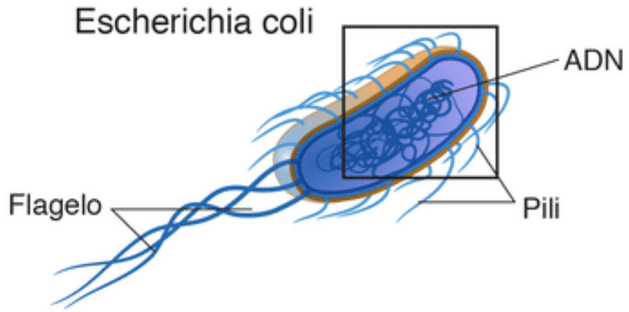
Age	15-18 years approximately	**Number of people**	30 people approximately	**Topic**	Biotechnology
Date					
Purpose	To explain how recombinant DNA is produced		**Time**	50 minutes	
Name of the activity			**Expected learning**		
Build a Vector			Develops analytical and logical thinking skills to generate constructions		
sequence				**Resources**	
Presentation (30 minutes)					
A presentation of synthetic biology concepts and iGEM will be given. Digestion and ligations are explained, as well as the general caracteristics of vectors and how restriction enzyme's work				Material visual de apoyo	
Build a Vector (15 minutes)					
Different escenarios will be told to the students and they have to build the appropiate vector with reastriction enzymes and genes				Cutting material (Should deliver the vectors and genes by themselves so students can join them as puzzles)	
They will be divided into teams of 4 to 5 people.					

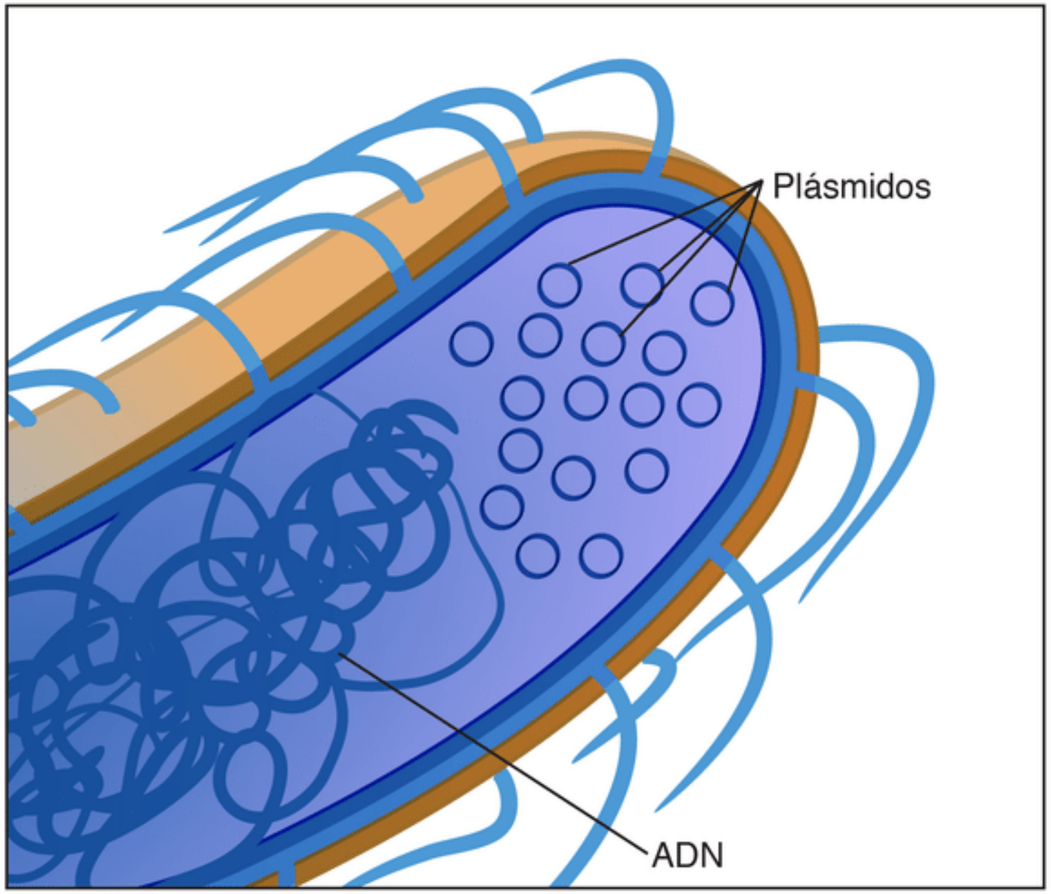
Vectors

What is a vector?

A vector is a vehicle that transports external genes

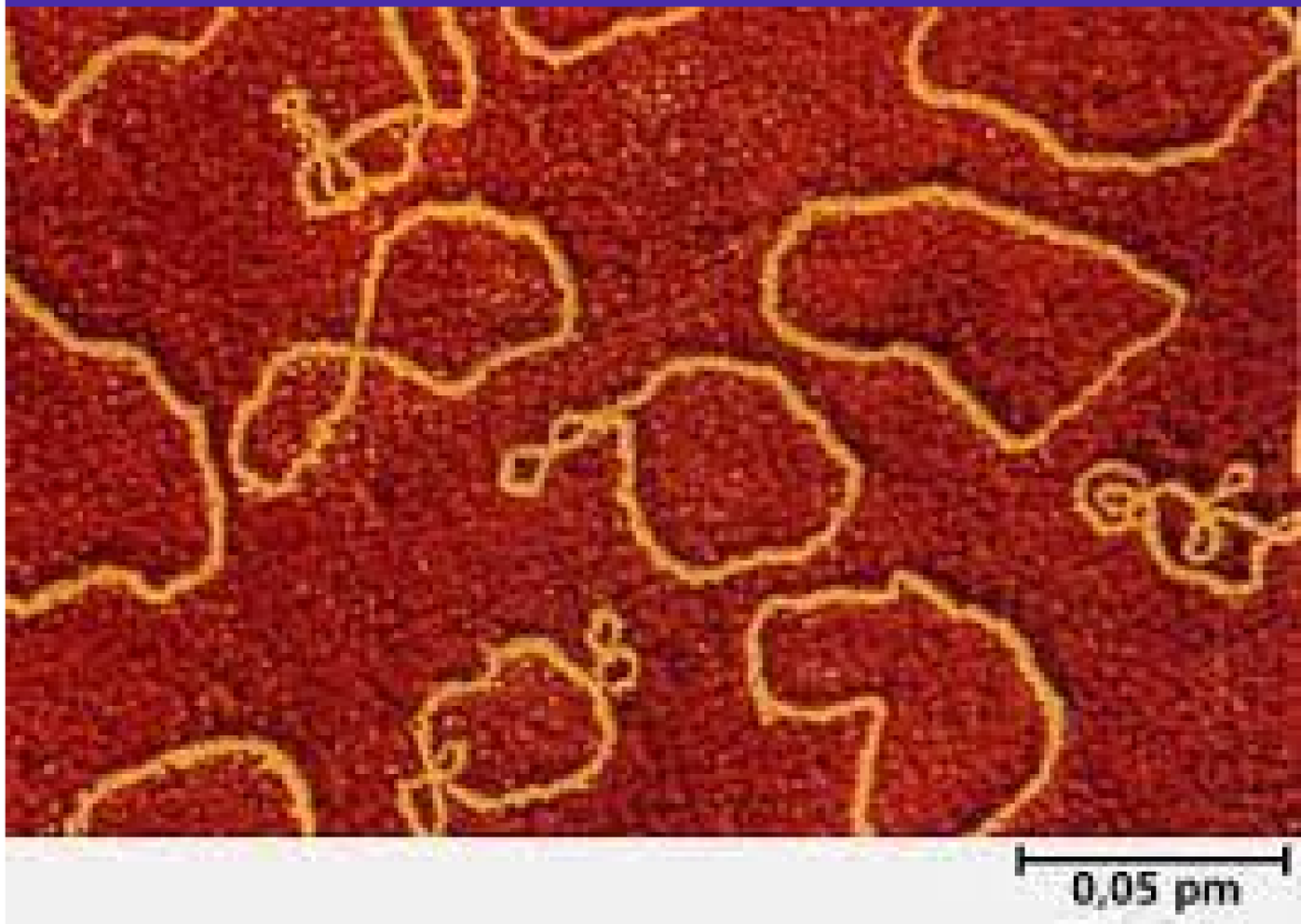
It is defined as a molecule of genetic material (DNA) capable of accepting external genes, meaning they come from another genome





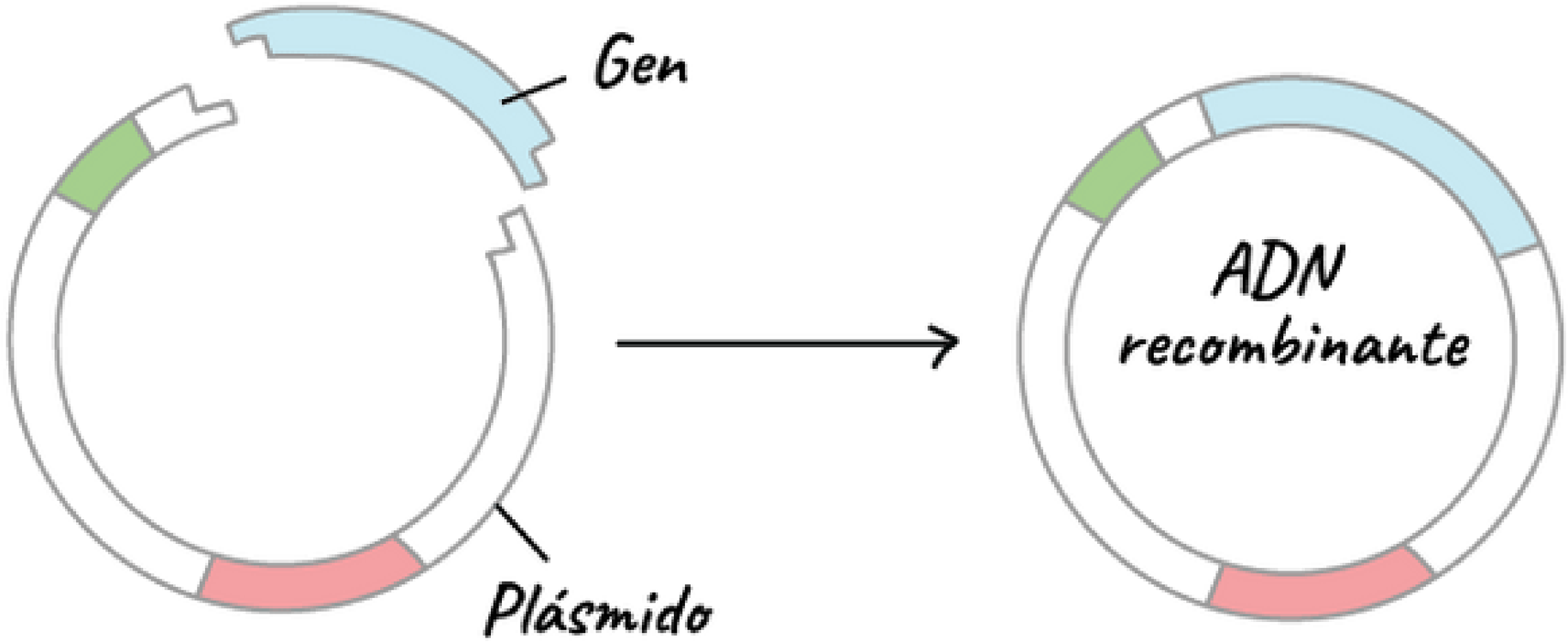
Escherichia coli

Vector



RECOMBINANT DNA

Molecule formed by two DNA fragments that are not naturally found together.

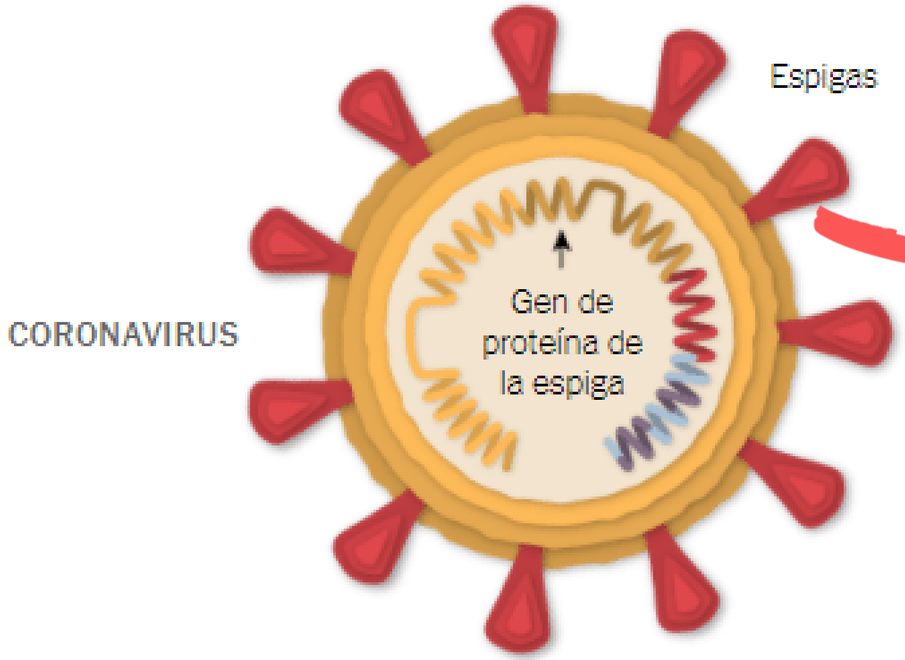


Molécula de dos fragmentos de ADN que no se encuentran juntos en la naturaleza

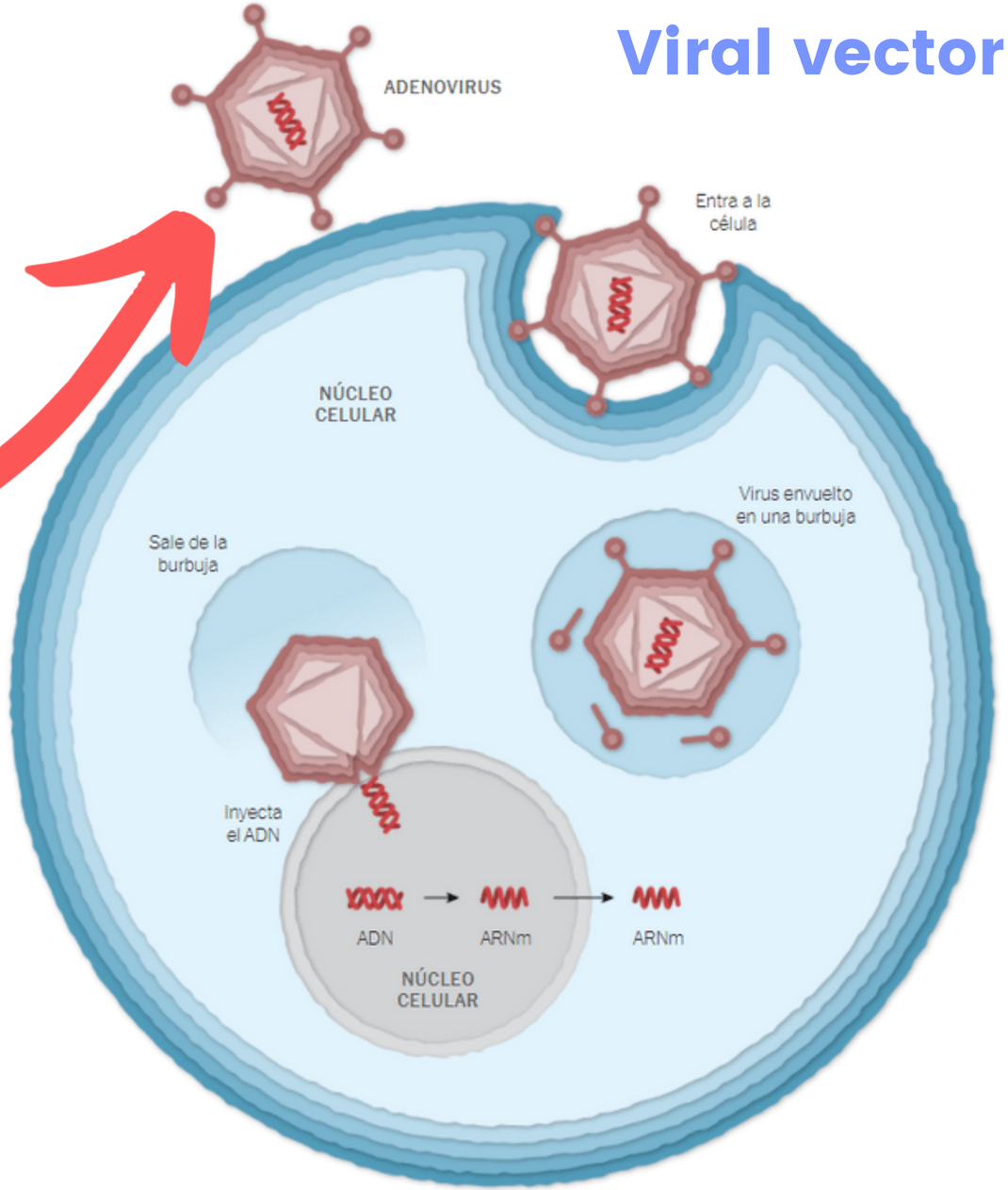
APPLICATIONS

- Vaccines
- Transgenic organisms
- Drugs
- Bioremediation
- Identification of hereditary disease's

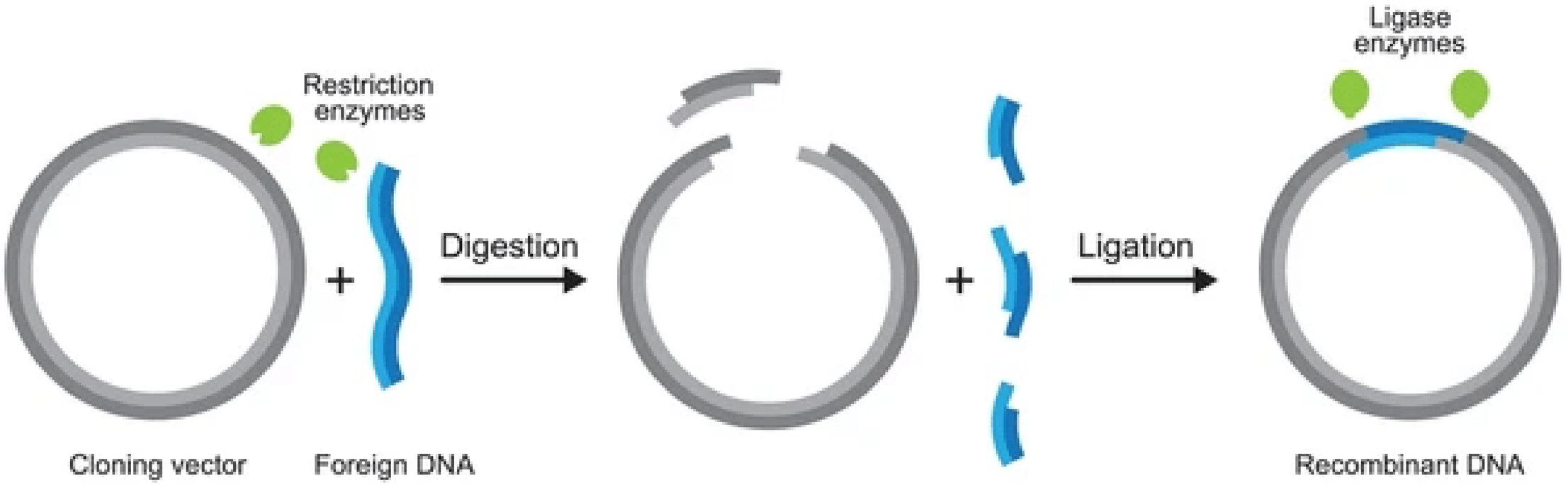
Astrazeneca vaccine



Viral vector



METHODOLOGY FOR RECOMBINANT DNA



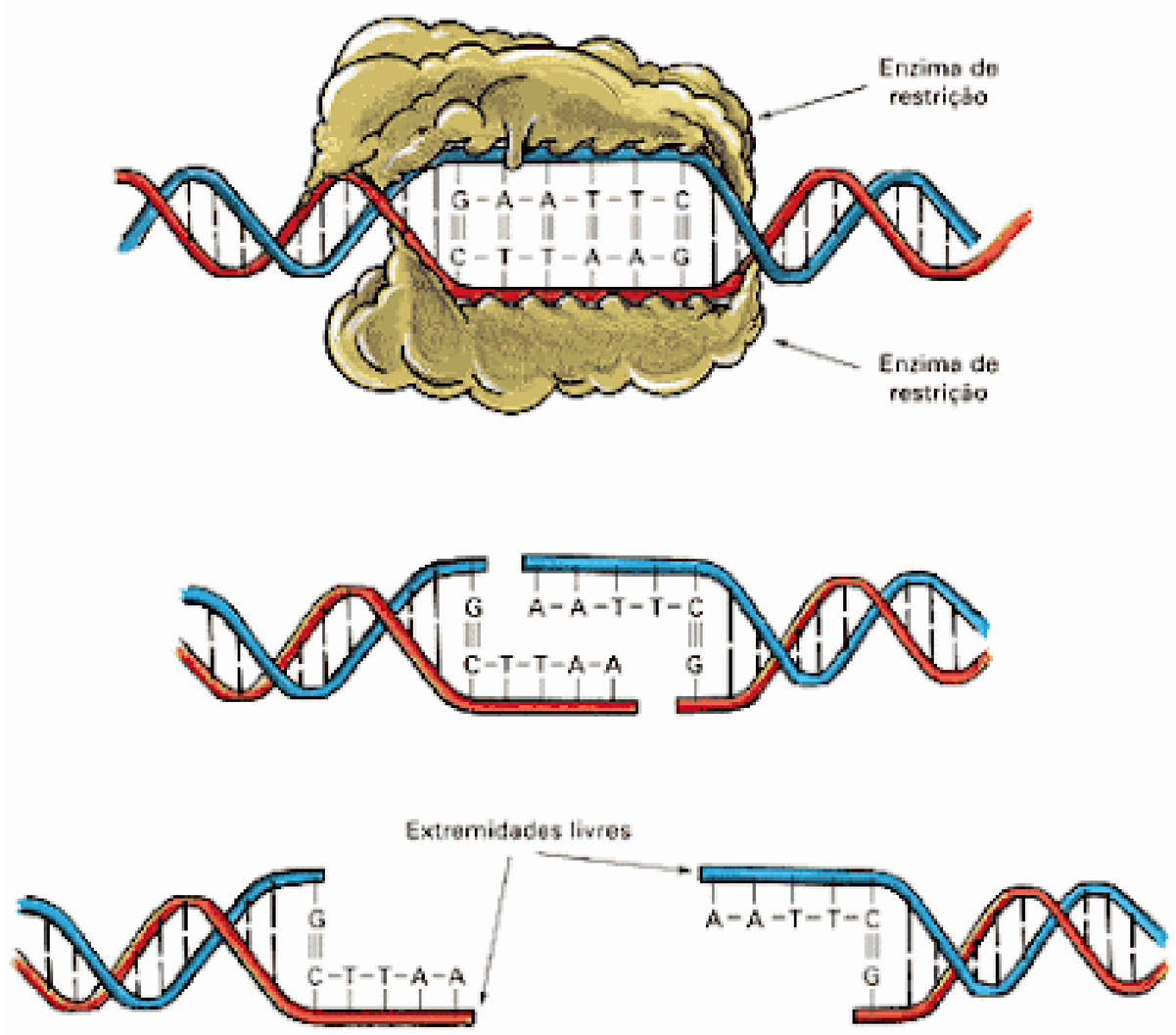
1. Restriction

2. Ligation

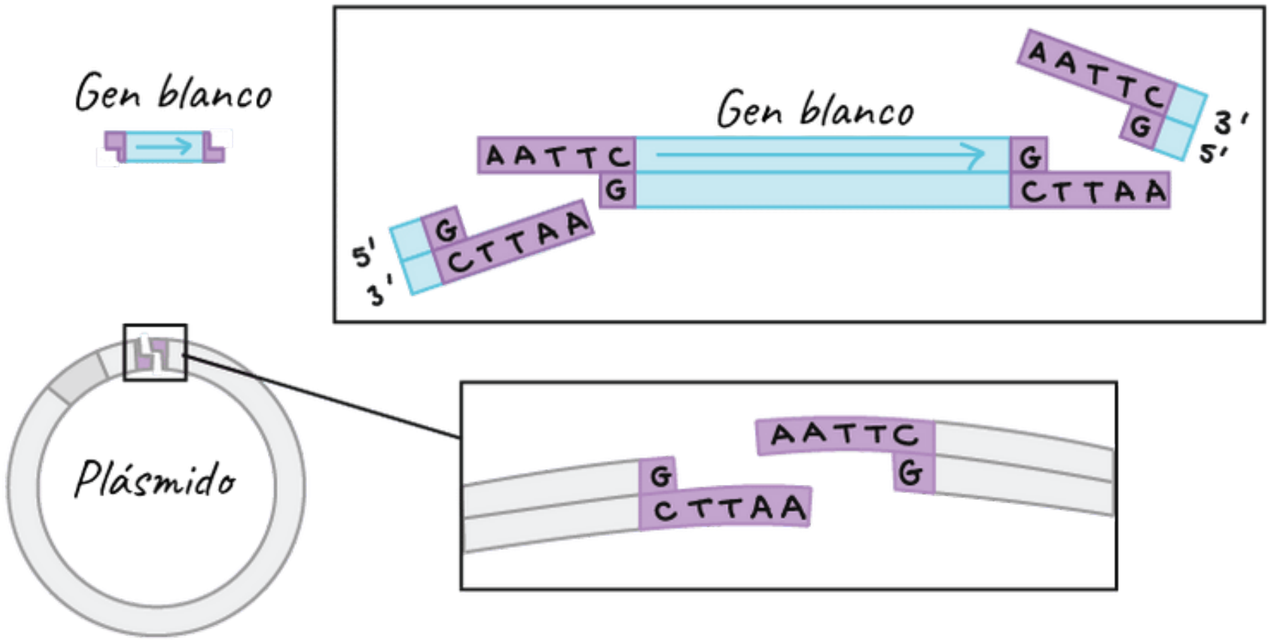
3. Recombinant DNA

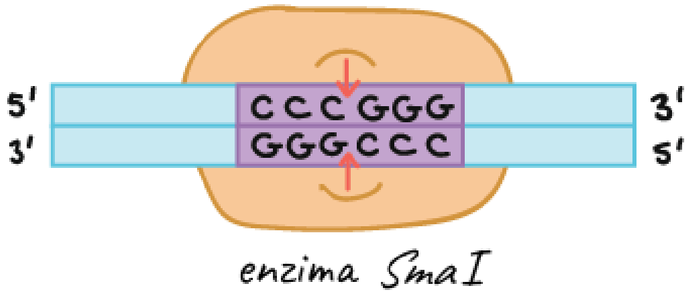
1. RESTRICTION/DIGESTION

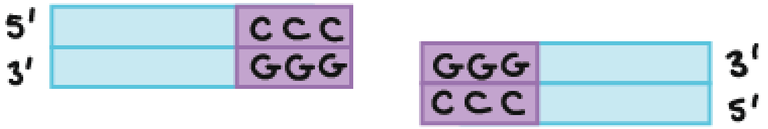
Enzyme that cuts the DNA molecule in specific sequences



sticky ends



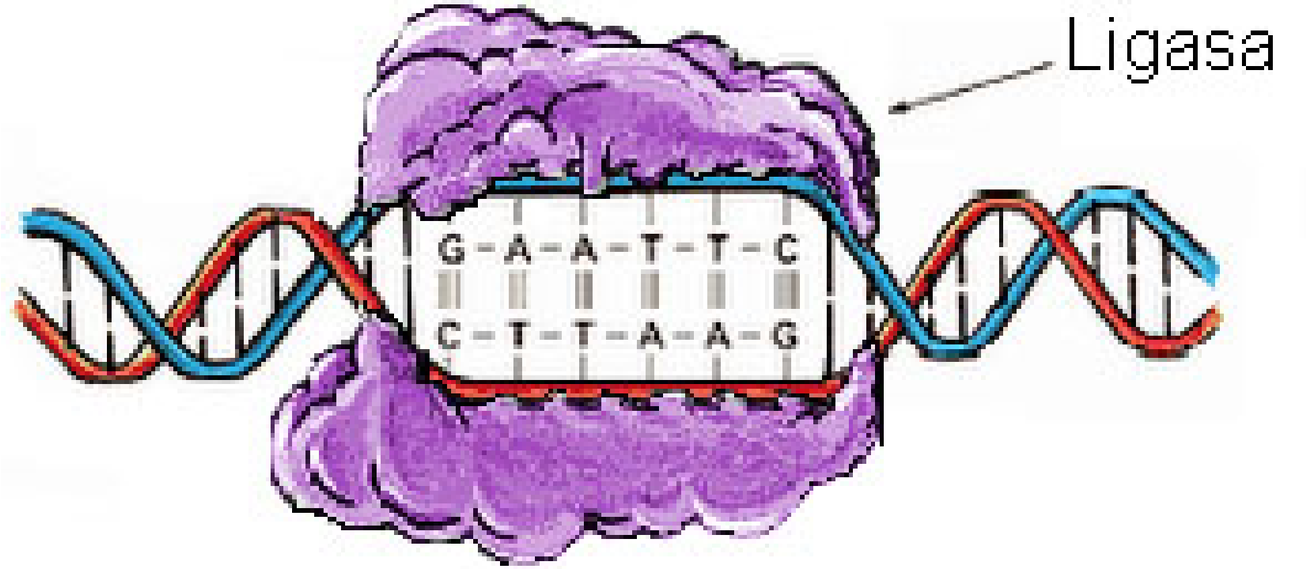




blunt ends

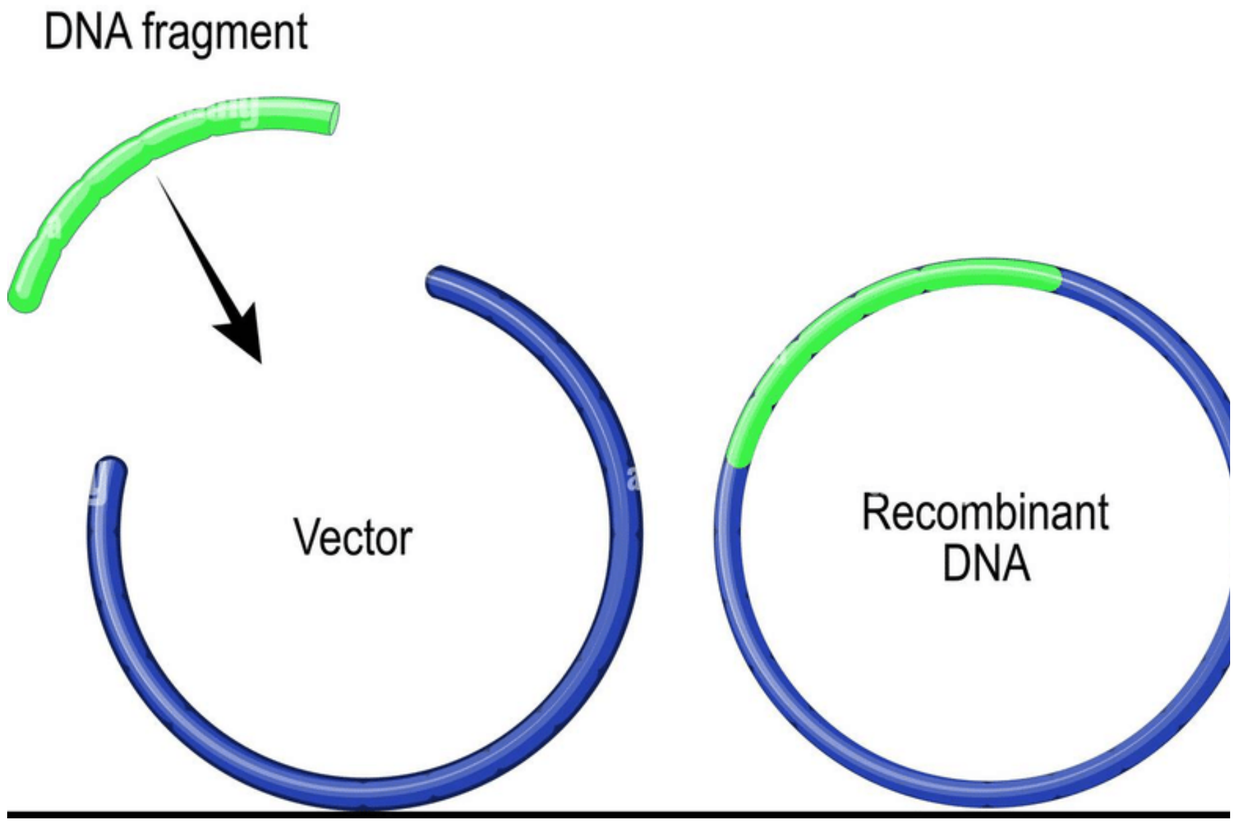
2. LIGATION

Enzyme that puts together the DNA fragments

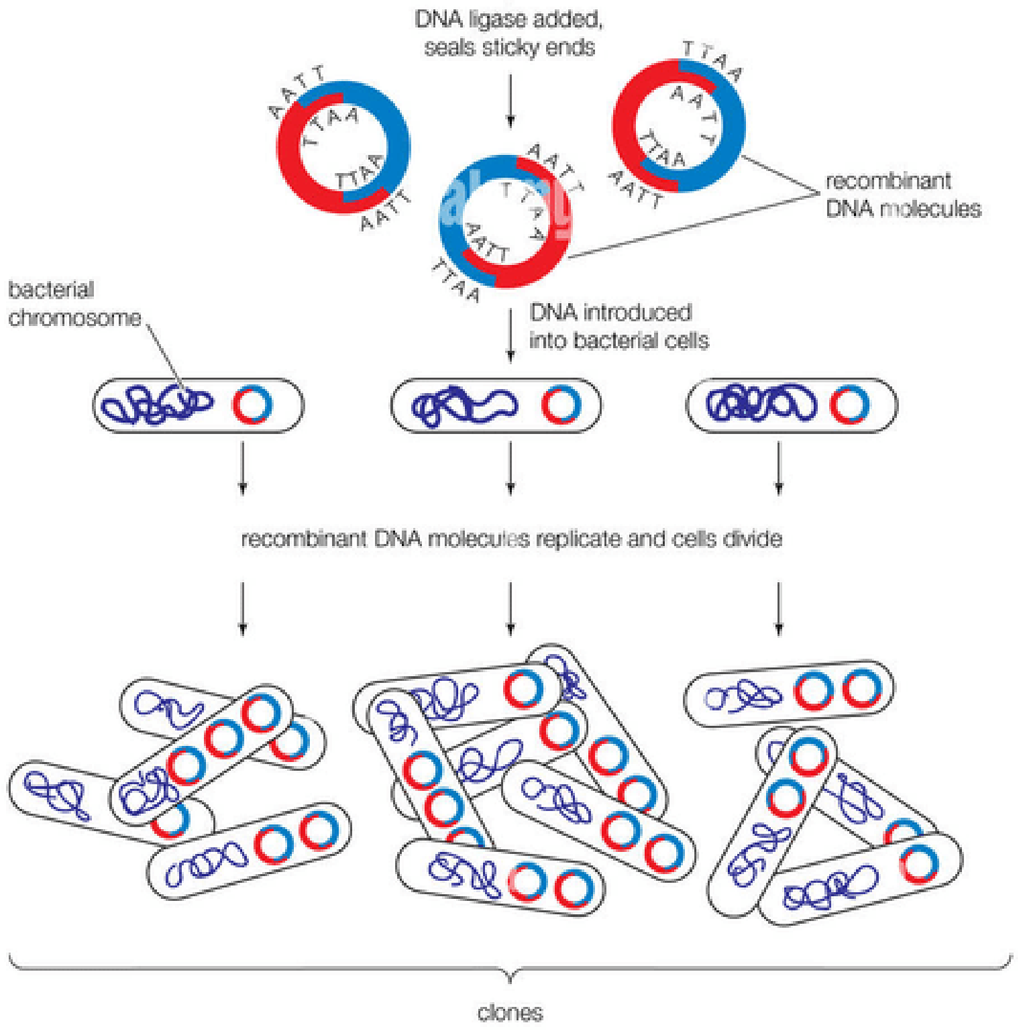


3. RECOMBINANT DNA

Hybrid DNA molecule



CLONATION

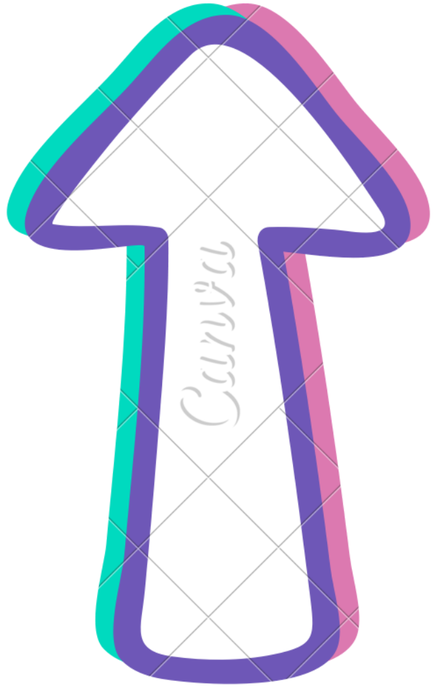

DNA ligase added,
seals sticky ends
recombinant
DNA molecules
bacterial
chromosome
DNA introduced
into bacterial cells
recombinant DNA molecules replicate and cells divide
clones


MAKE GIFS AT GIFSOUP.COM

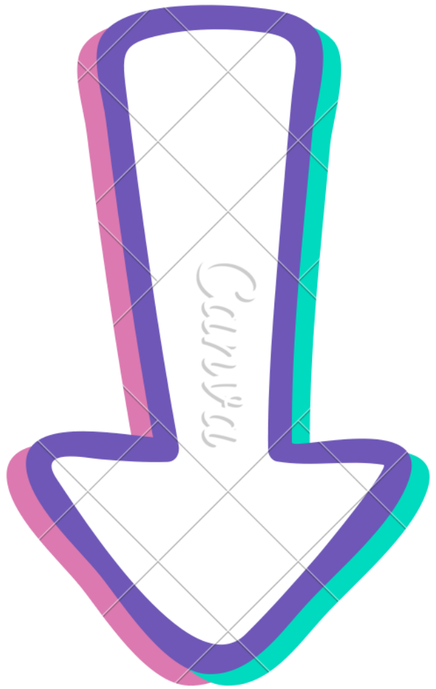
VECTOR SELECTION

The selection of the vector depends on int's application

High copy

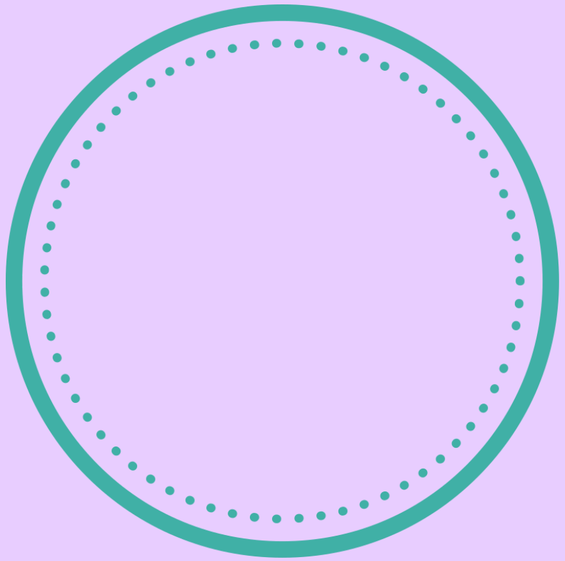


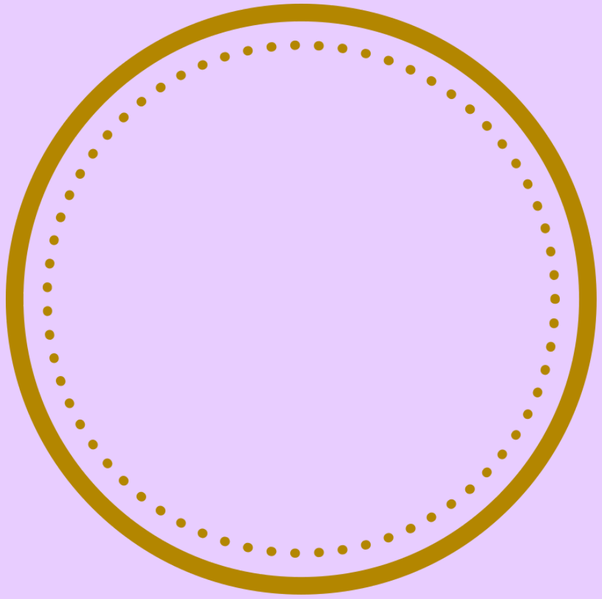
Low copy



ACTIVITY

Build a vector

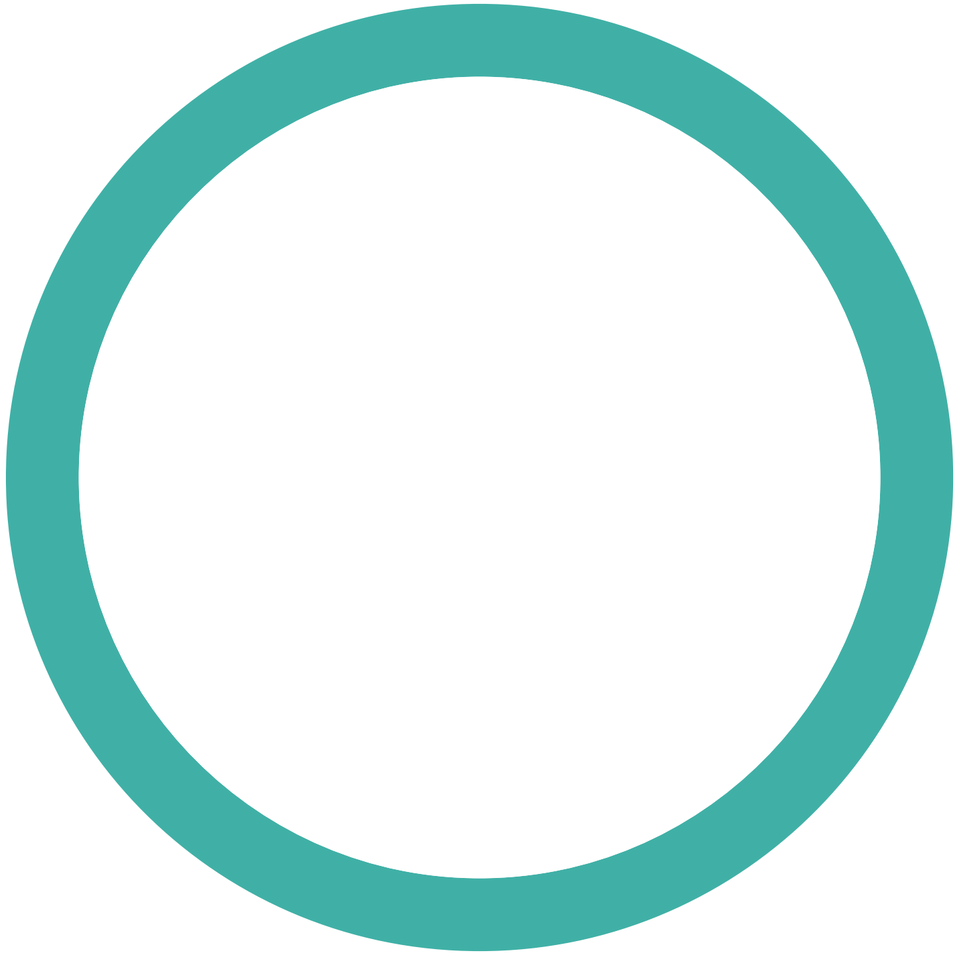




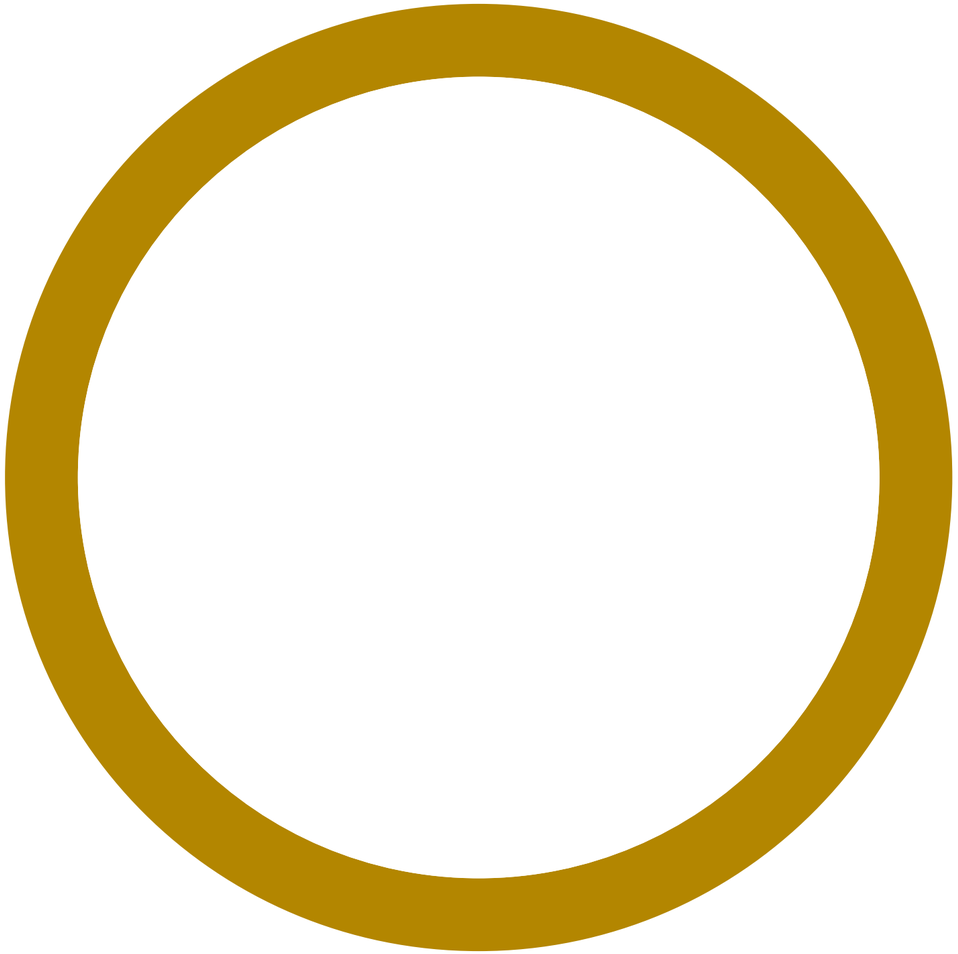
Melatonin Gene

Insulin Gene

Cry gene (insecticide)



High Copy

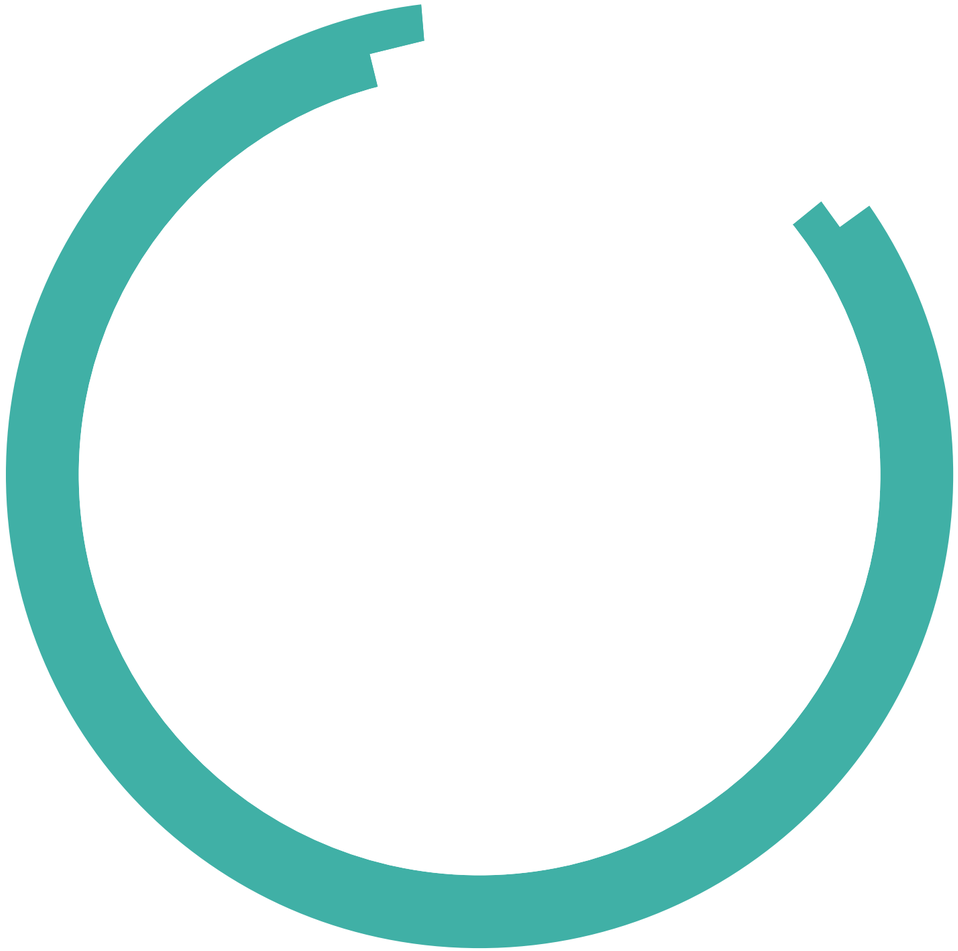


Low copy

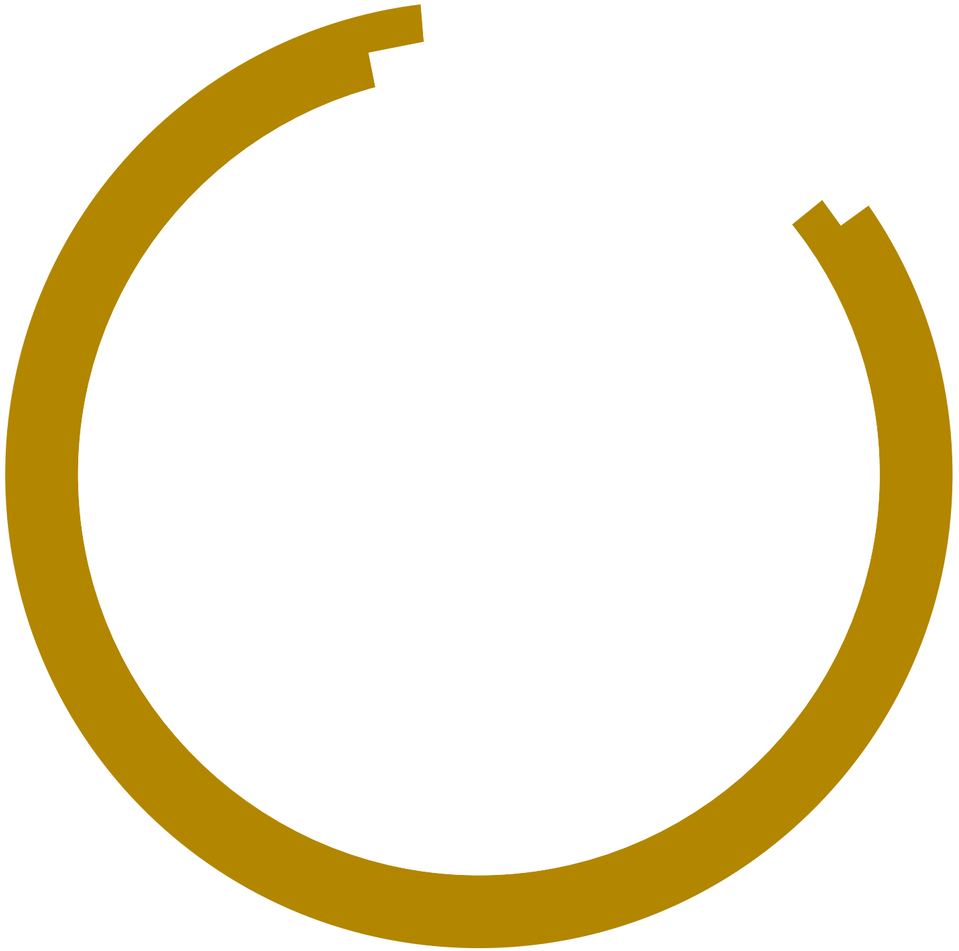
Gene 1

Gene 2

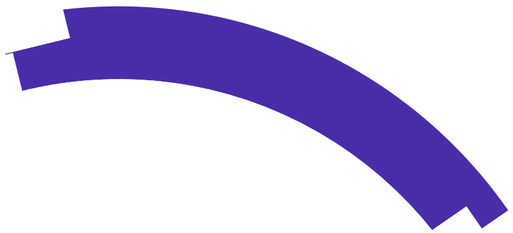
Gene 3



High Copy



Low copy



Gene 1

Gene 2

Gene 3