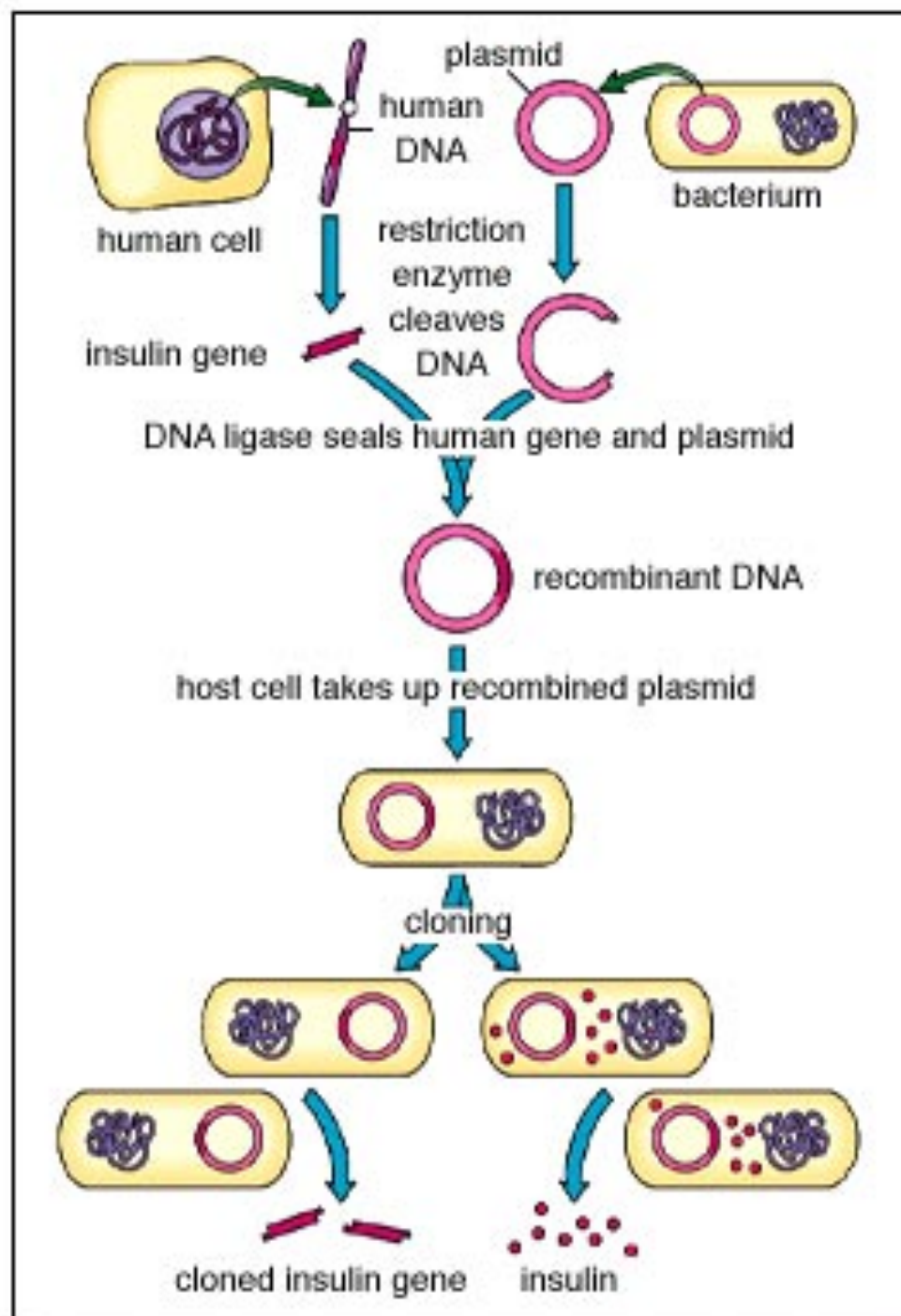
Recombinant DNA

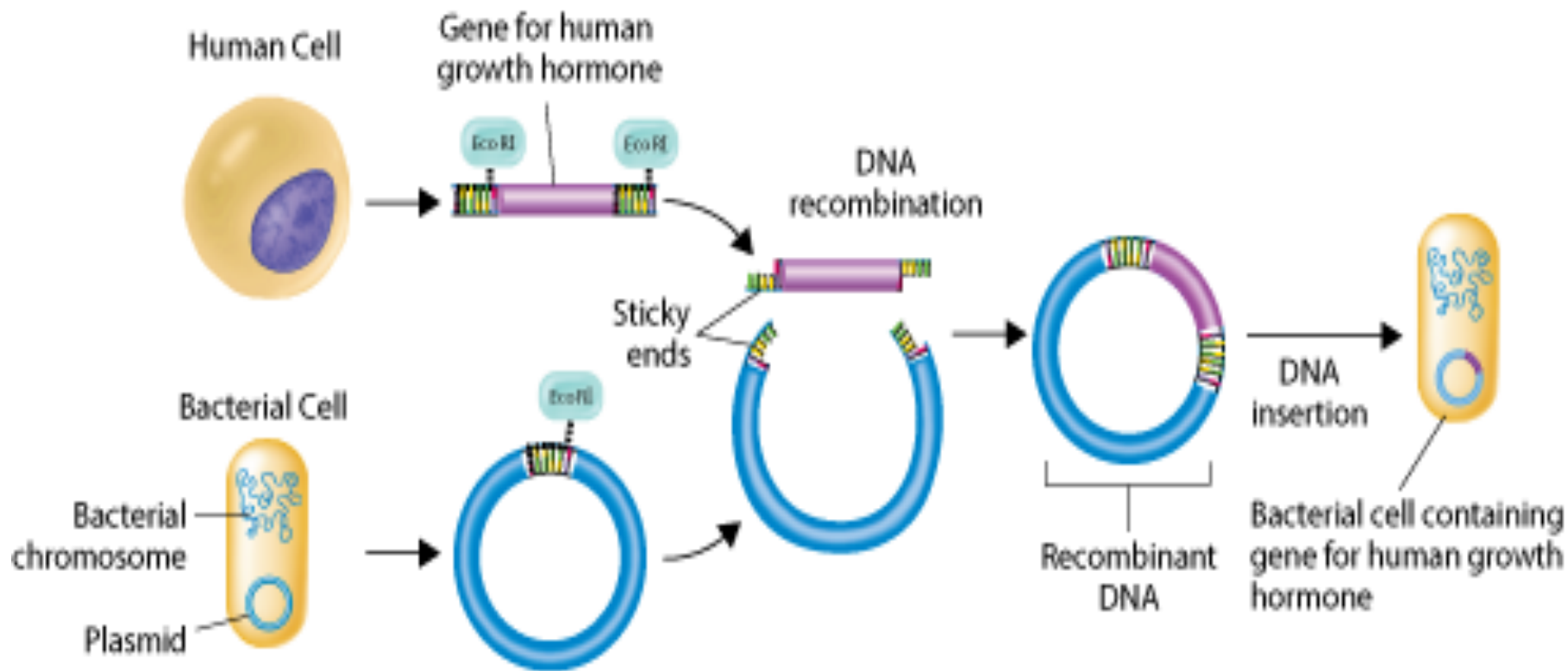


How is recombinant DNA used?

1. Making insulin or other hormones using bacteria.



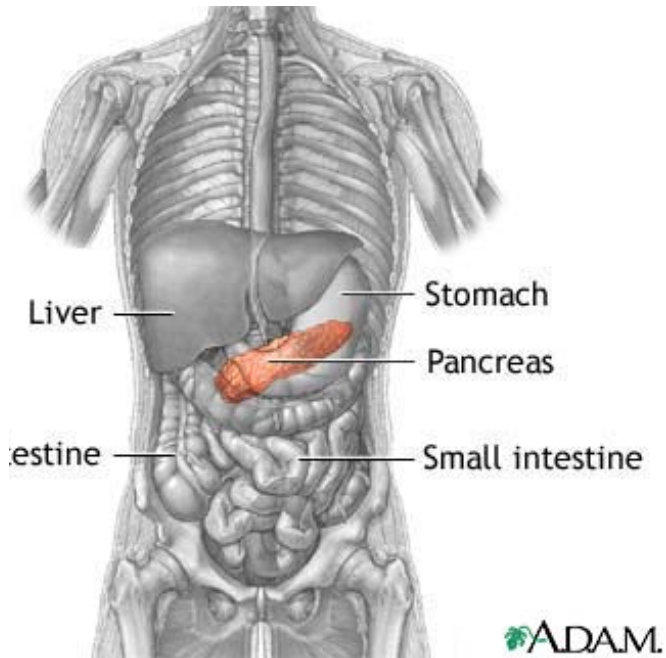




EX:



Give the insulin gene to diabetics.



- ***Diabetic*** = a person whose pancreas cannot create the important hormone ***insulin***.
1. Take the gene for making insulin from a healthy donor's DNA
 2. Add that gene to the DNA of **pancreas** cells from a diabetic
 3. Let mitosis happen for a while (in a "test tube") so you get LOTS of pancreas cells with the **good gene**.
 4. Surgically implant the good cells back into the diabetic

Advantages of Genetic Engineering

- Will get improved organisms
- Can create organisms with traits not previously thought possible
- Can remove “bad” genes
- Reduces the chance of getting “undesirable” organisms



Disadvantages of Genetic Engineering

- Co\$tly
- Must be performed in a lab with special equipment
- Ethical issues
- Long term negative affects
- Negative environmental impacts

