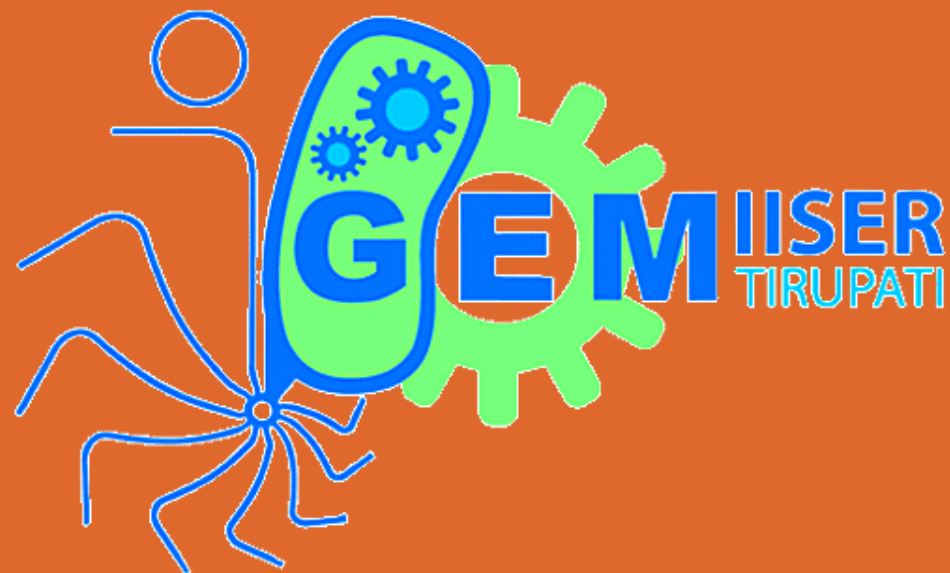


# Gene Gala

- A Visit to the SynBio World

iGEM 2021



IISER Tirupati



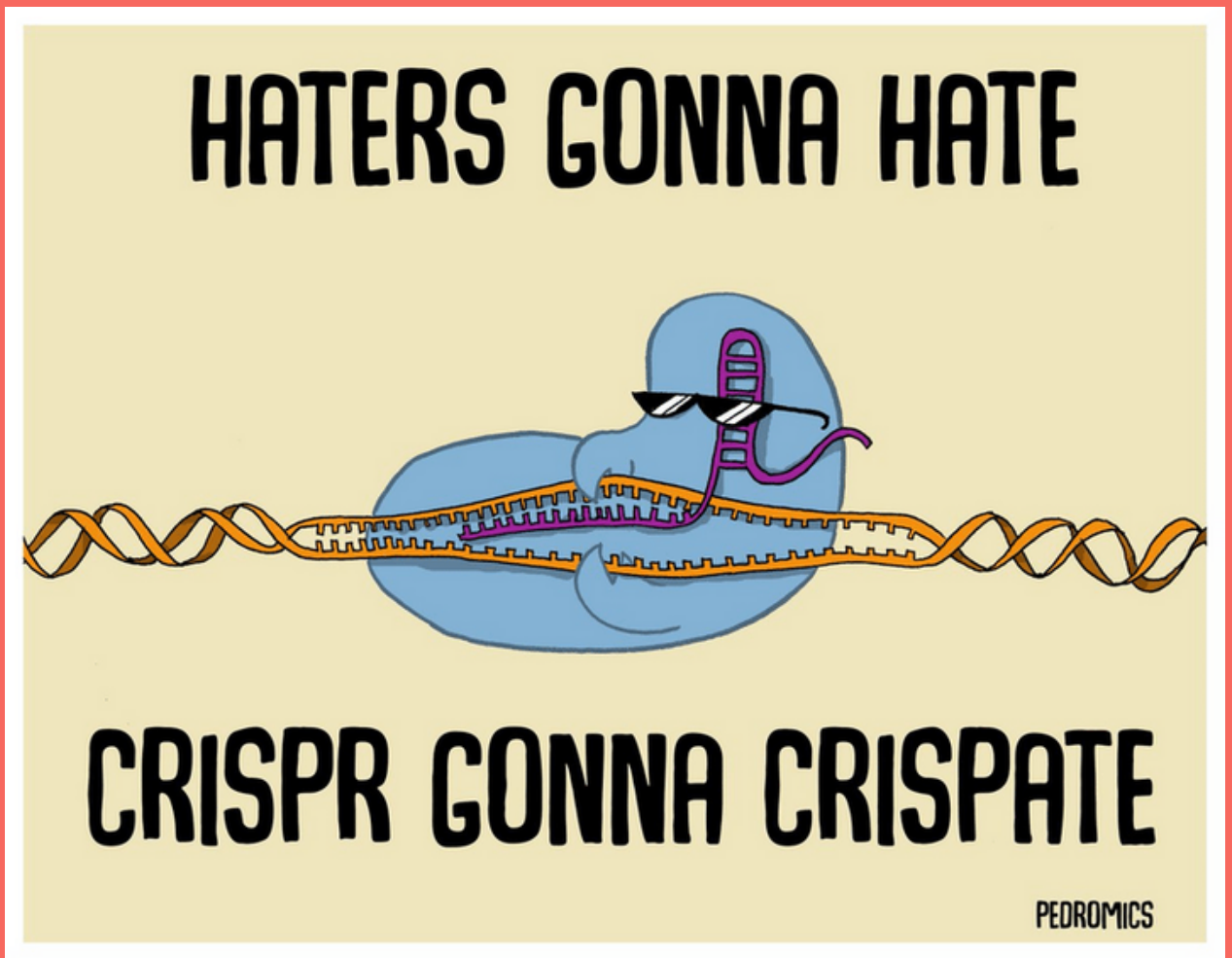
IISER Kolkata



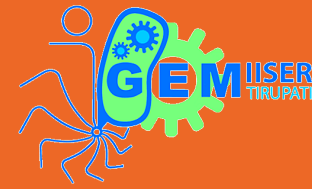
DAY 3

# Question of the Day

**Name some round objects. Can there be a round DNA? Have you ever thought how wonderful it would be if we could glow in the dark?**

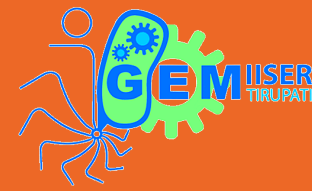
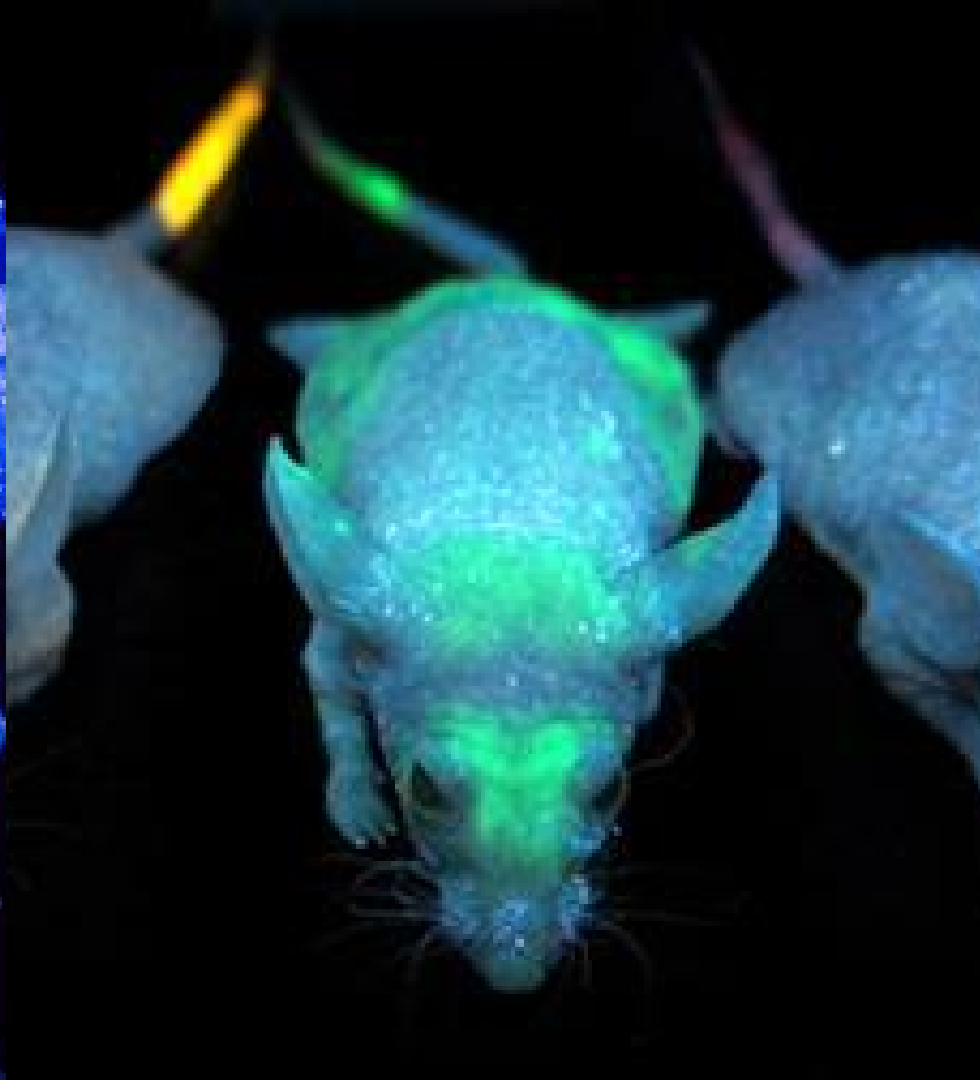


# Editing the code of life



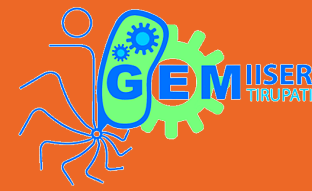
# Synthetic Biology



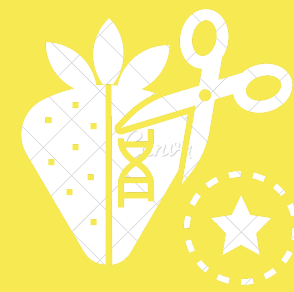


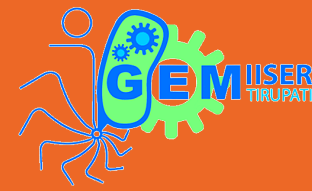
# Synthetic Biology



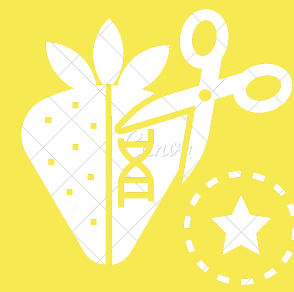



# Synthetic Biology






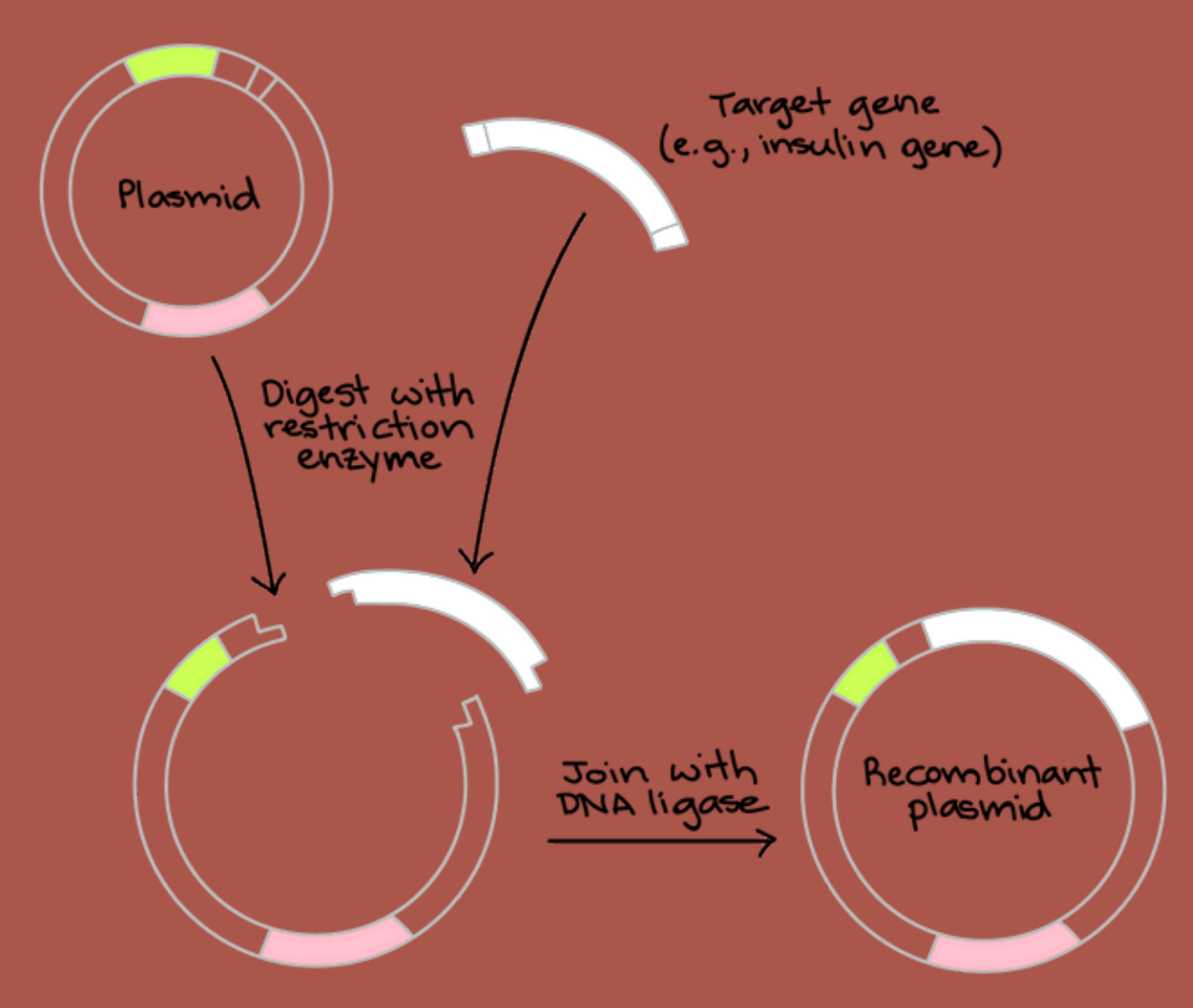


# Synthetic Biology

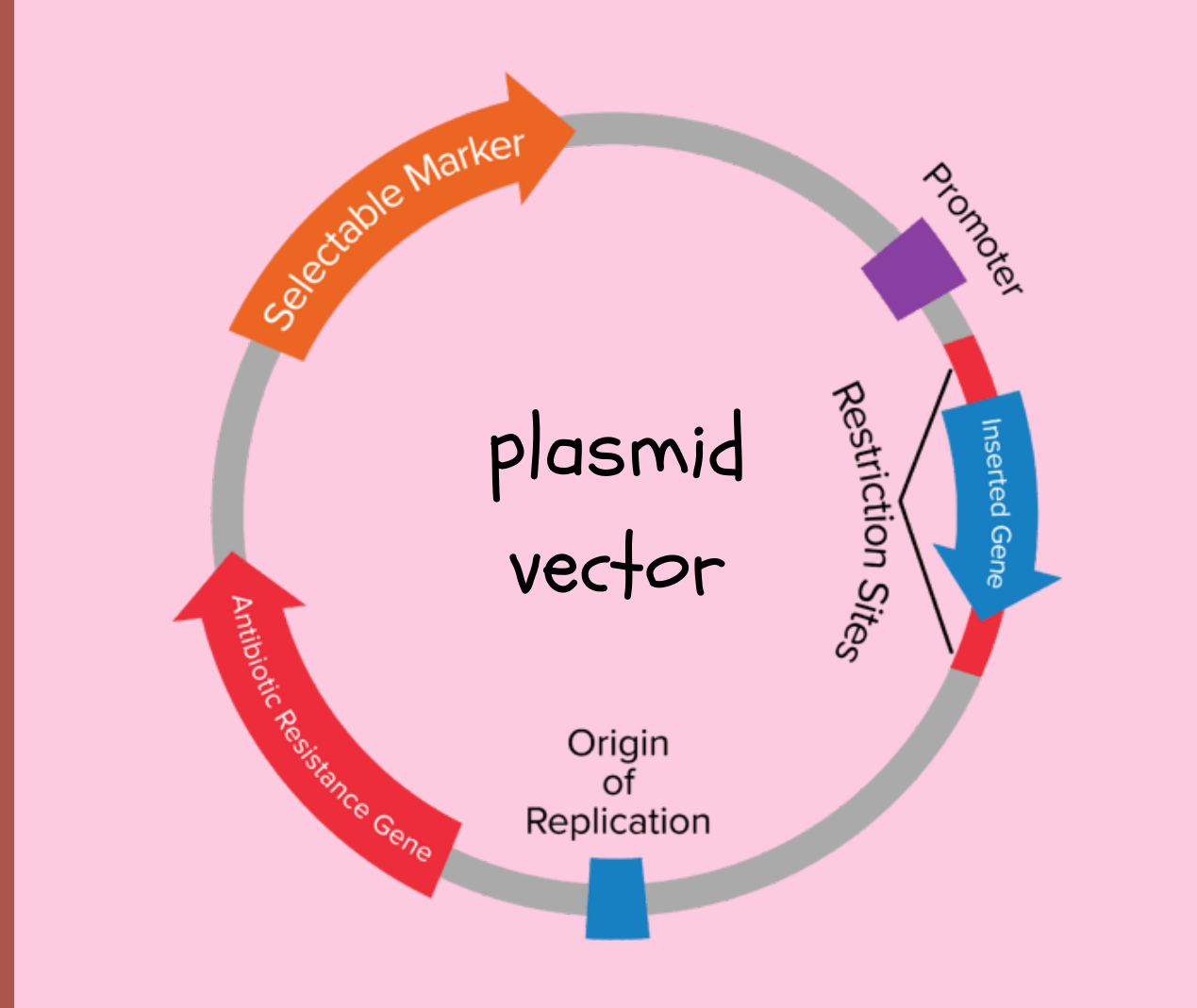
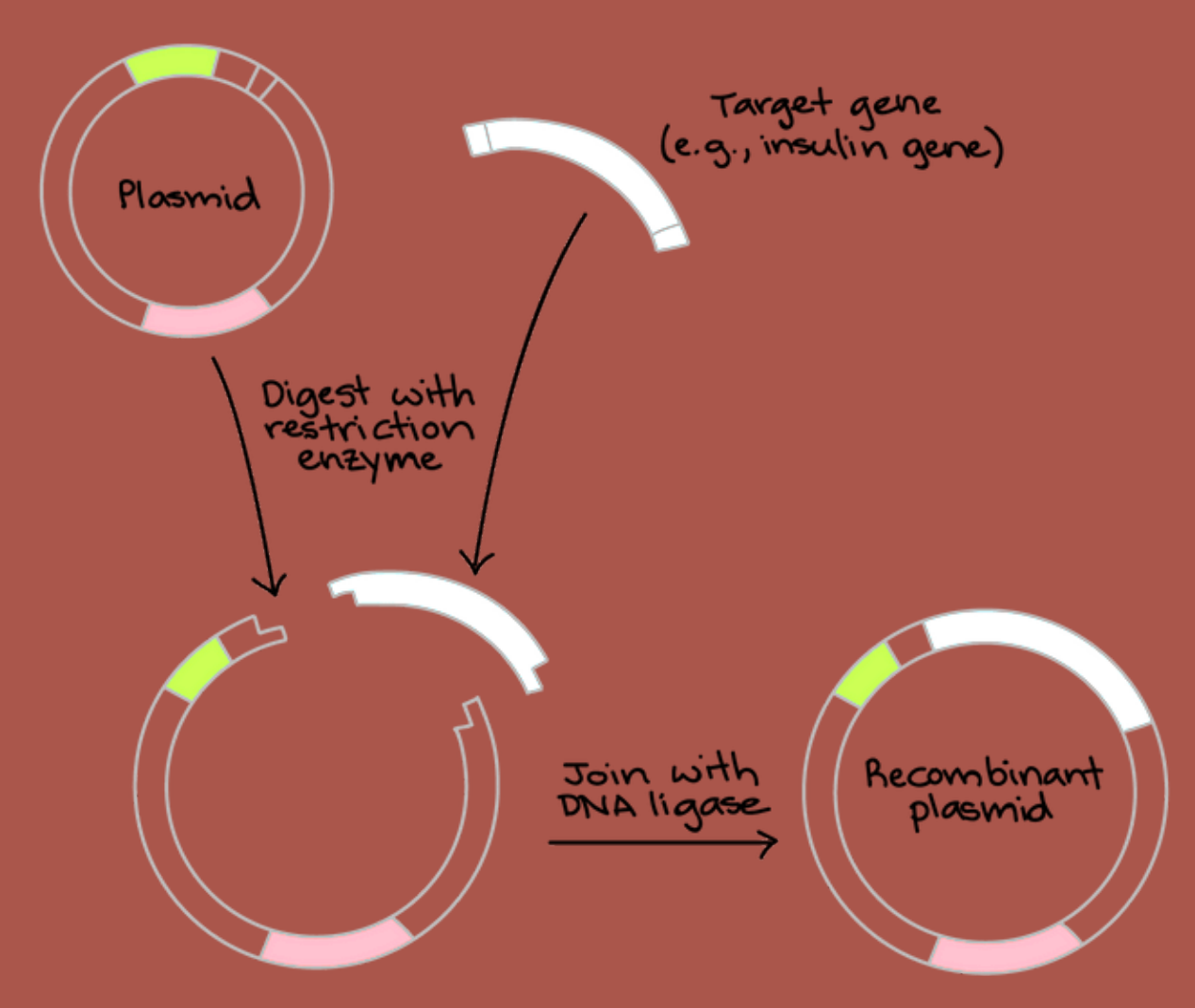




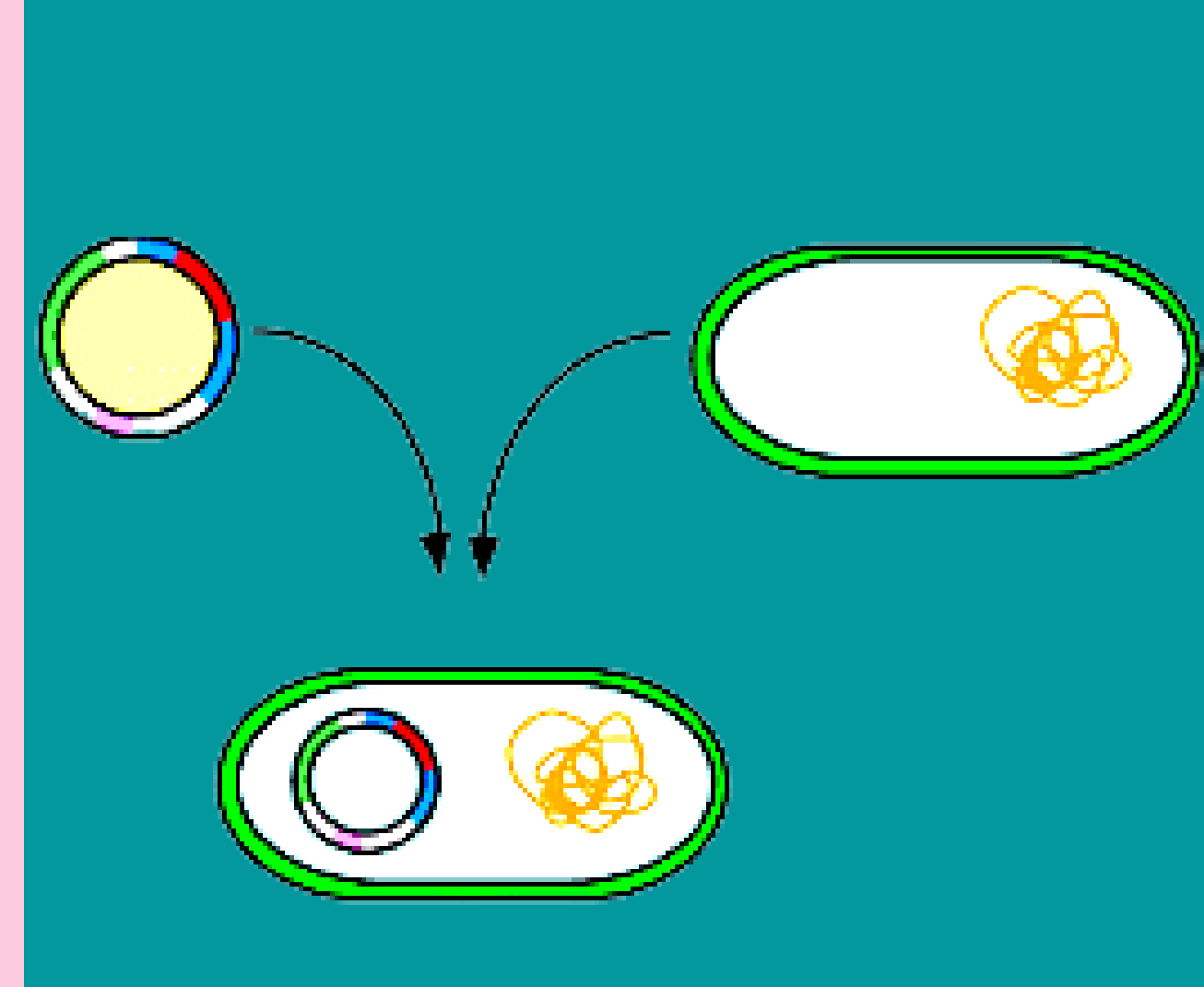
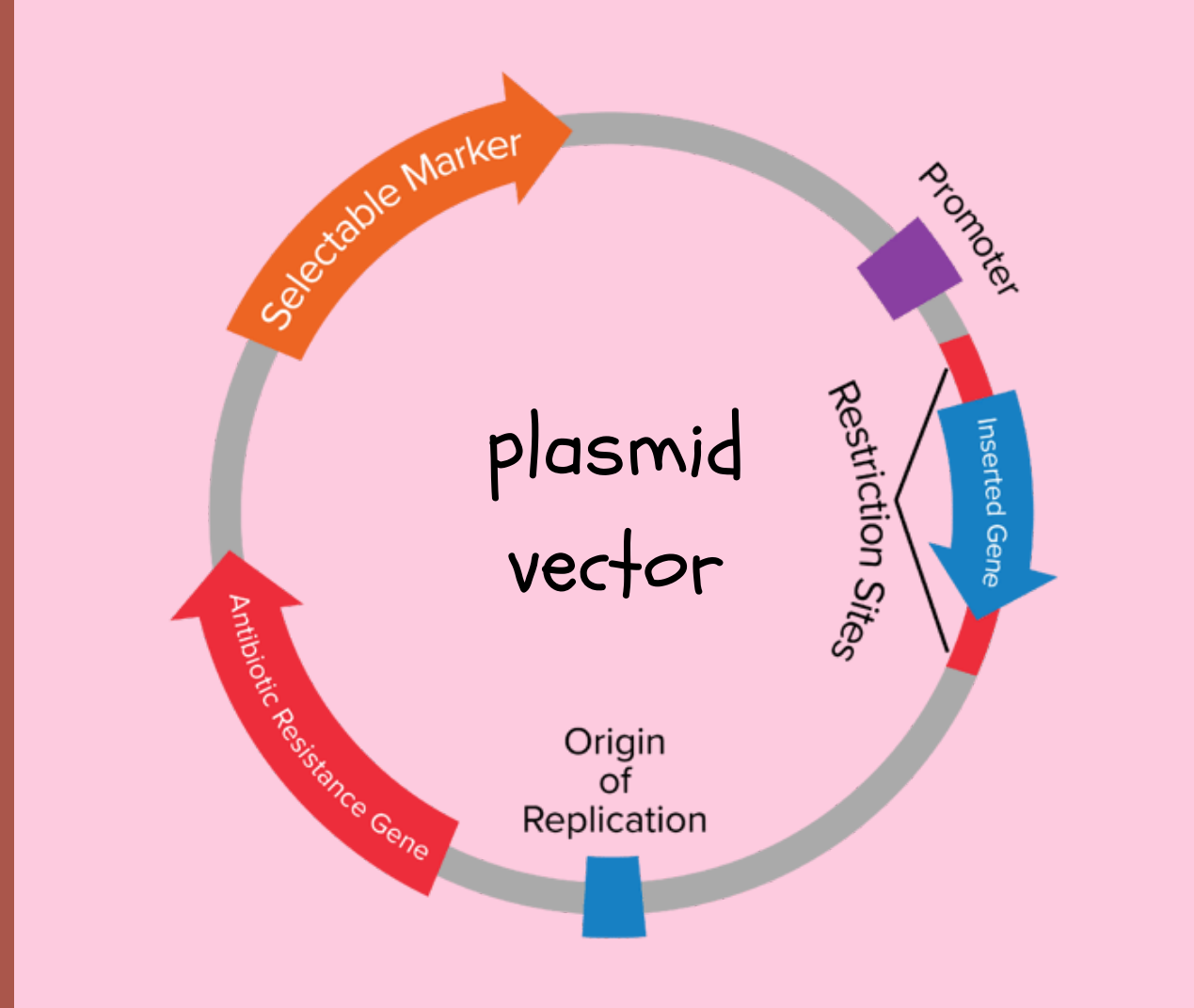
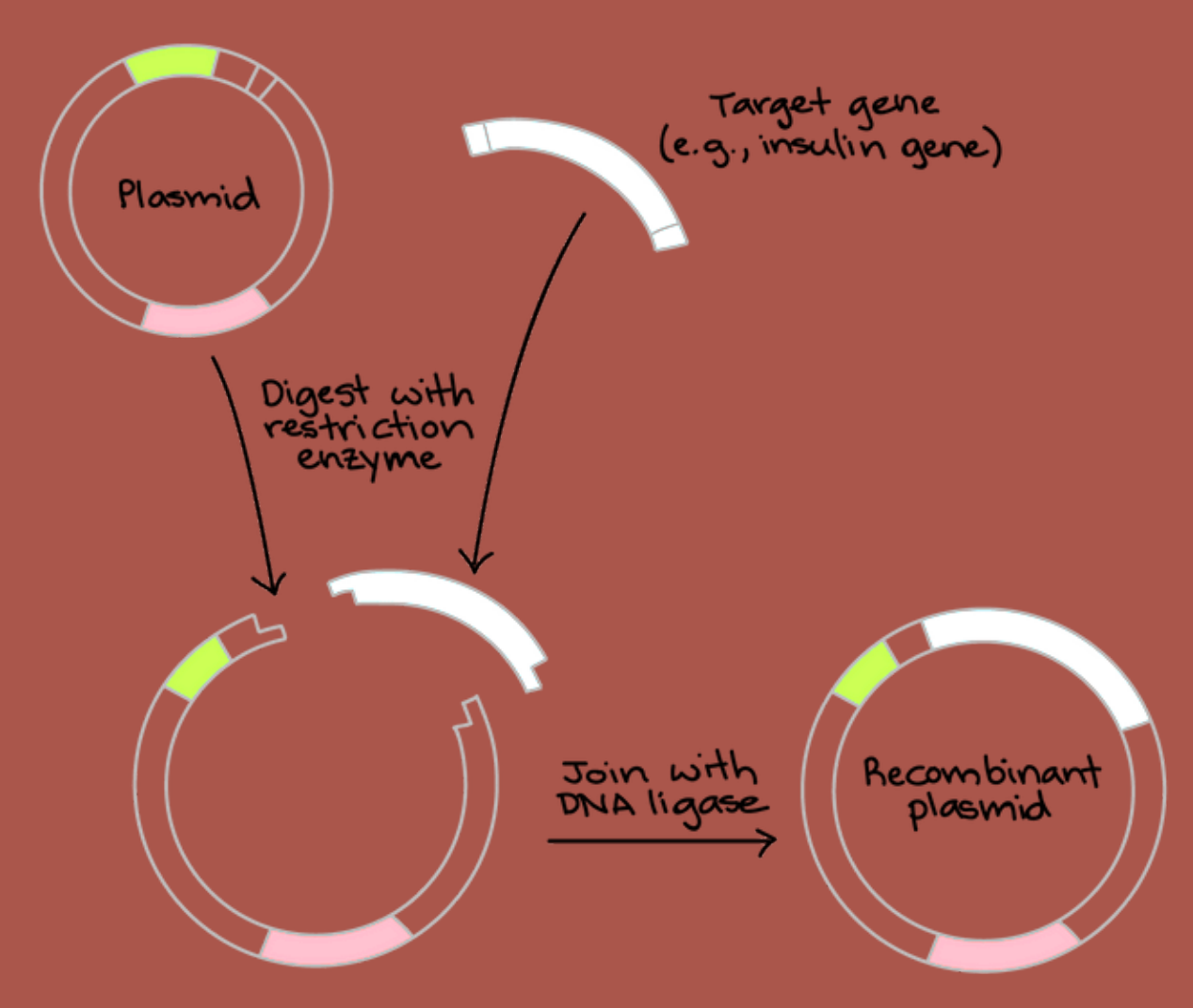
  **Molecular**  
**Cloning**




# Molecular Cloning



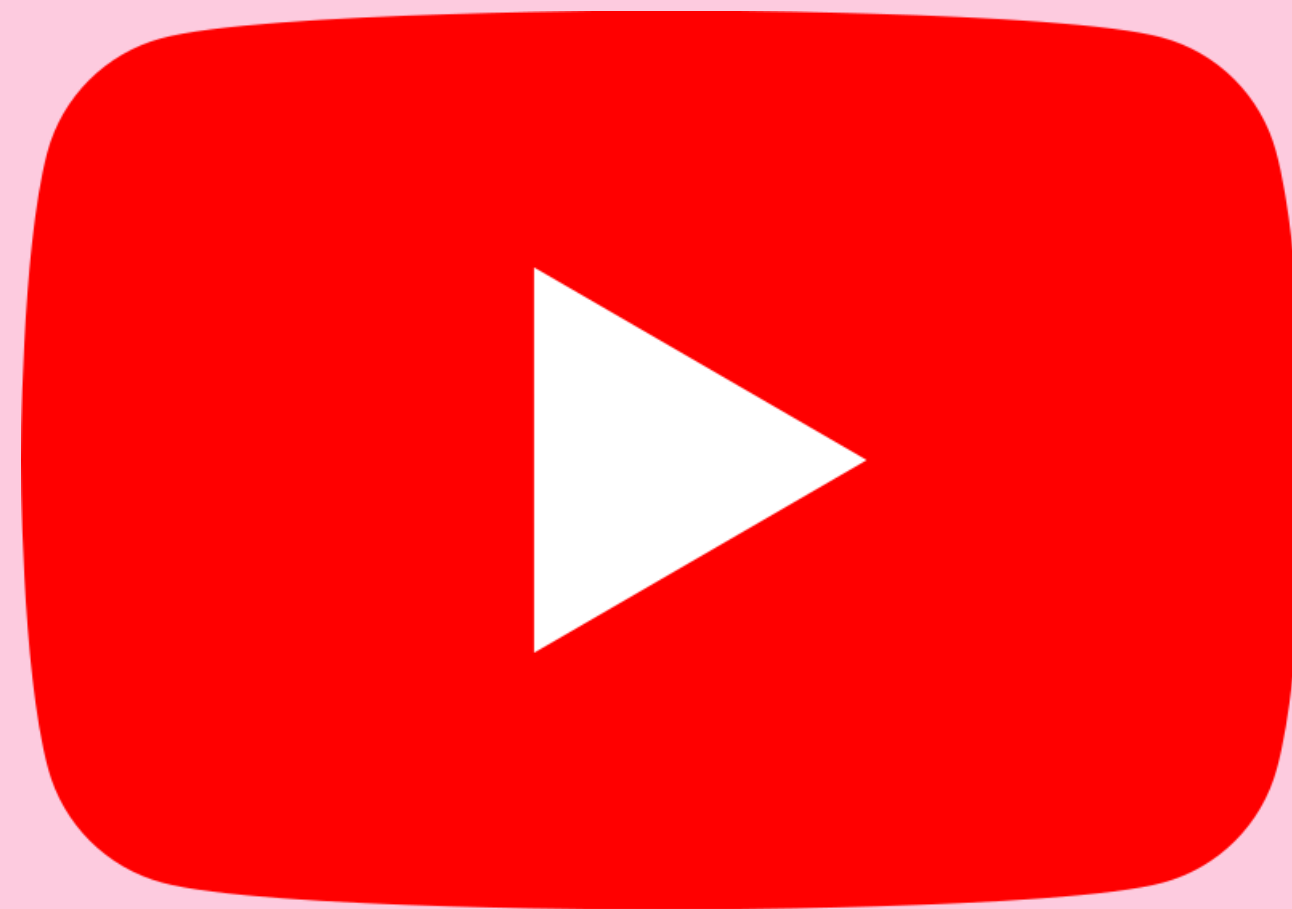

# Molecular Cloning



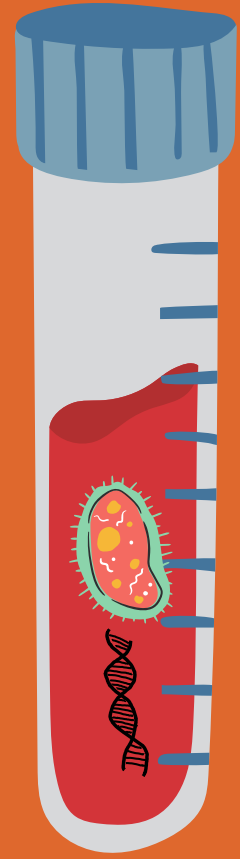
# Molecular Cloning

# Plasmids

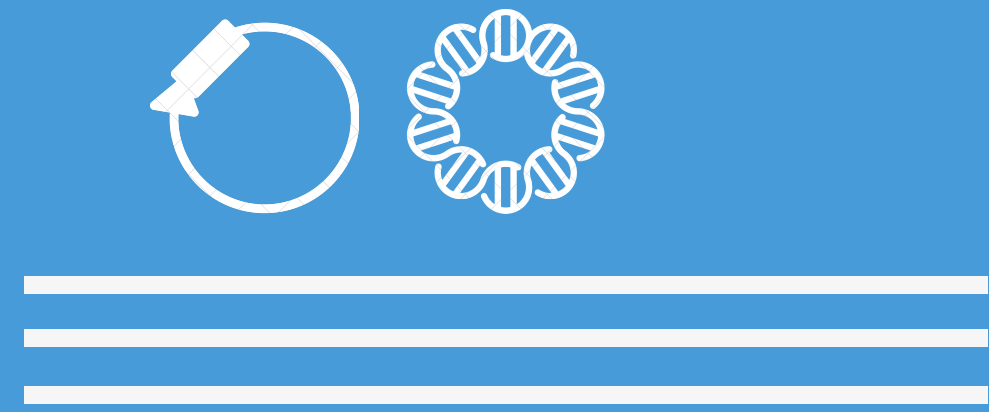


Source - [What is a Plasmid? - Plasmids 101](#)

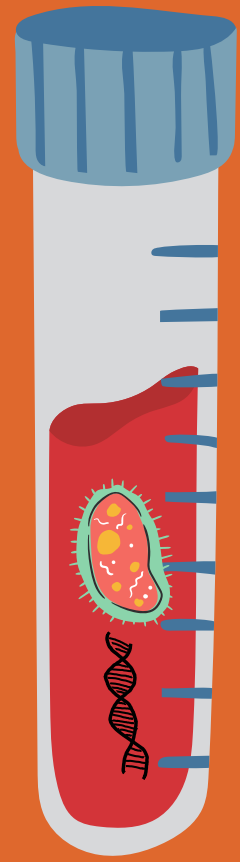




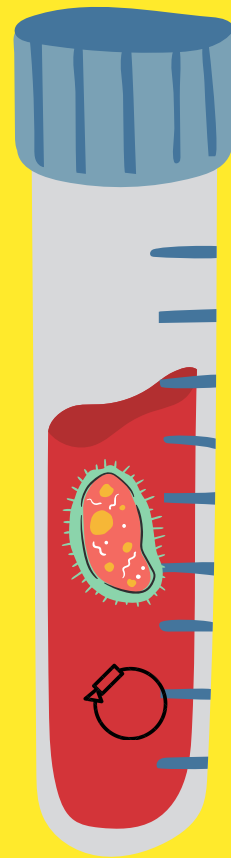
Extraction  
of DNA  
from cells



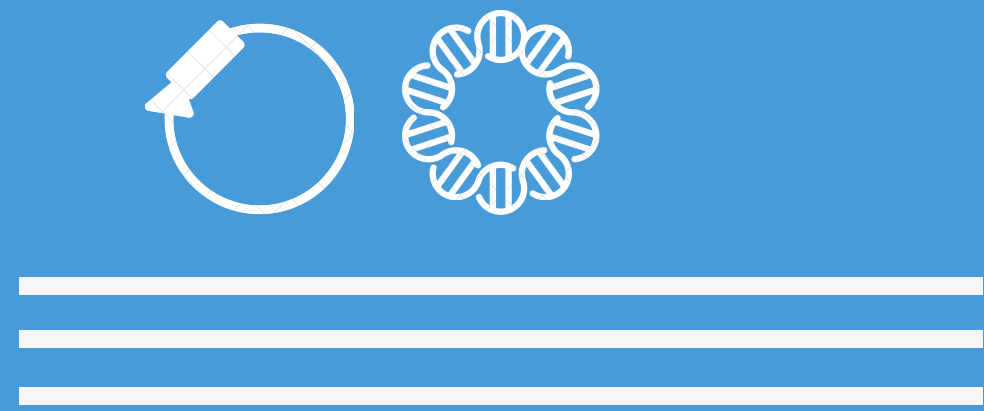
# DNA Cloning



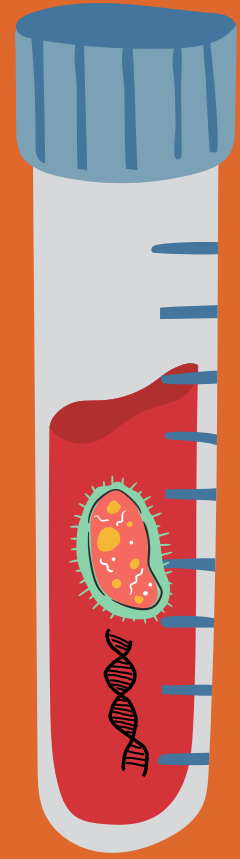
Extraction  
of DNA  
from cells



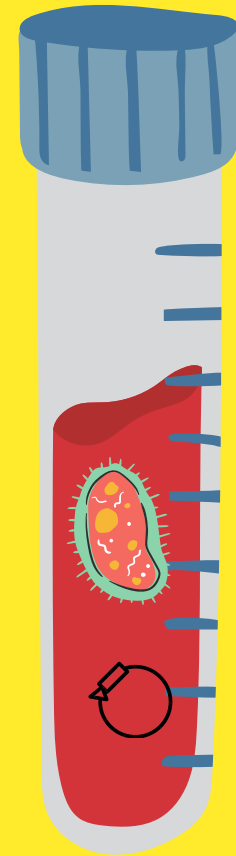
Plasmid  
Purification



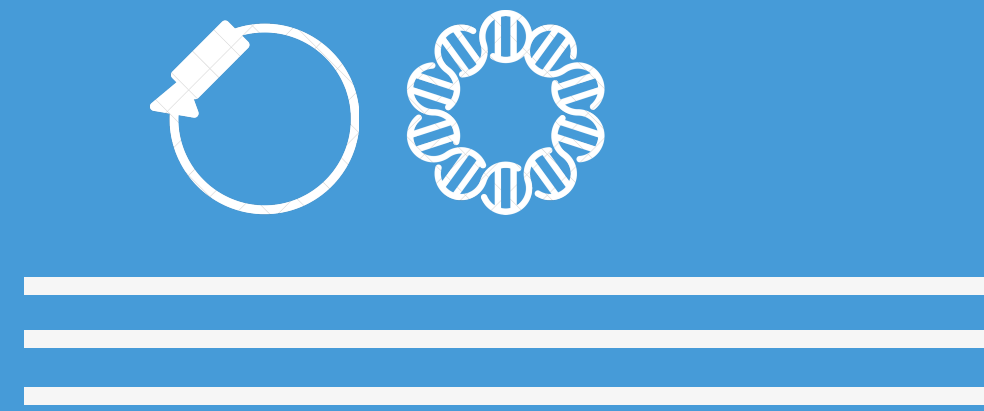
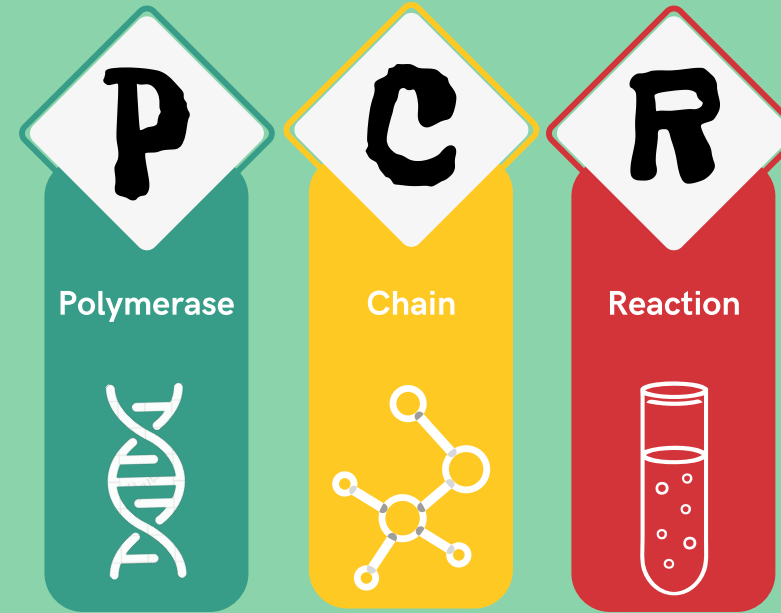
# DNA Cloning



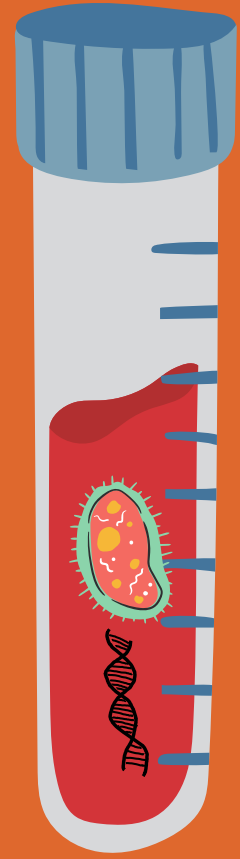
Extraction  
of DNA  
from cells



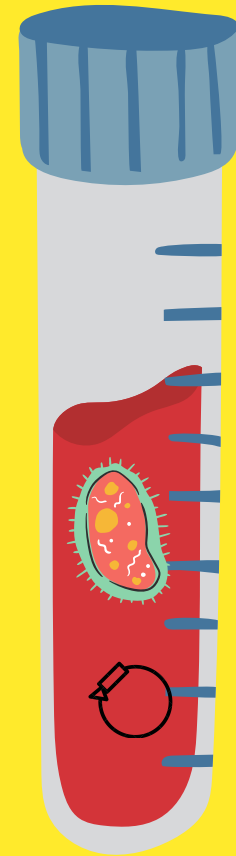
Plasmid  
Purification



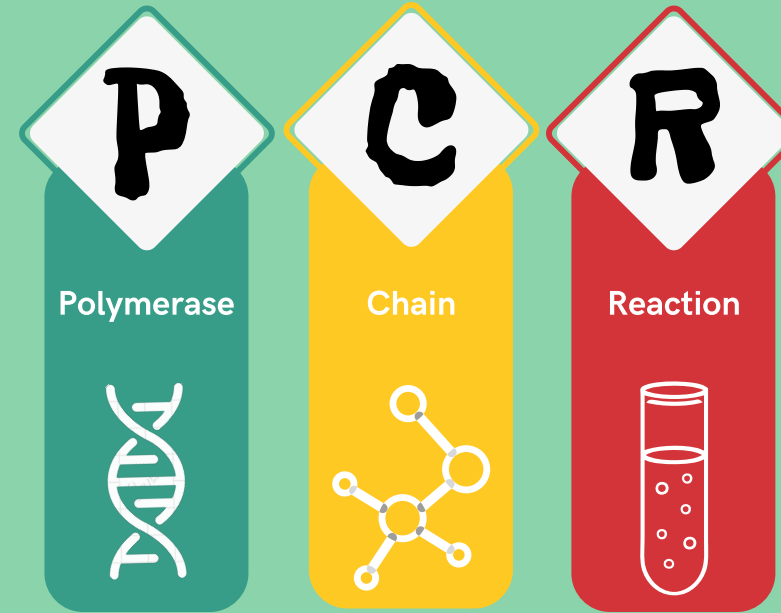
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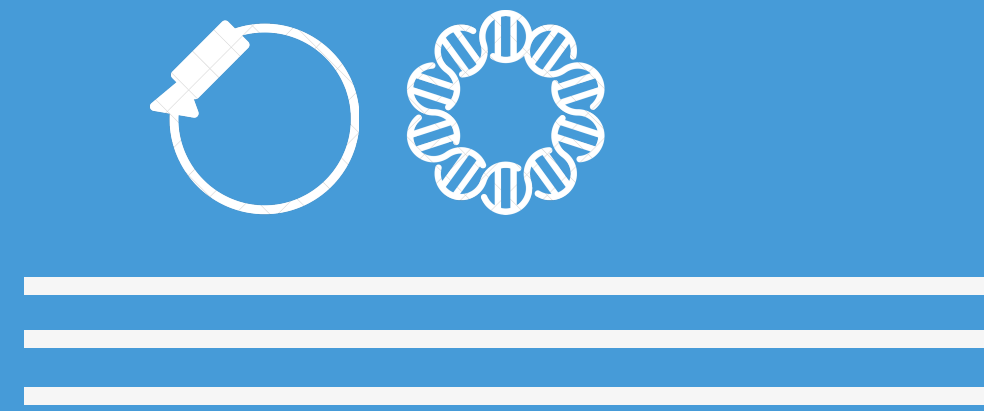
Extraction  
of DNA  
from cells



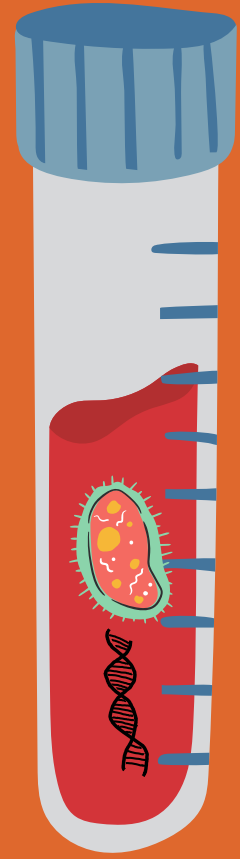
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Purification



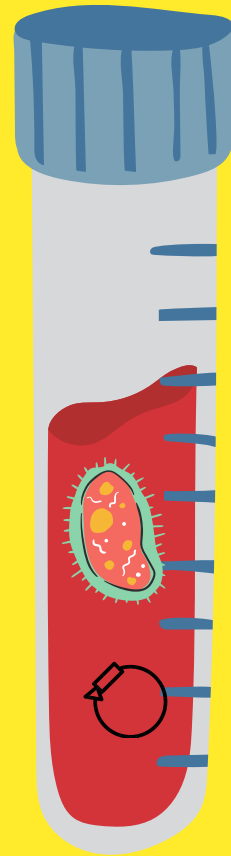
Restriction  
Enzymes



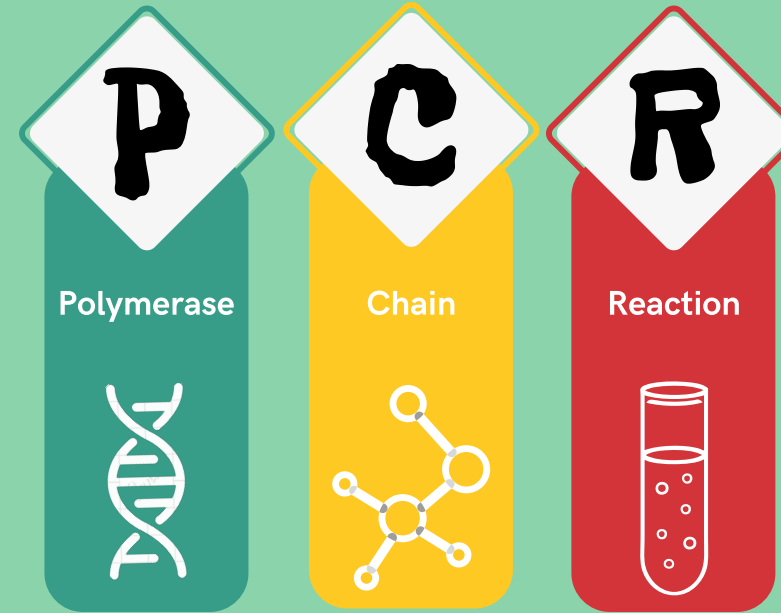
# DNA Cloning



Extraction  
of DNA  
from cells



Plasmid  
Purification



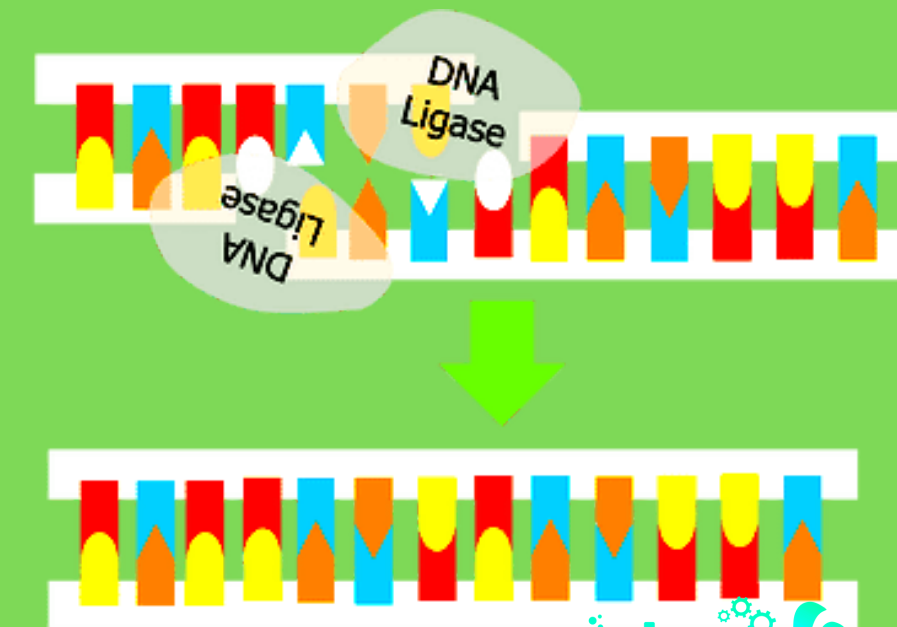
Restriction  
Enzymes

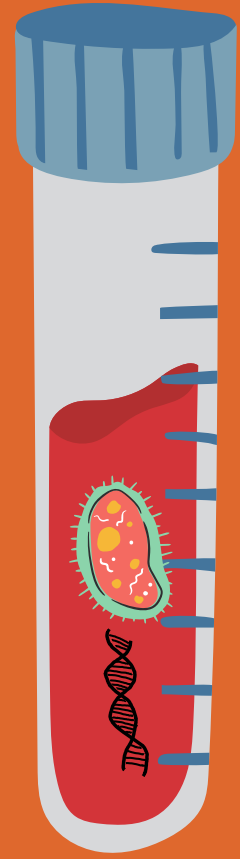


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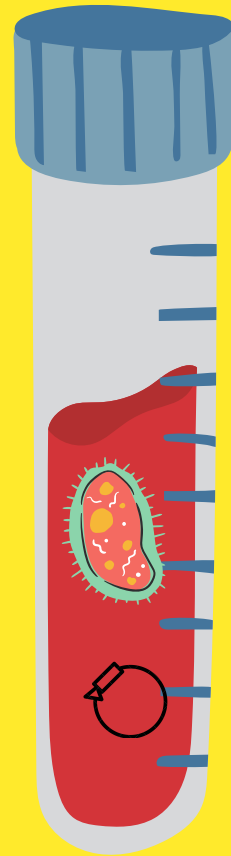


## Ligation

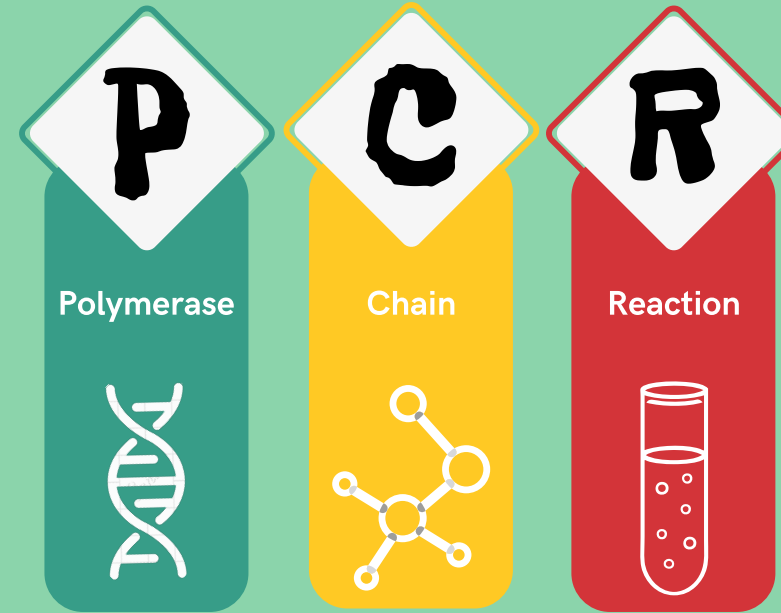




Extraction  
of DNA  
from cells



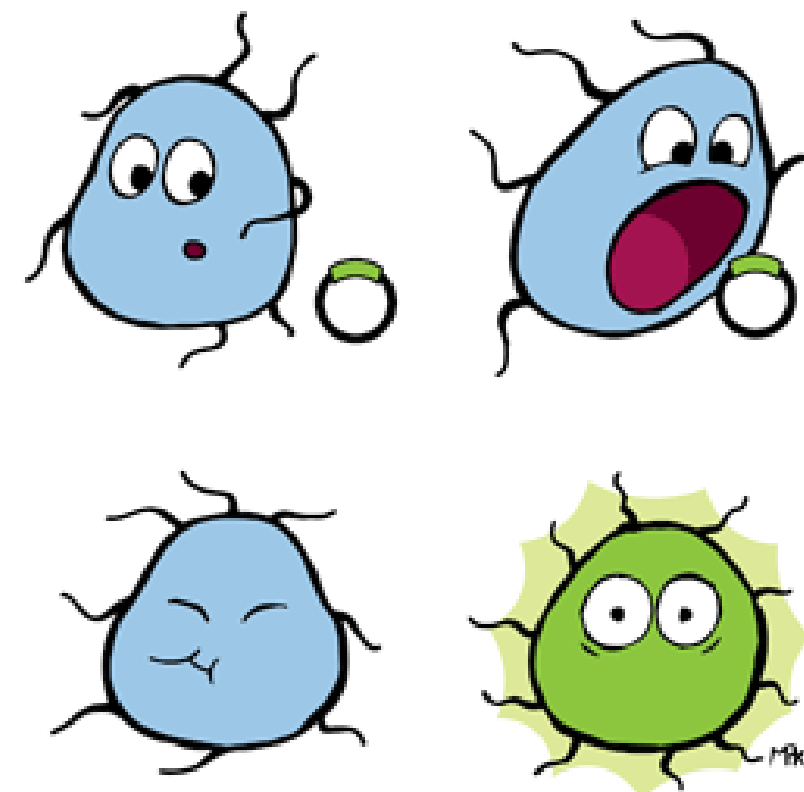
Plasmid  
Purification



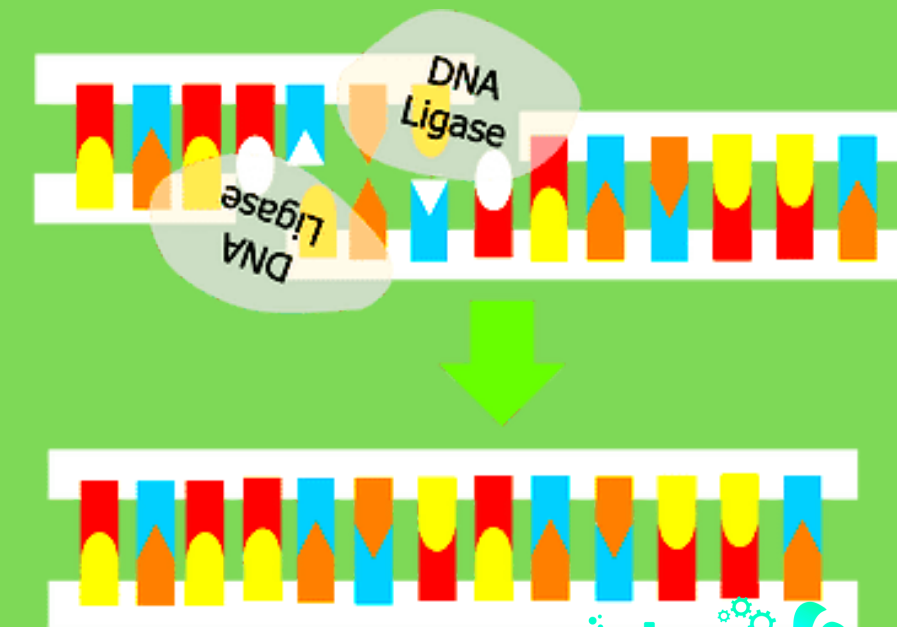
Restriction  
Enzymes



Transformation

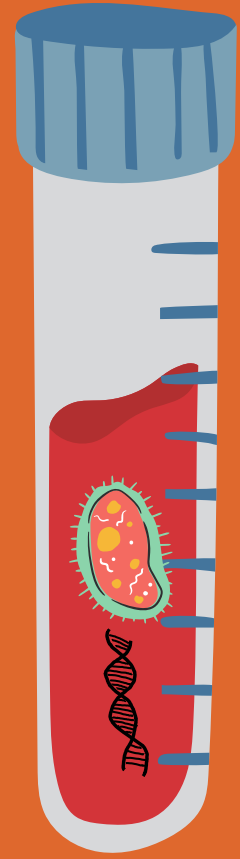


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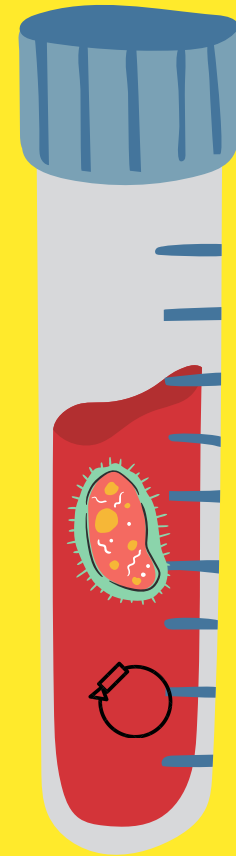


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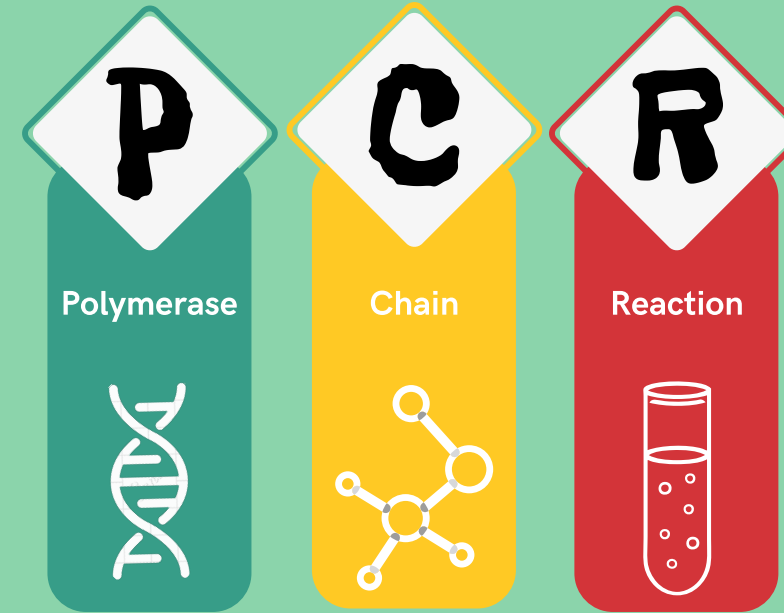




Extraction  
of DNA  
from cells



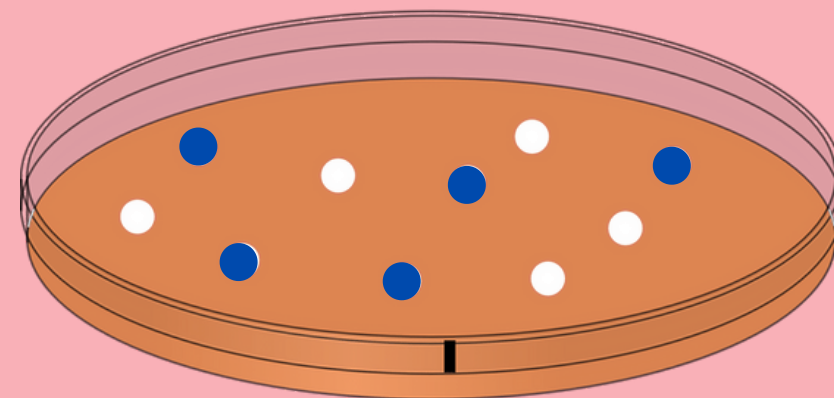
Plasmid  
Purification



Restriction  
Enzymes

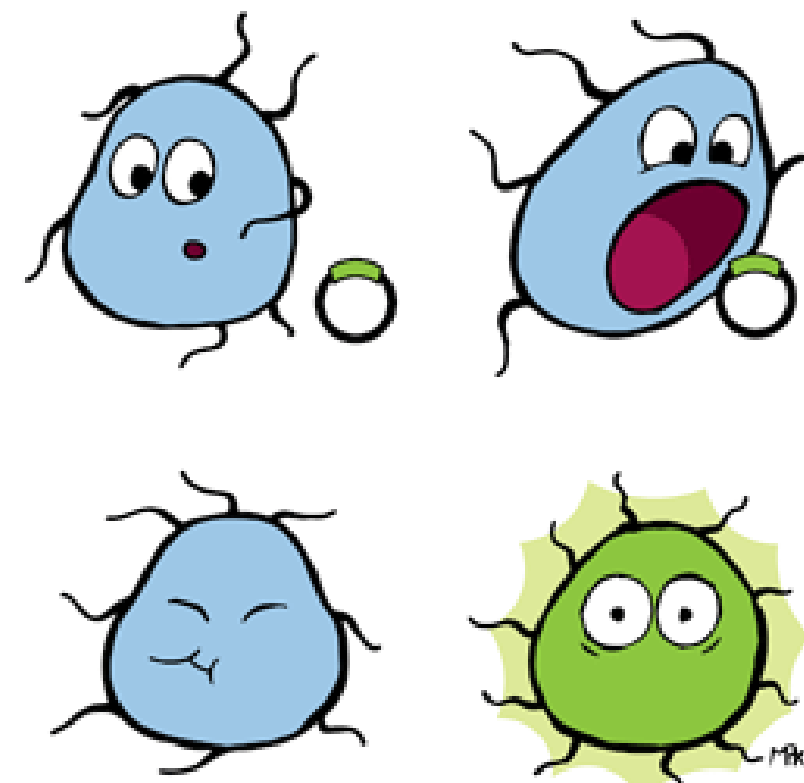


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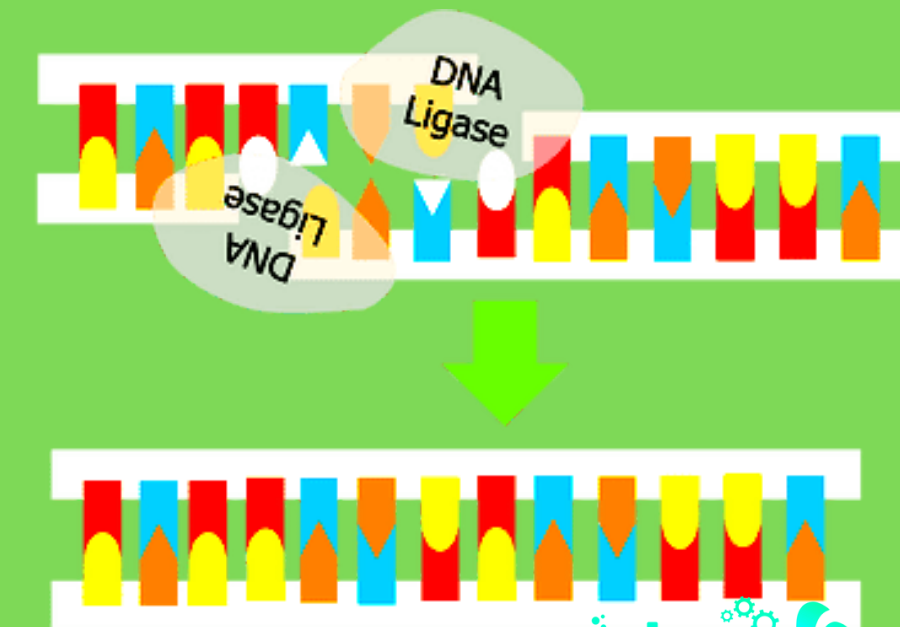


Blue White  
screening

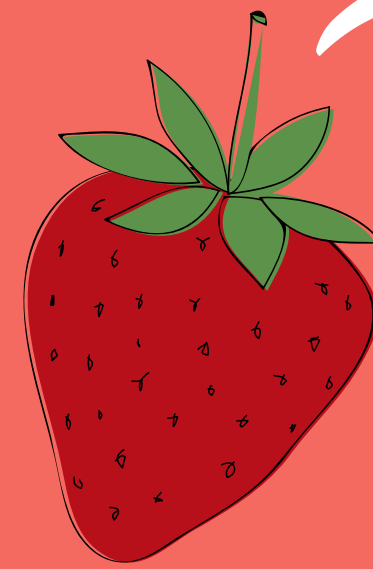
Transformation



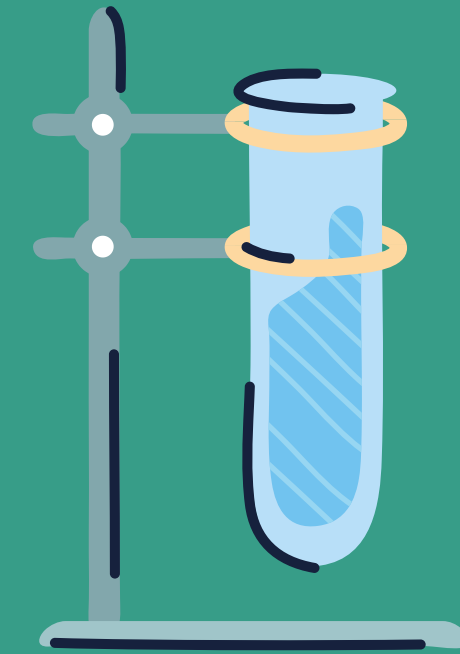
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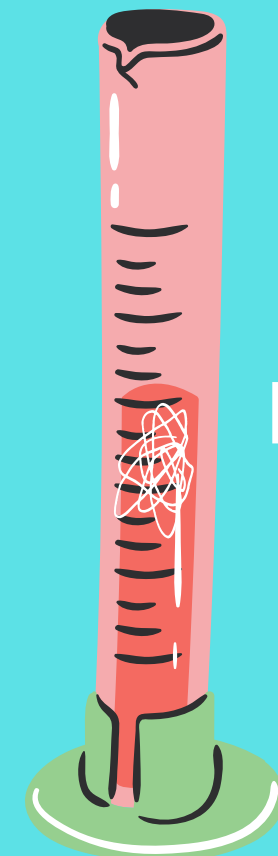
# Extraction of DNA



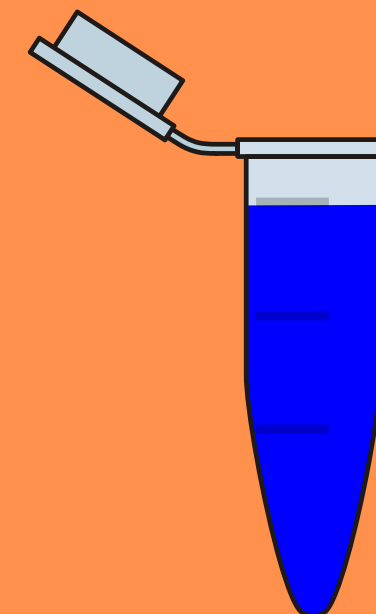
Cells or tissues



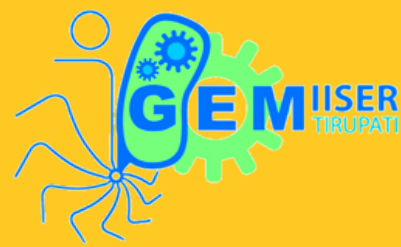
Cells  
Lysis



Precipitation



Nucleic  
acid  
Separation



# Registry of Standard Biological Parts

tools catalog repository assembly protocols help search

iGEM 2020



## Add and Document Parts

Start **adding and documenting** your parts early! Throughout the season you can update your part documentation with new information, modelling data, and/or experimental characterization.

## Sample Submissions

iGEM teams do not need to send samples of their parts anymore. We encourage teams to focus on the design, modeling, characterization, and documentation of their parts!

## Update: Distribution Kit

As a result of the current pandemic, we will not be able to manufacture and ship our 2020 DNA Distribution Kits to teams in some labs this year. We sincerely apologize for any inconvenience this may cause.

# Extraction of DNA

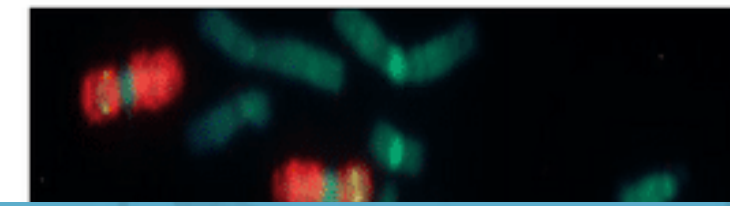


NCBI Resources How To

Gene   [Advanced](#)

## COVID-19 Information

[Public health information \(CDC\)](#) | [Research information \(NIH\)](#) | [SARS-CoV-2 data \(NCBI\)](#) | [Prevention and treatment information \(HHS\)](#) | [Español](#)



## Gene

Gene integrates information from a wide range of species. A record may include nomenclature, Reference Sequences (RefSeqs), maps, pathways, variations, phenotypes, and links to genome-, phenotype-, and locus-specific databases.



[BLAST](#) [Align](#) [Retrieve/ID mapping](#) [Peptide search](#) [SPARQL](#)

The mission of UniProt is to provide the scientific community with a comprehensive, high-quality and freely accessible resource of protein sequence and functional information.

**UniProtKB**  
UniProt Knowledgebase

**UniRef**  
The UniProt Reference Clusters (UniRef) provide

**UniParc**  
UniParc is a comprehensive and non-redundant database

**Proteomes**  
Proteomes



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tools catalog repository assembly protocols help search

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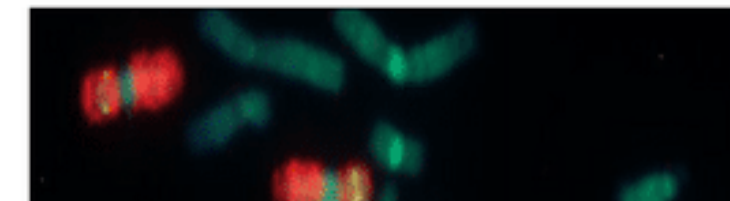
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UniProt

BLAST Align Retrieve/ID mapping Peptide search SPARQL

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UniProt Knowledgebase

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The UniProt Reference Clusters (UniRef) provide

**UniParc**

UniParc is a comprehensive and non-redundant database

**Proteomes**



# Extraction of DNA





# Plasmid purification



[Browse Catalog](#)

[Deposit](#)



**Browse Addgene's Repository**

Browse our collection of 100,777 plasmids contributed by 4,751 research labs around the world. If you can't find what you're looking for, contact us for more information.

### Plasmid Collections

Browse our collection of over 100,777 plasmids.

[Bacterial Expression](#)   [Fluorescent Proteins](#)

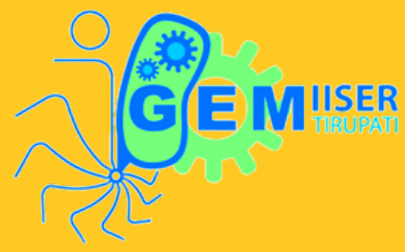
[Chemogenetics](#)   [Optogenetics](#)

[CRISPR](#)   [Viral Plasmids](#)

### Depositing Scientists and Institutions

Addgene distributes plasmids on behalf of 4,751 research labs from 1,068 institutions around the world.

[Depositing Institutions](#)

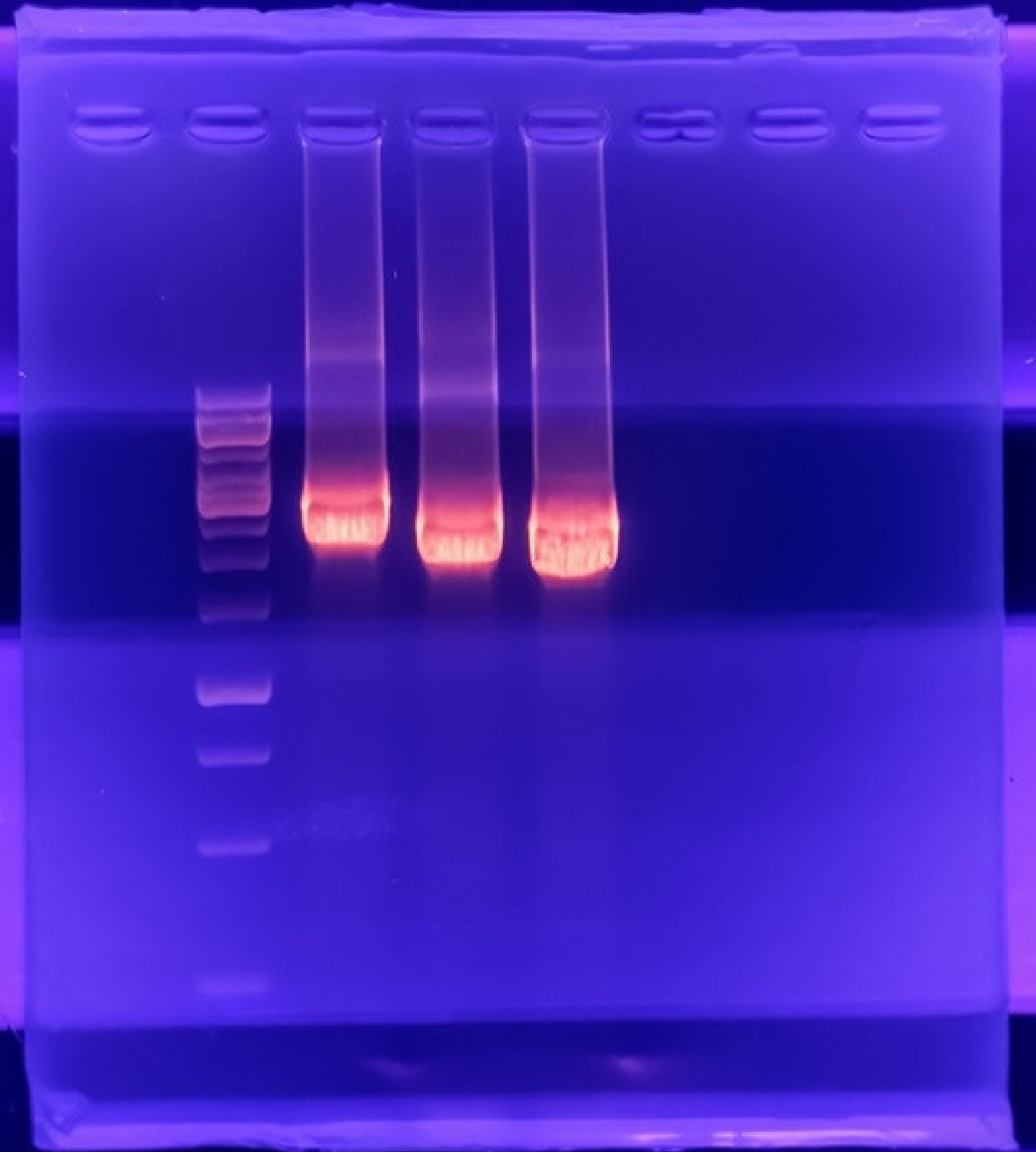


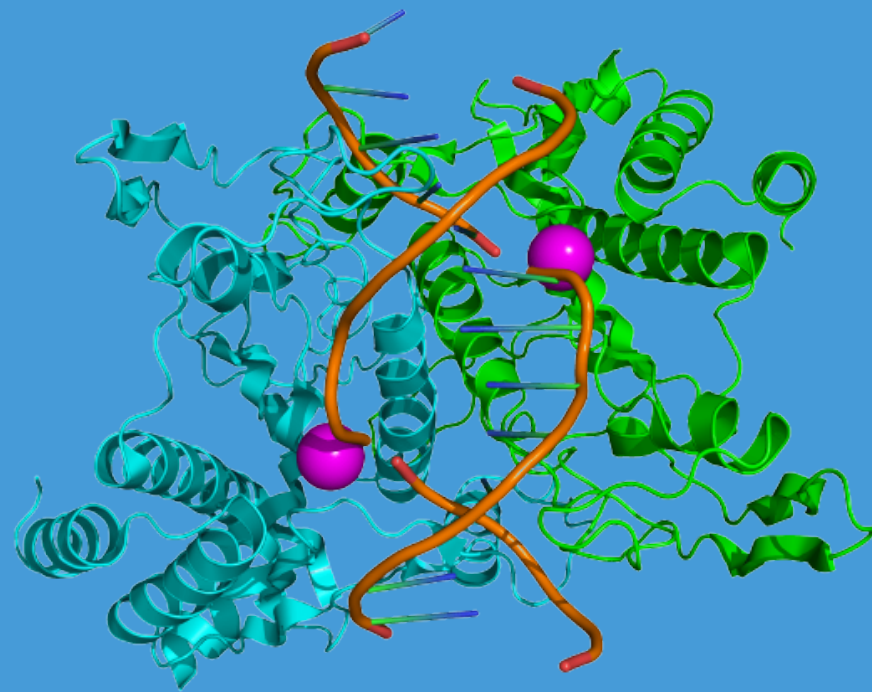
# Polymerase Chain Reaction





# Gel Electrophoresis



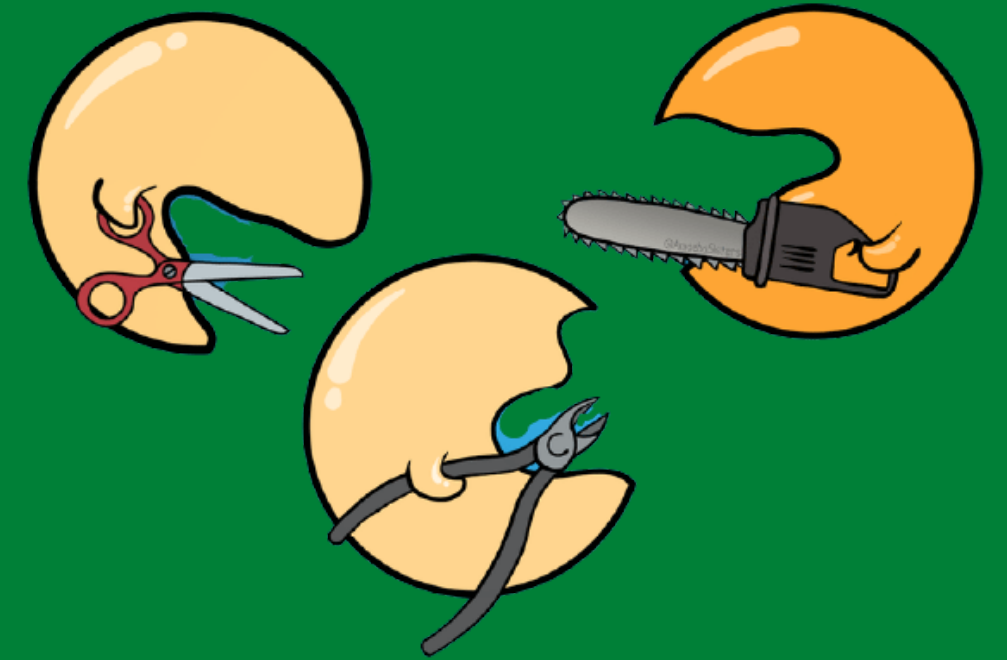


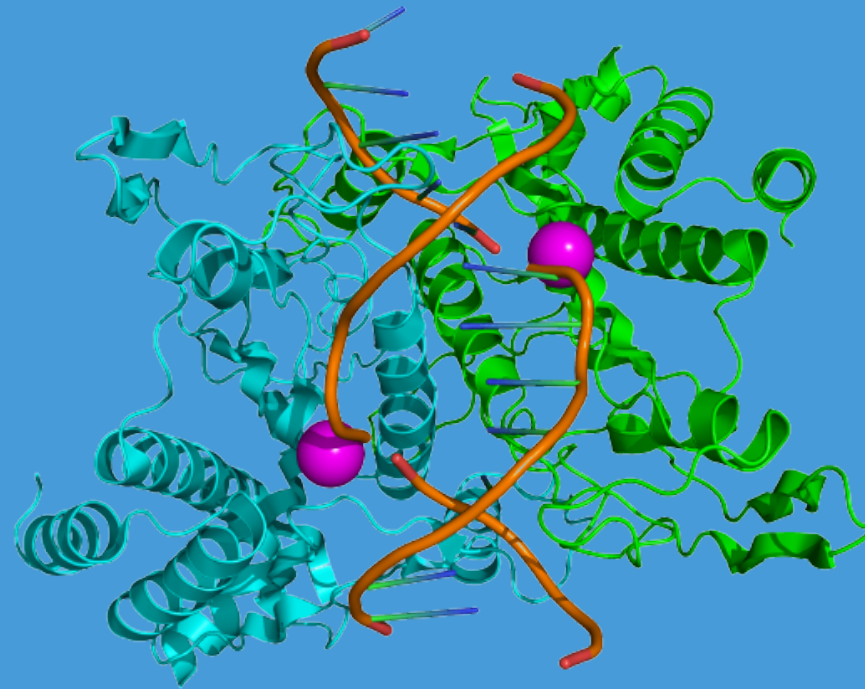
# Restriction Enzymes

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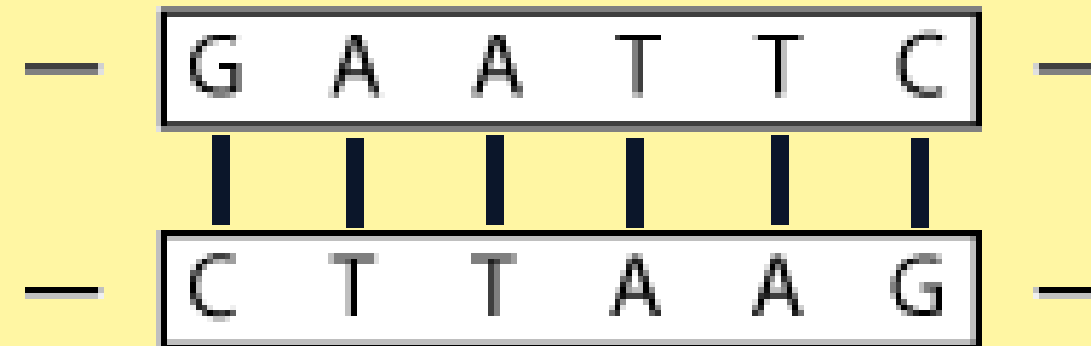
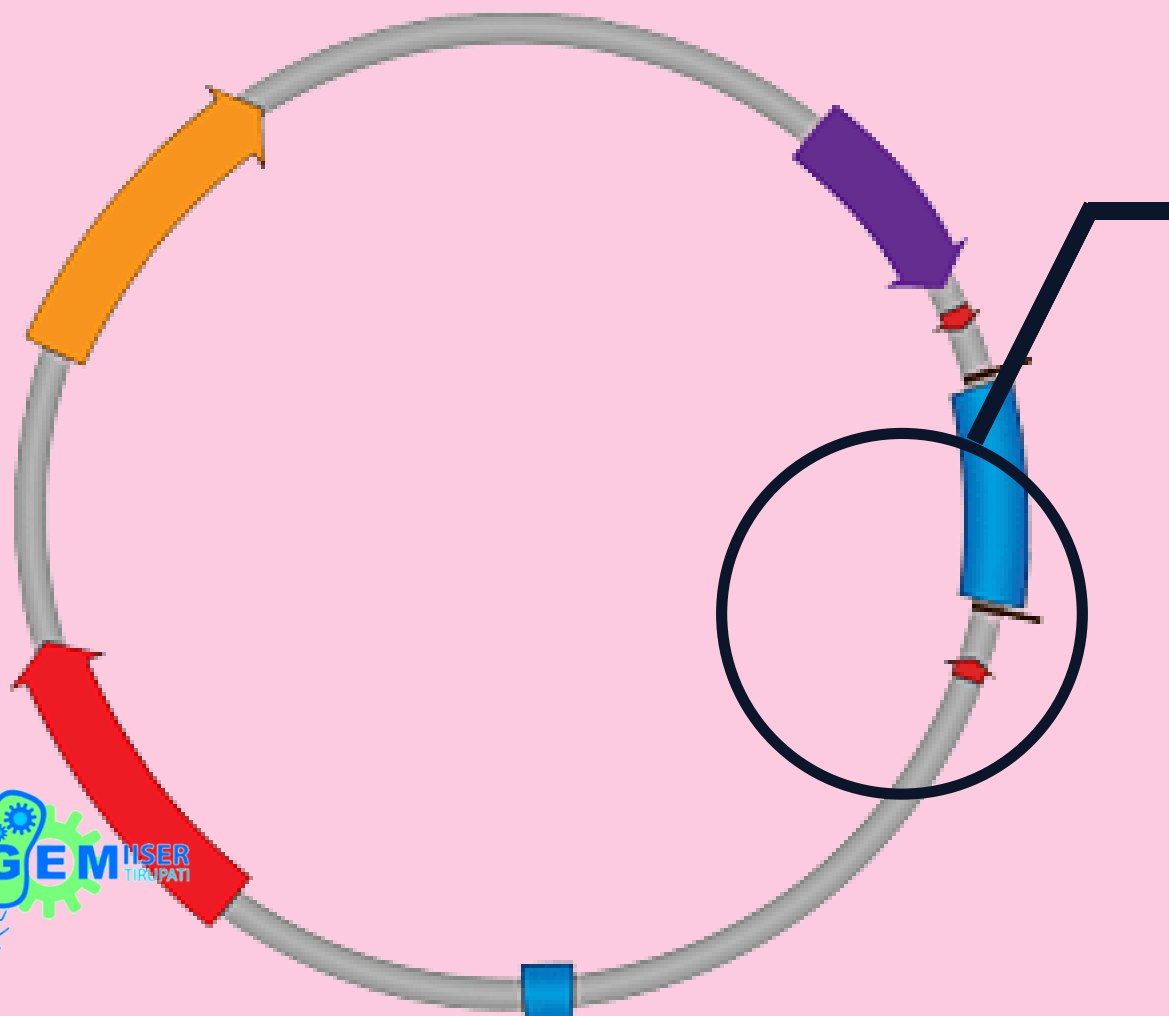
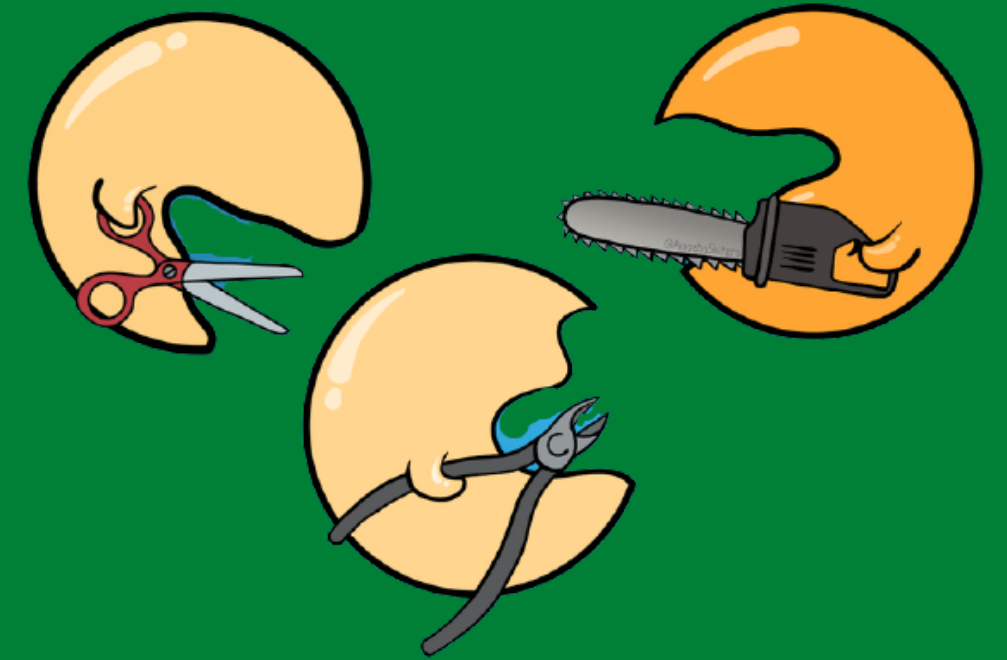
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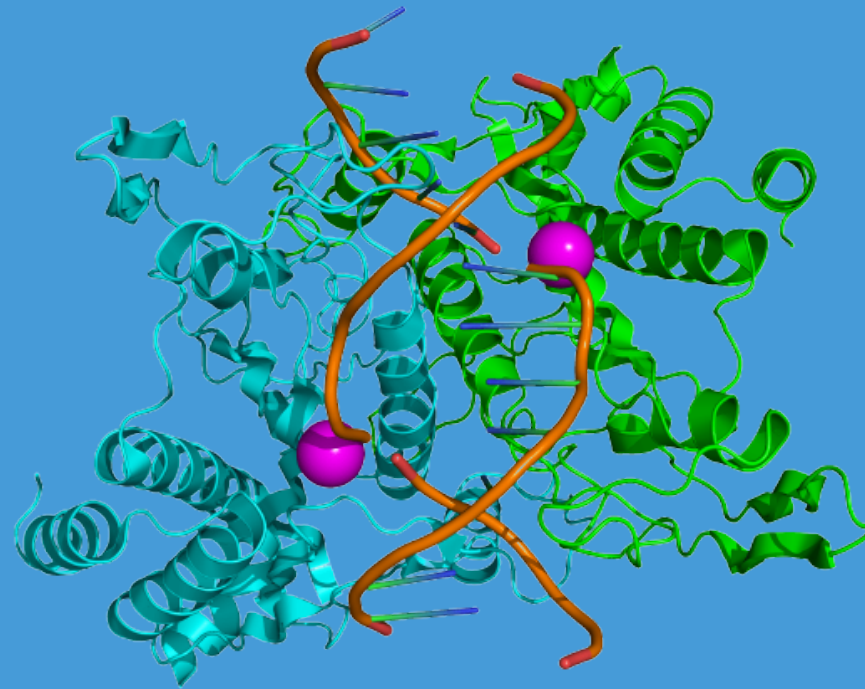
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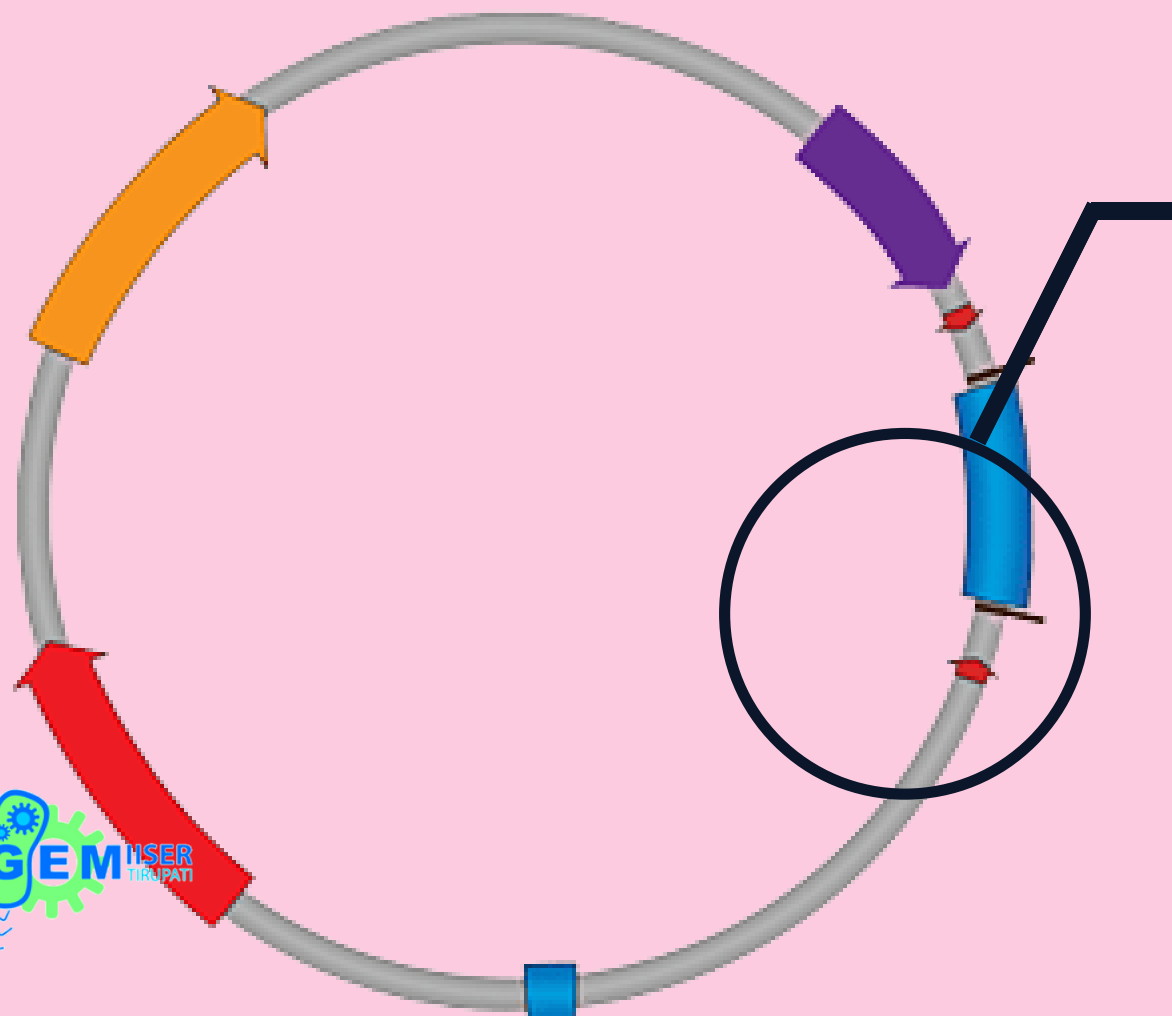
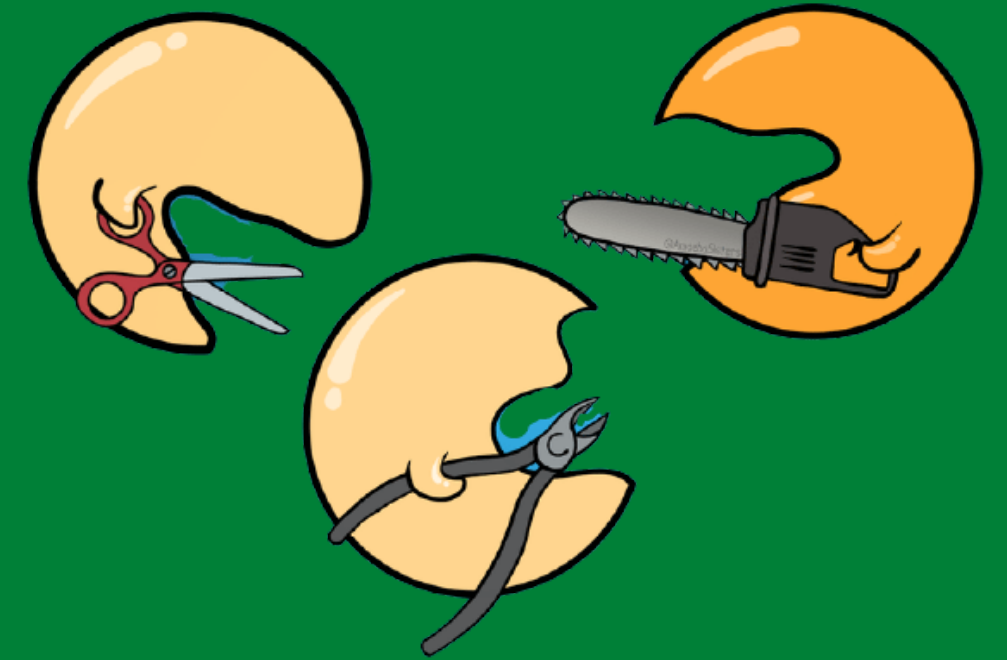


# Restriction Enzymes

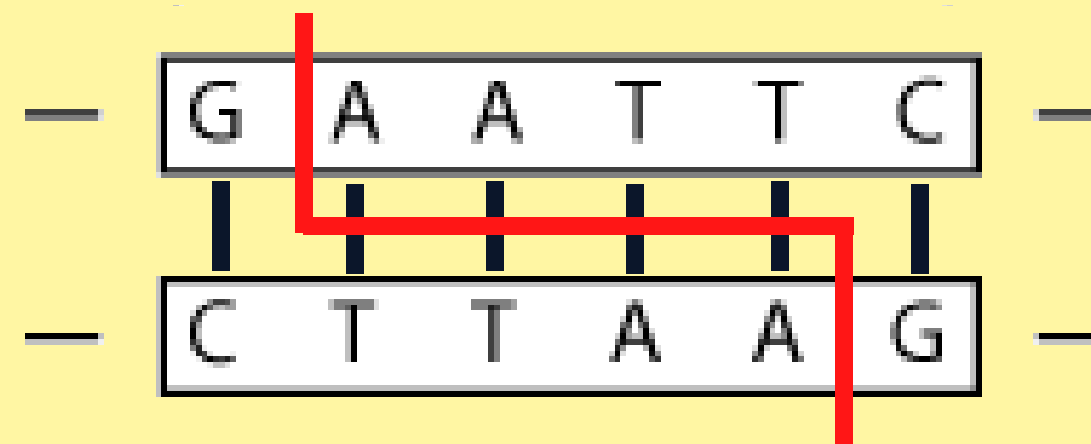


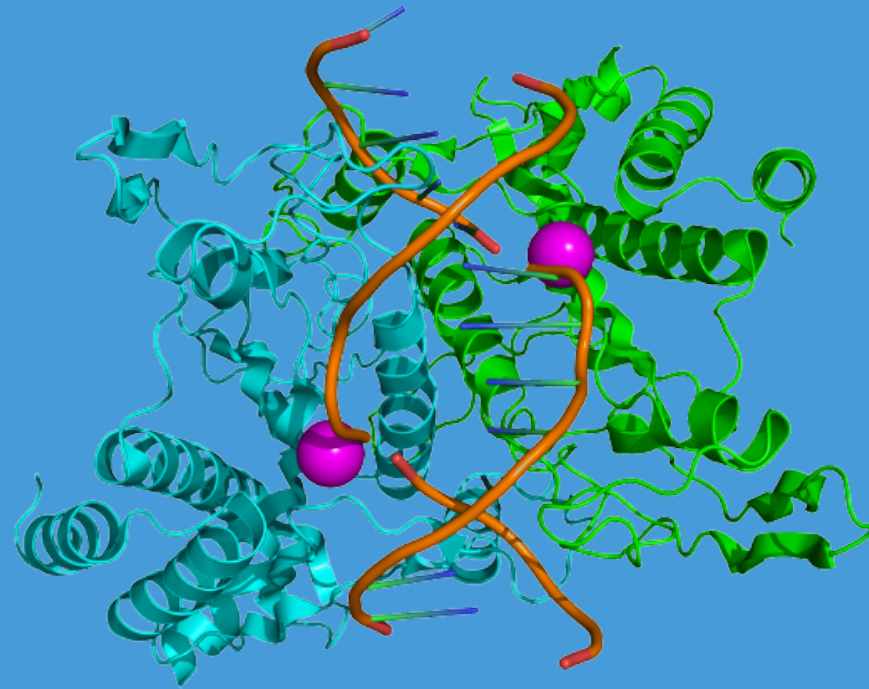


Restriction Enzymes

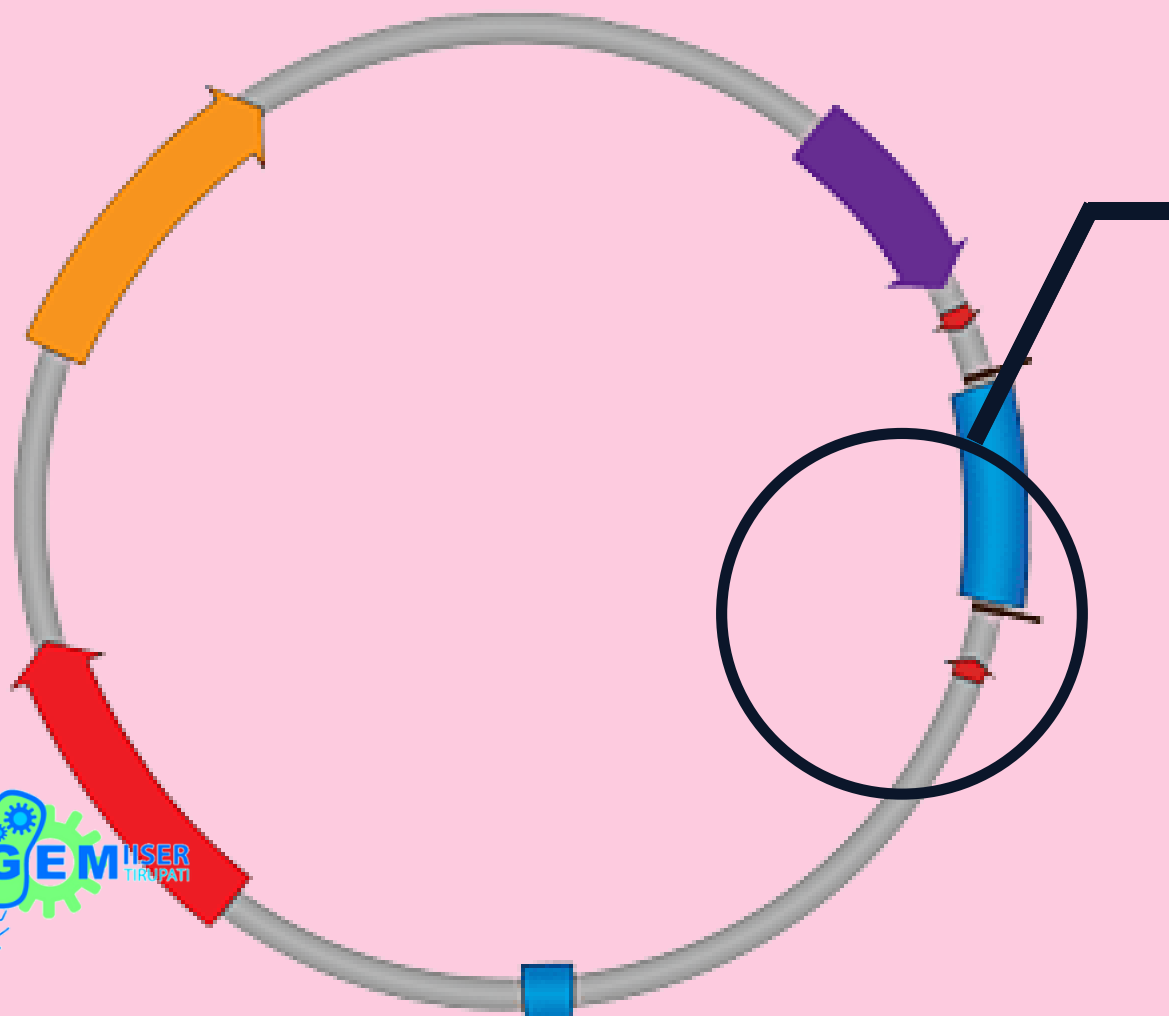
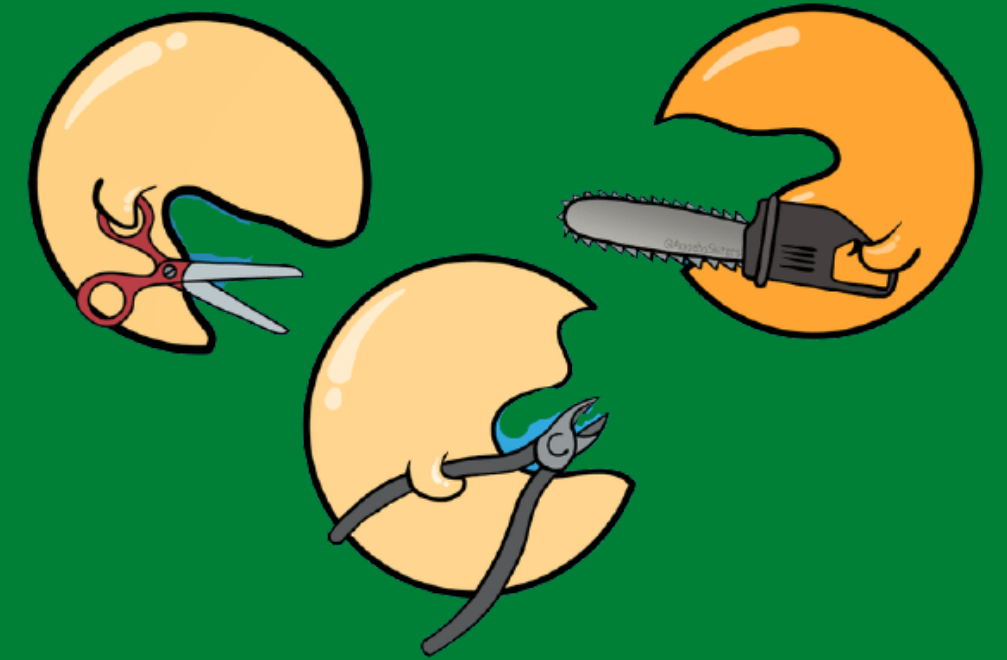


**EcoRI**

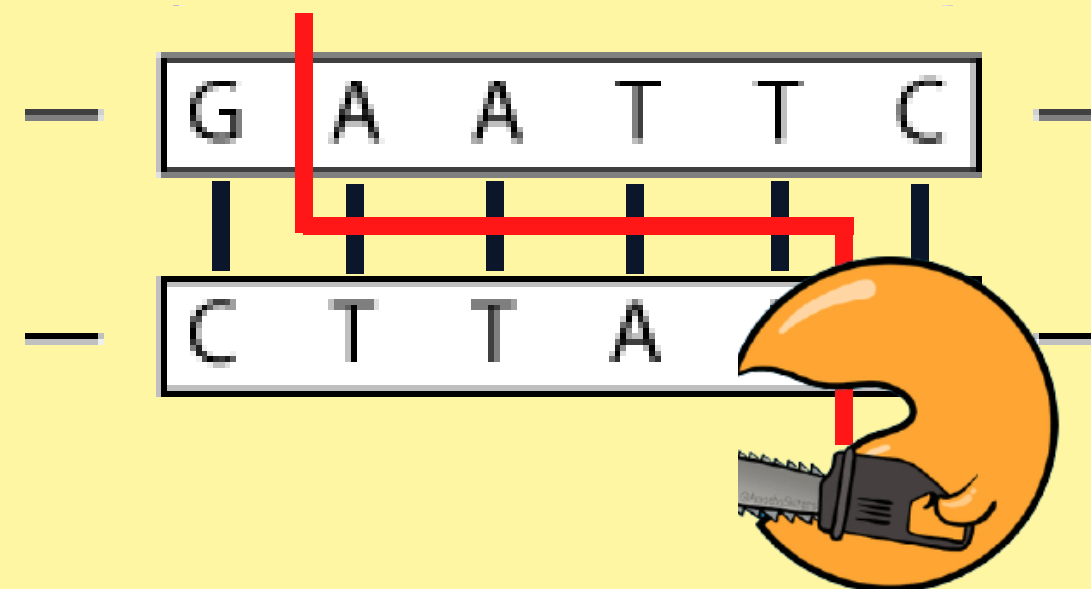


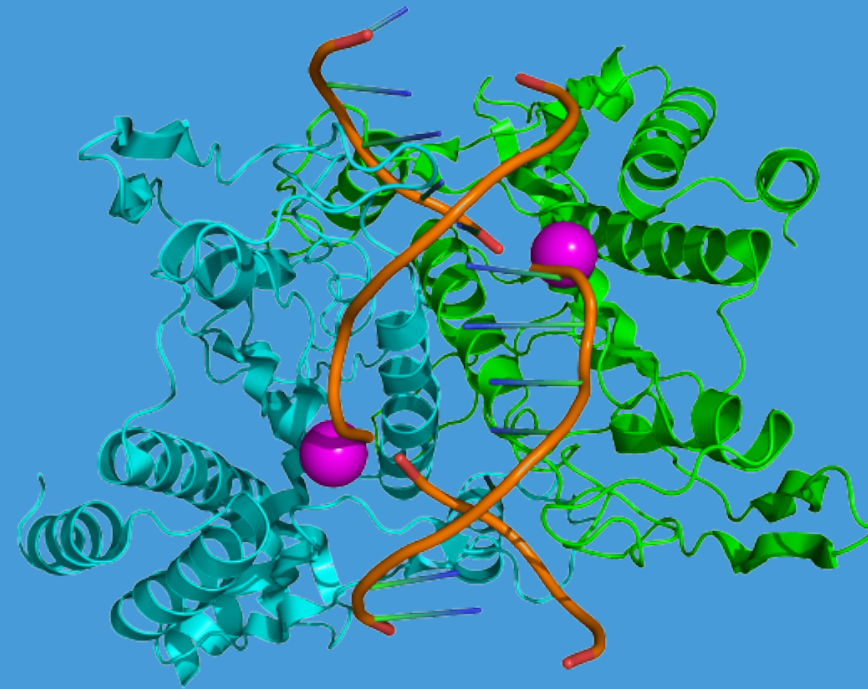


## Restriction Enzymes

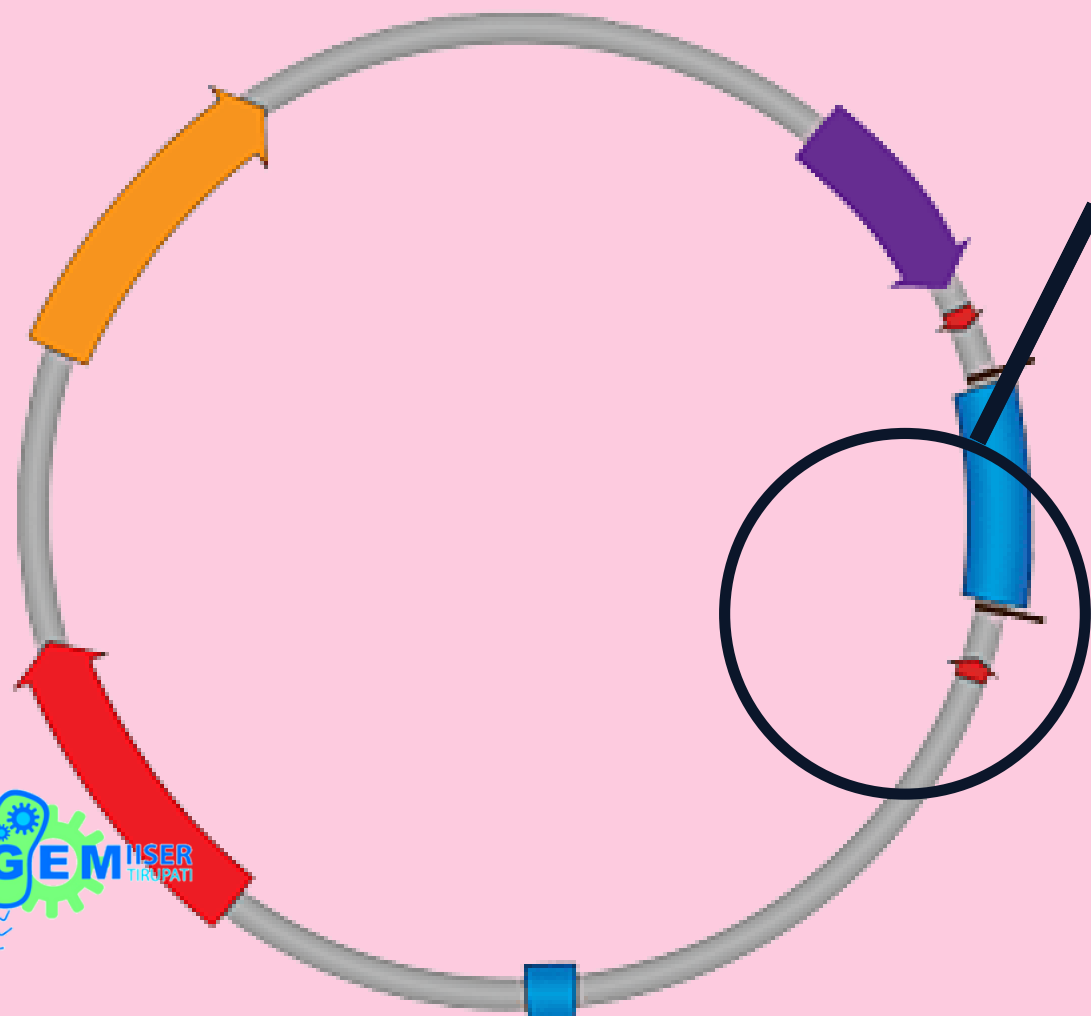
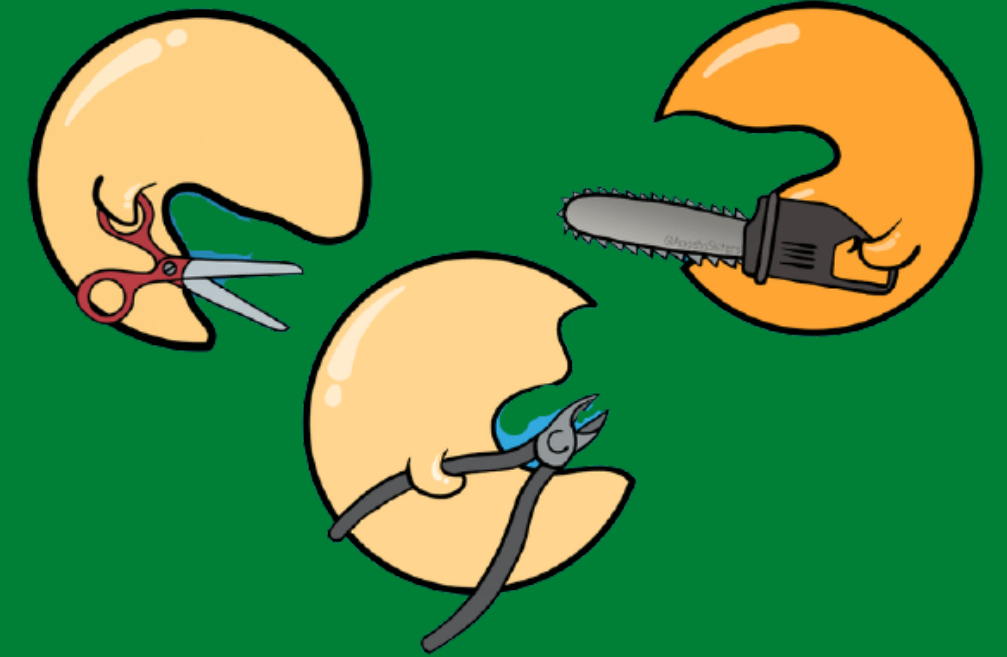


## EcoRI

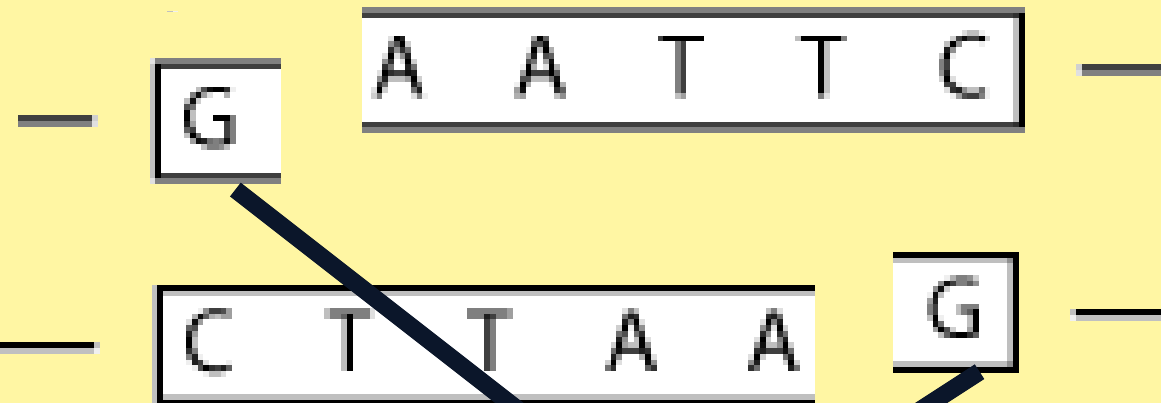




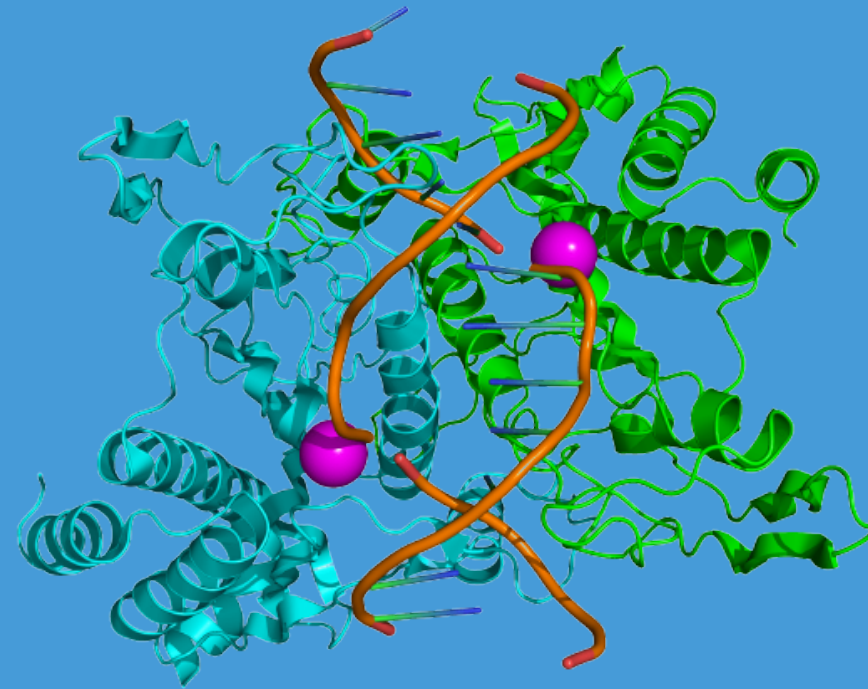
Restriction Enzymes



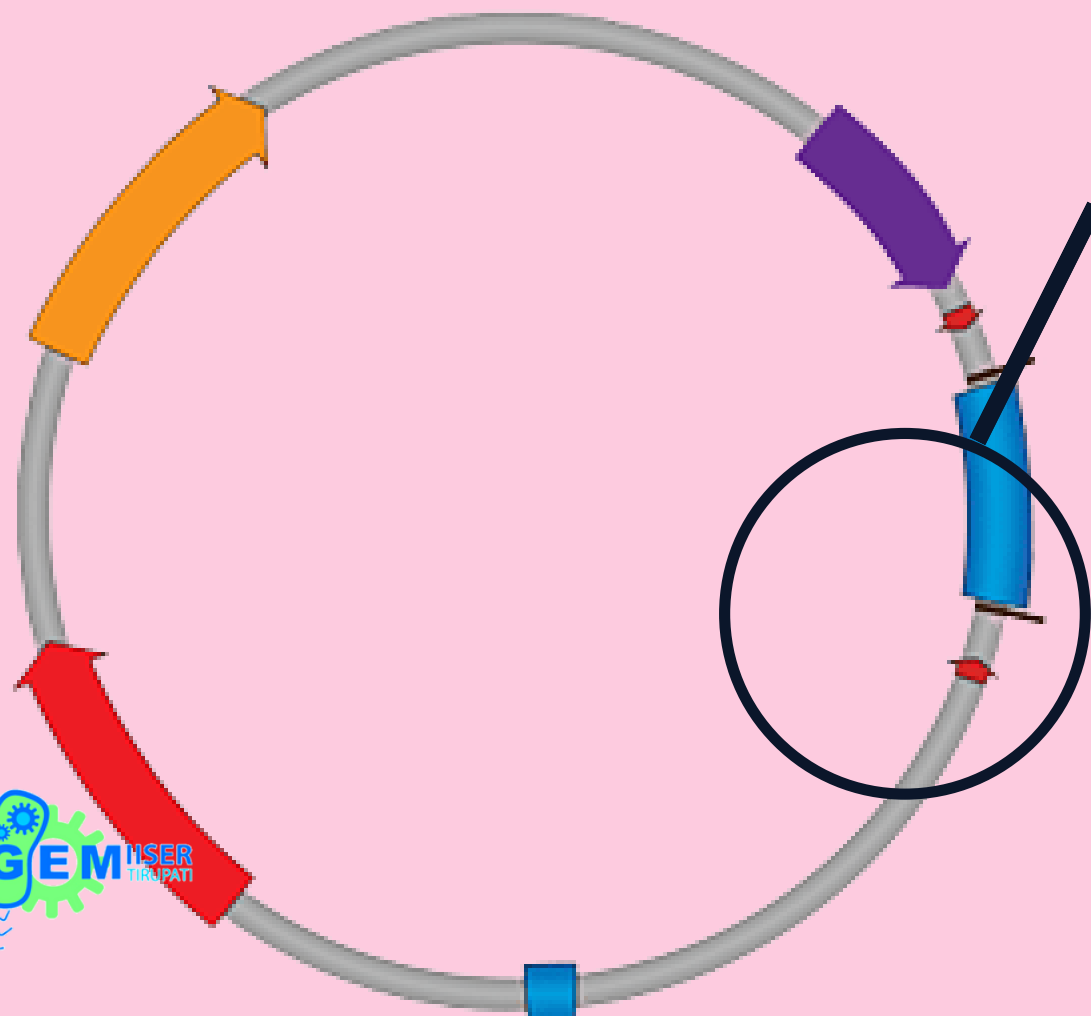
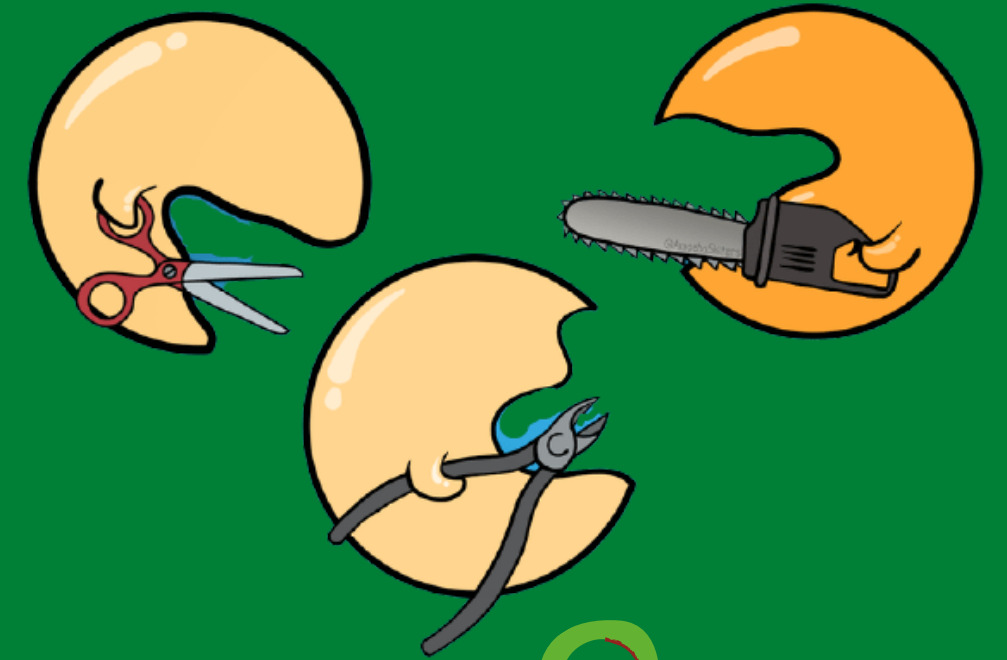
**EcoRI**



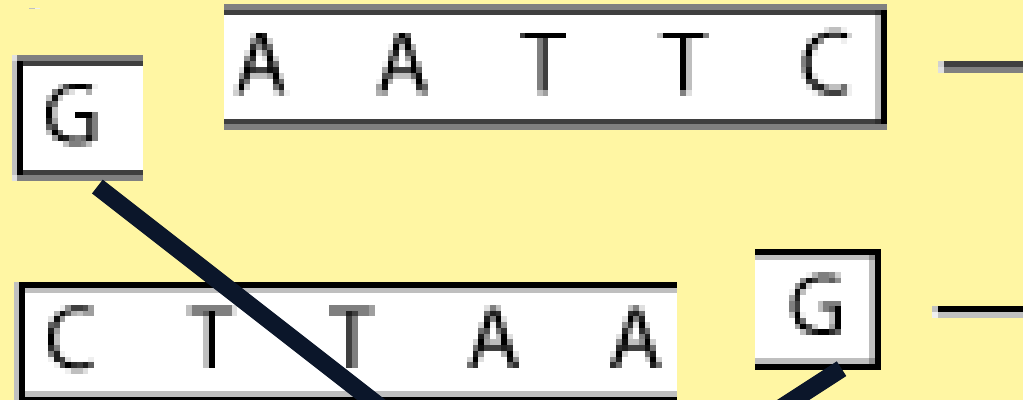
Sticky ends



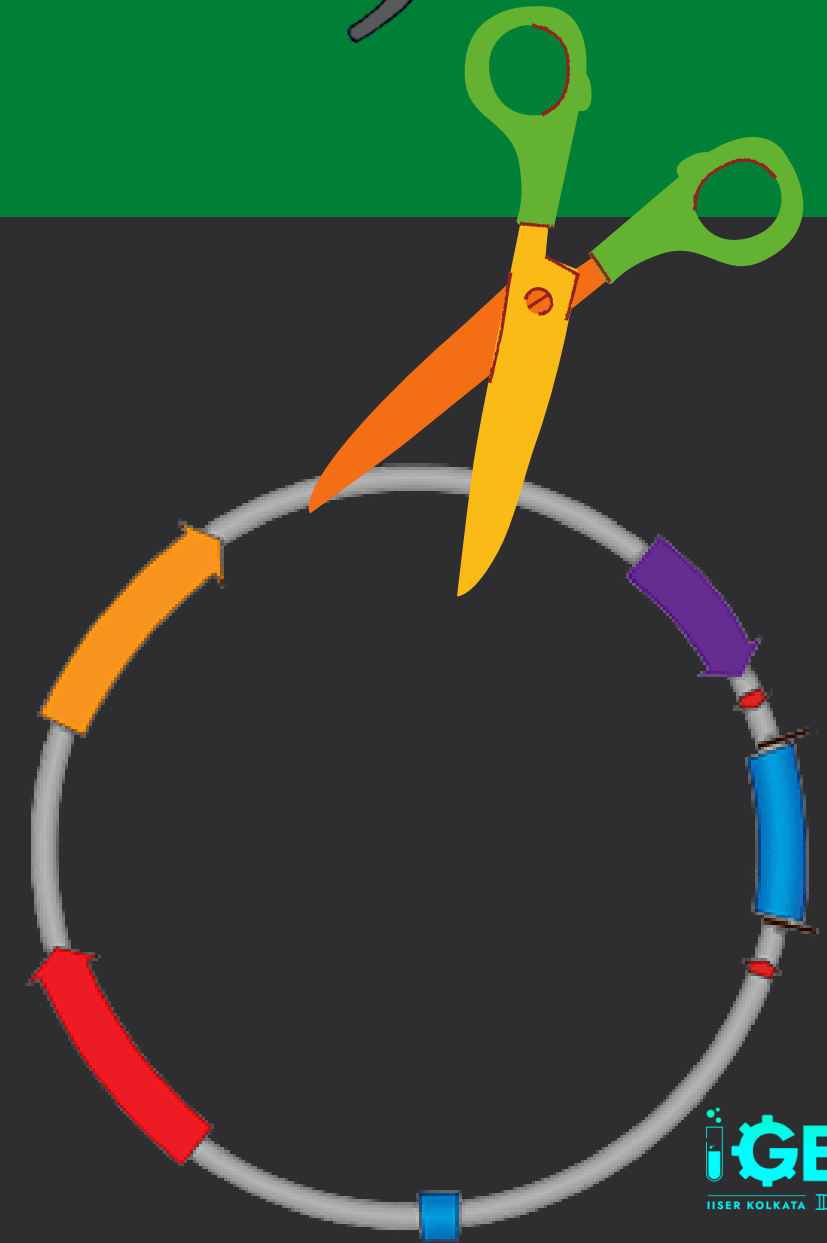
Restriction Enzymes

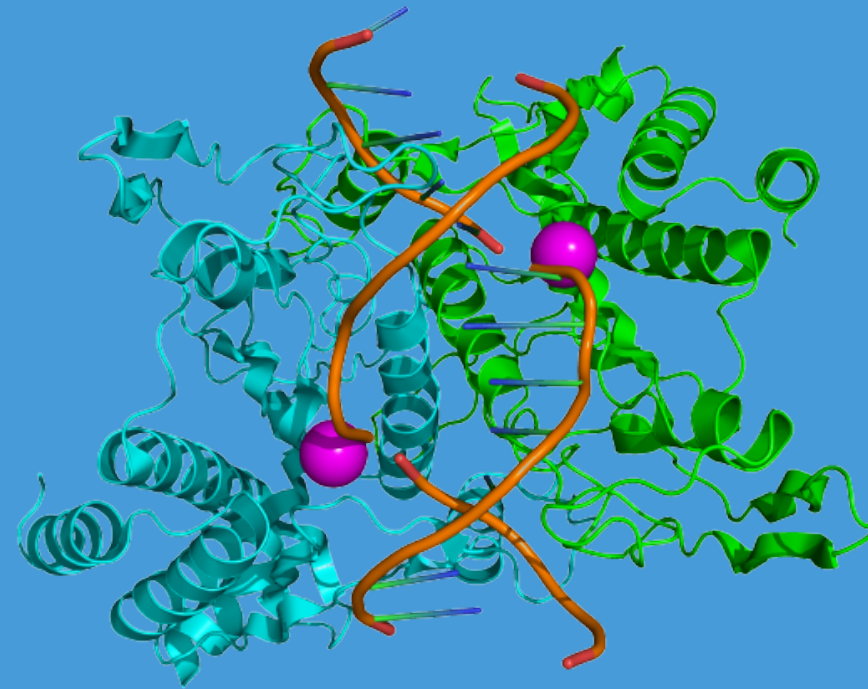


**EcoRI**

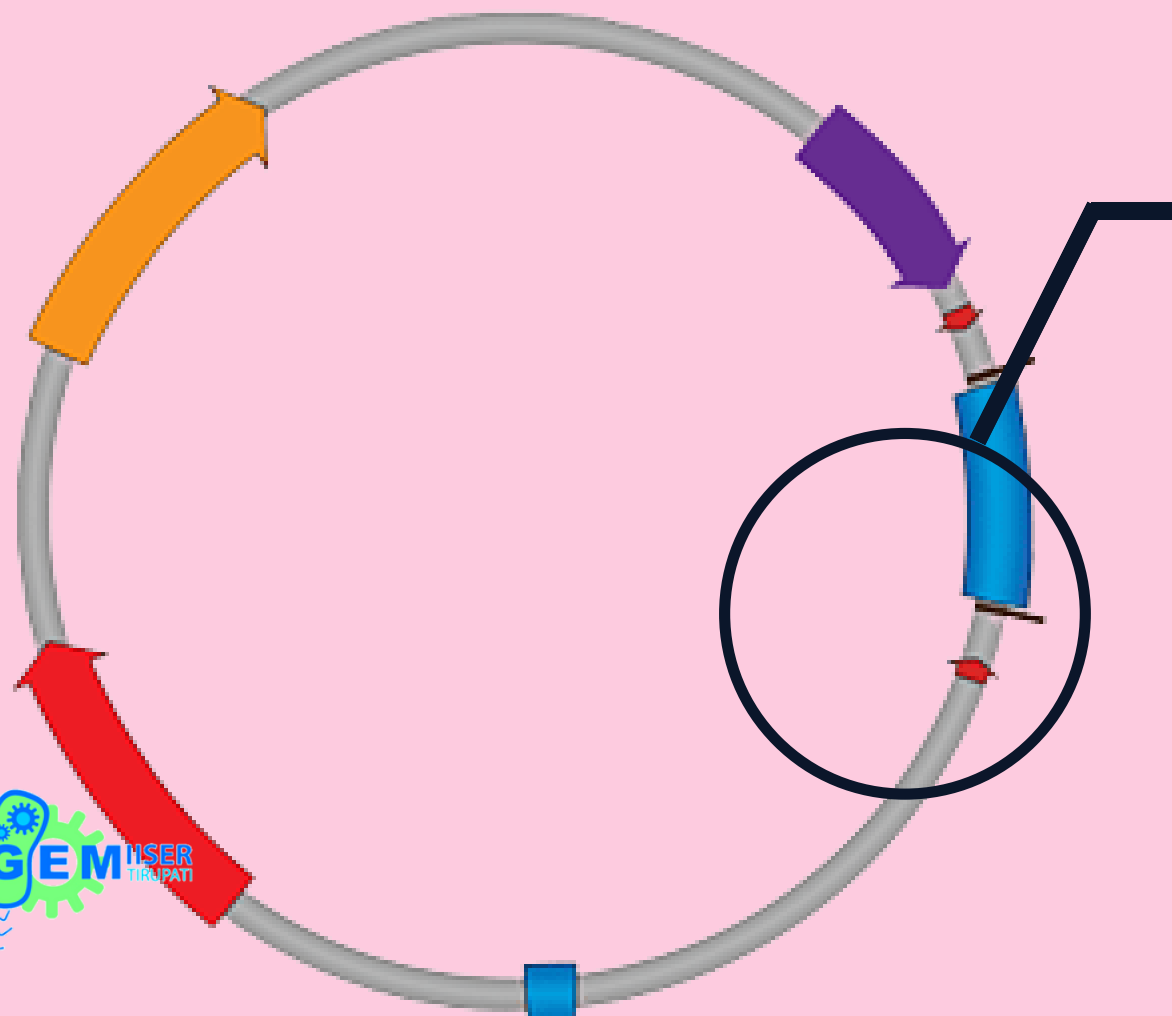
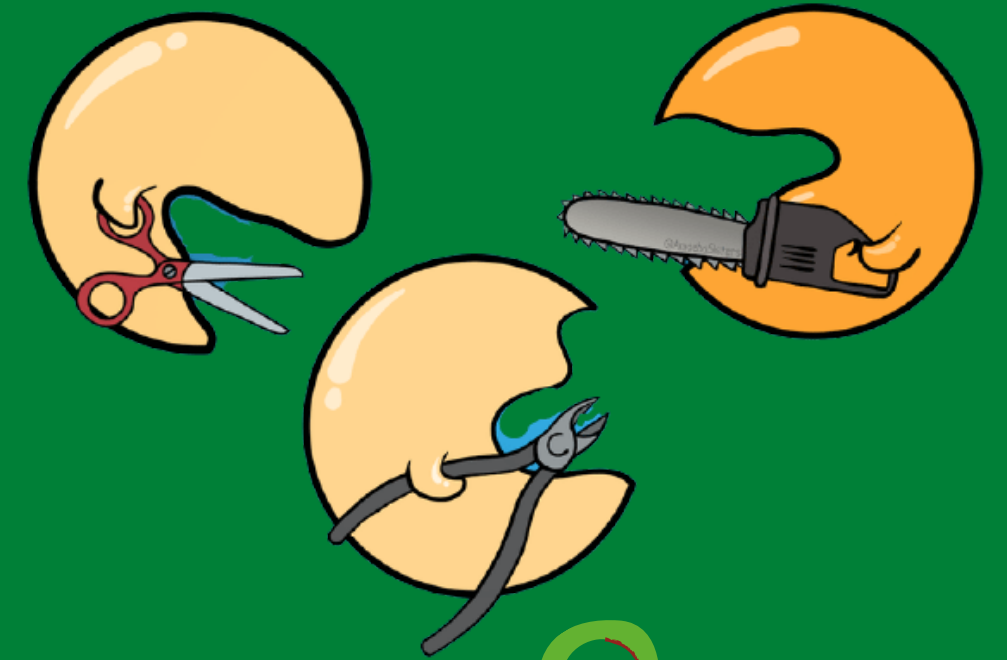


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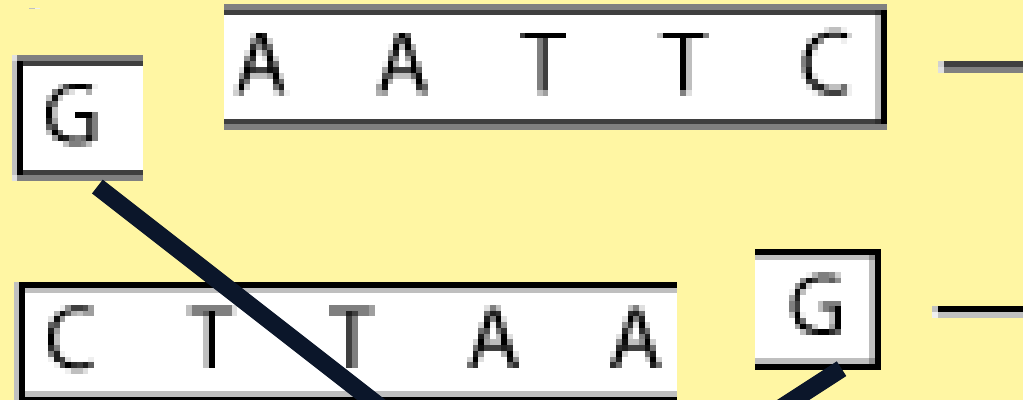




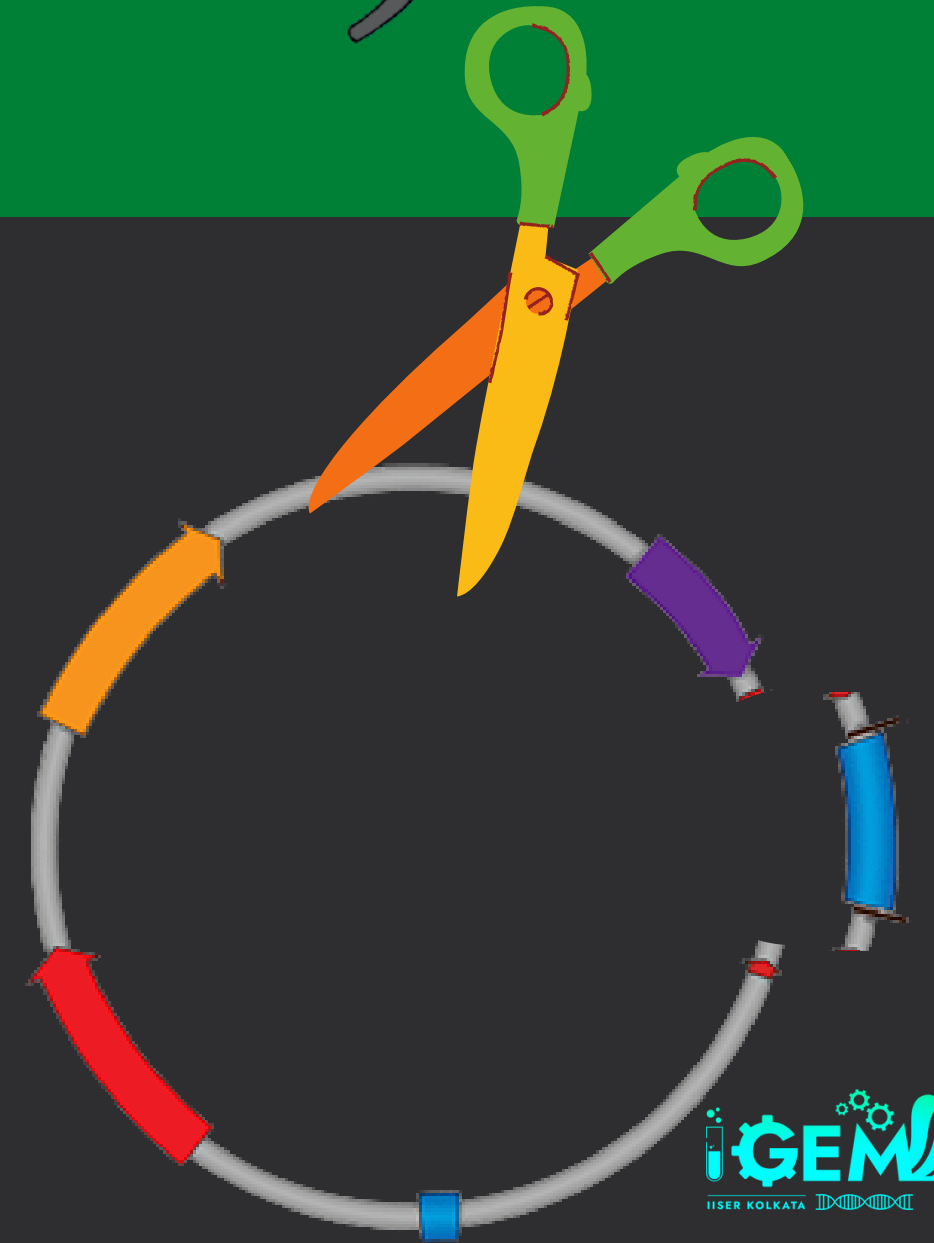
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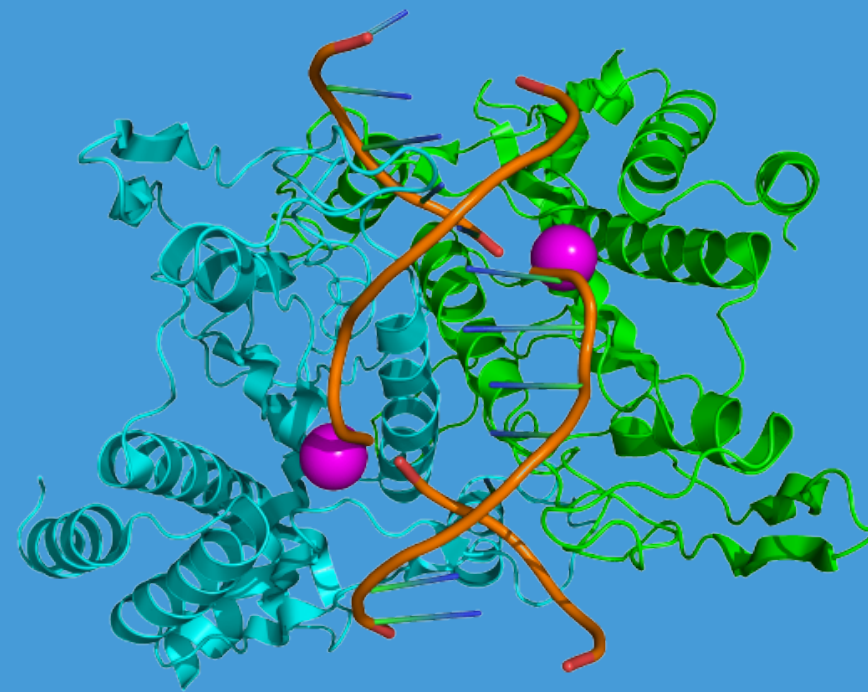


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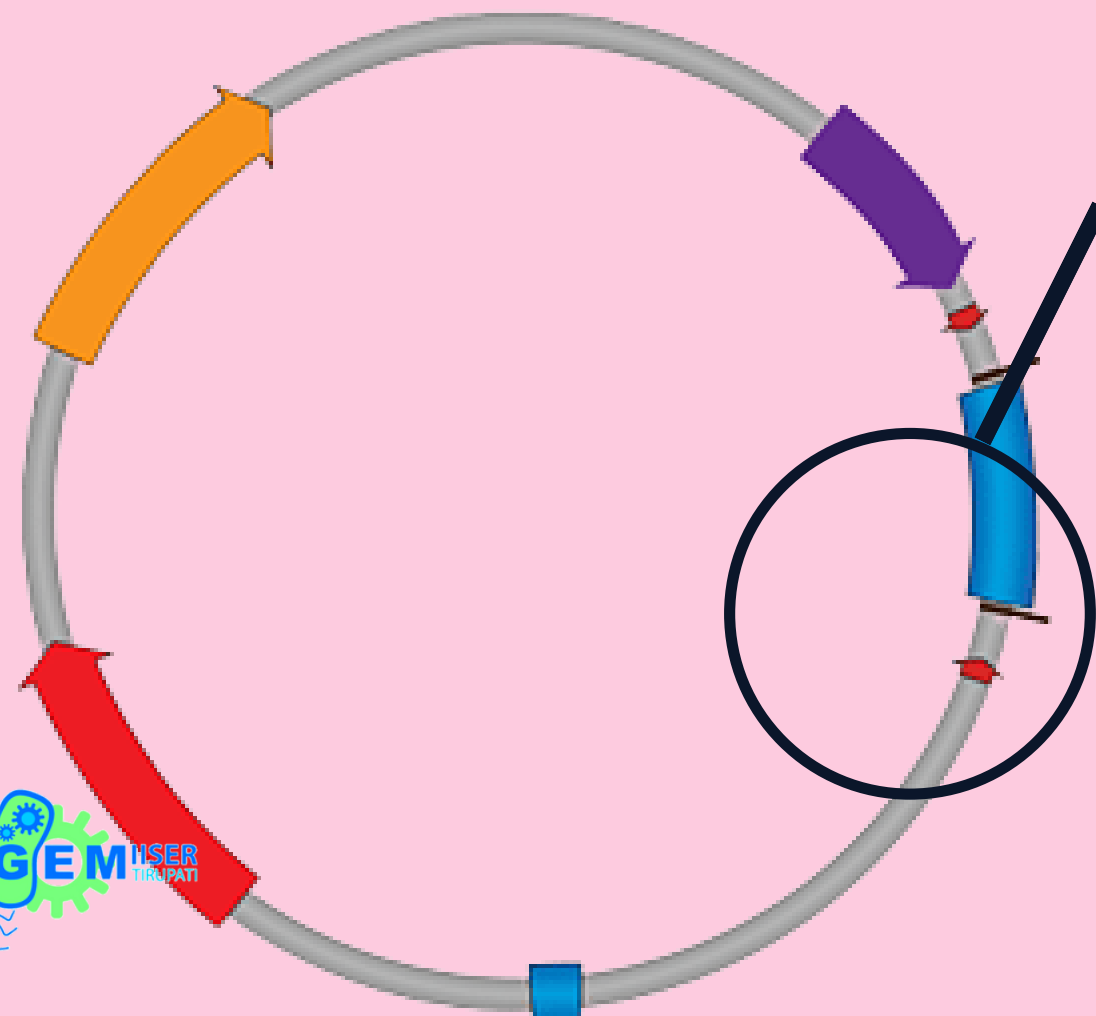
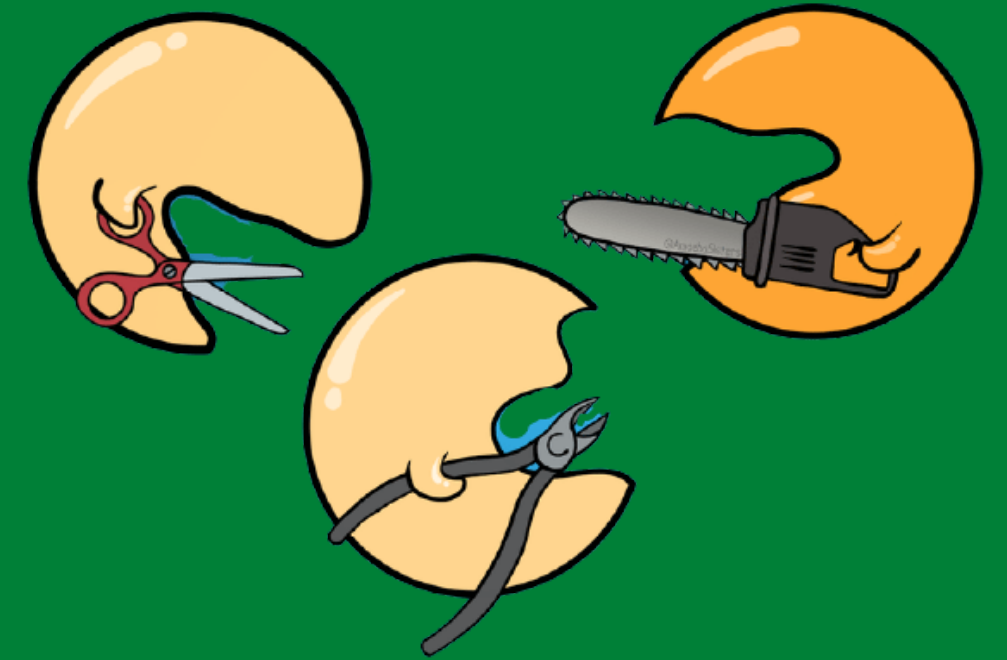


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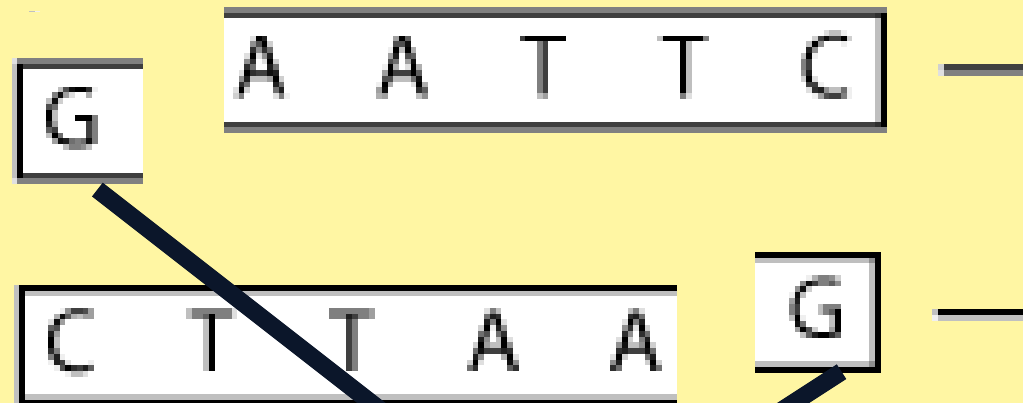




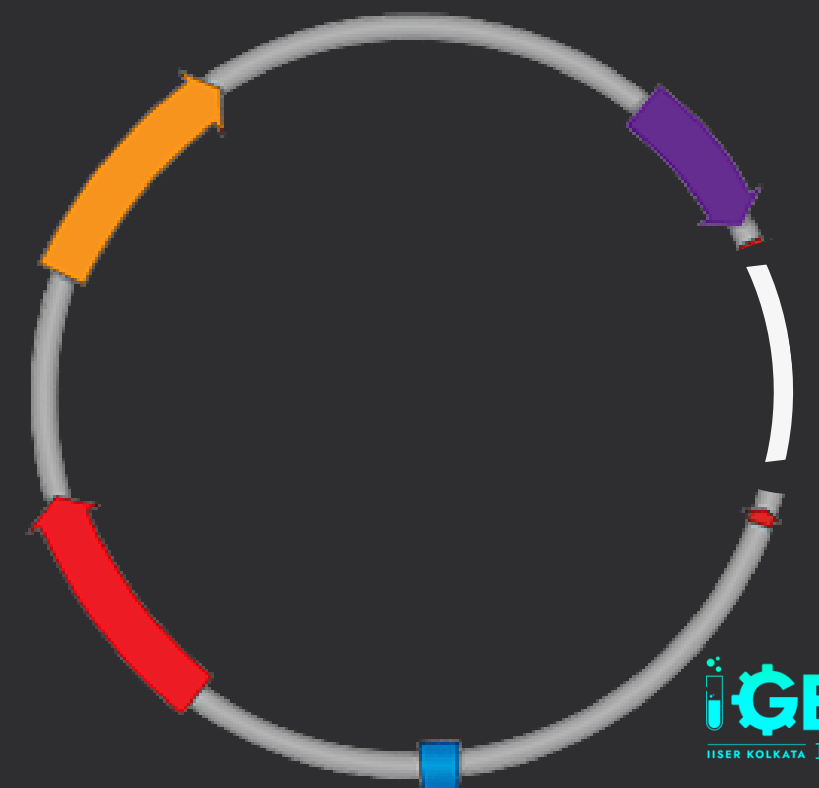
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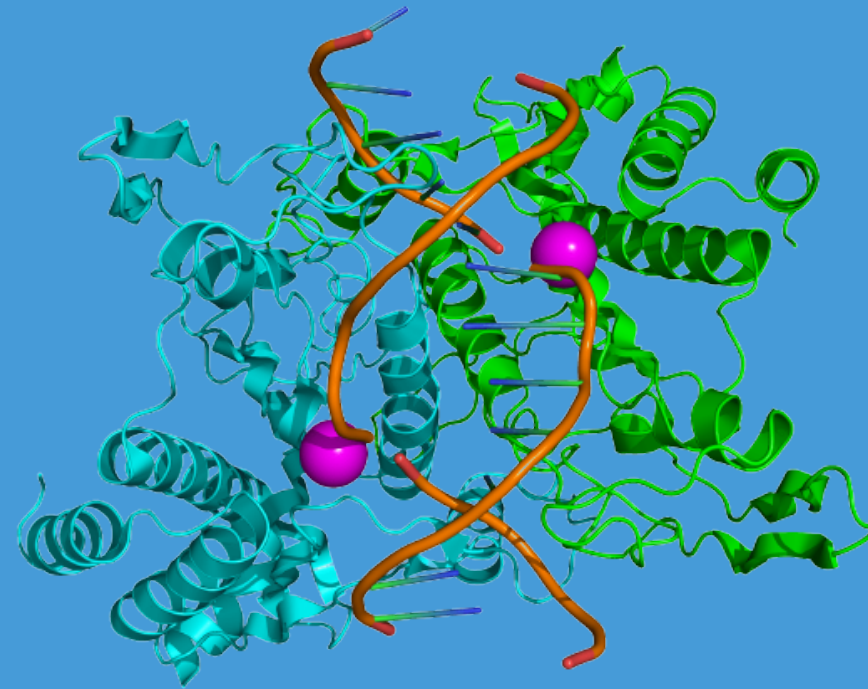


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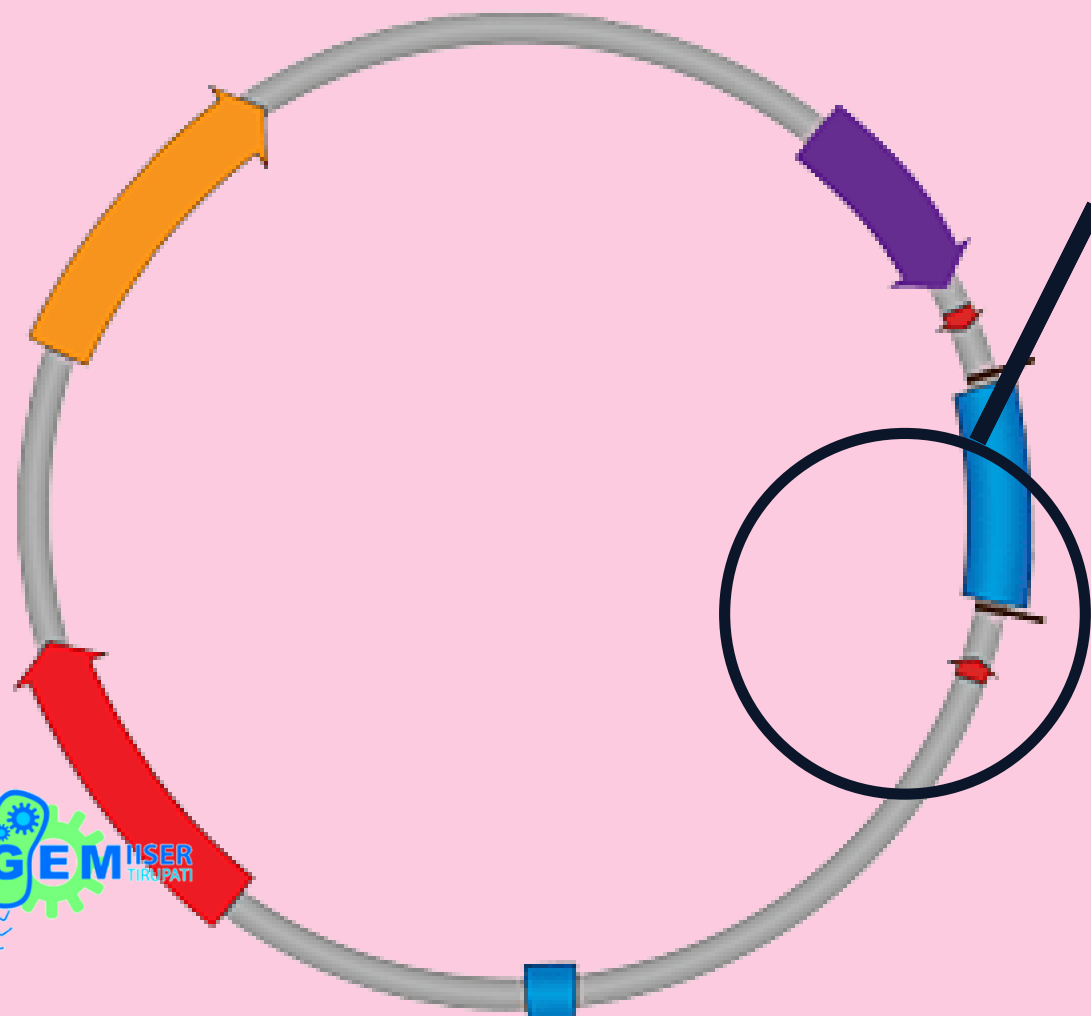
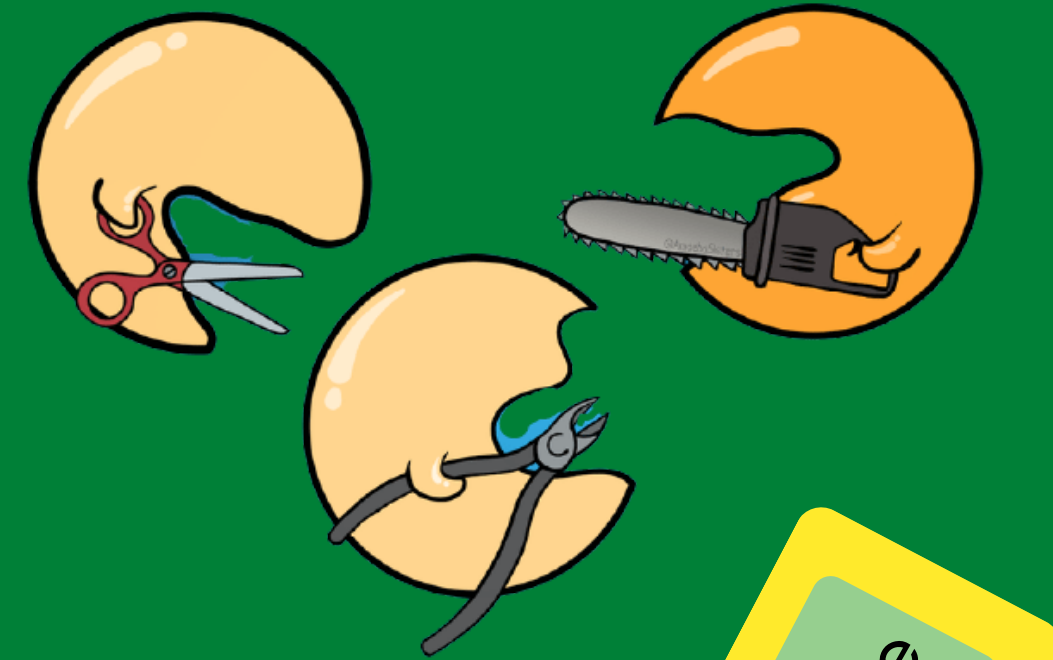


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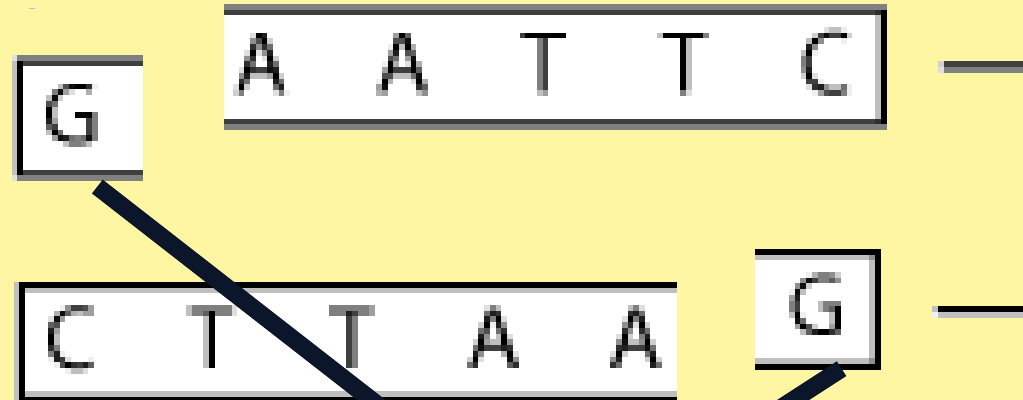




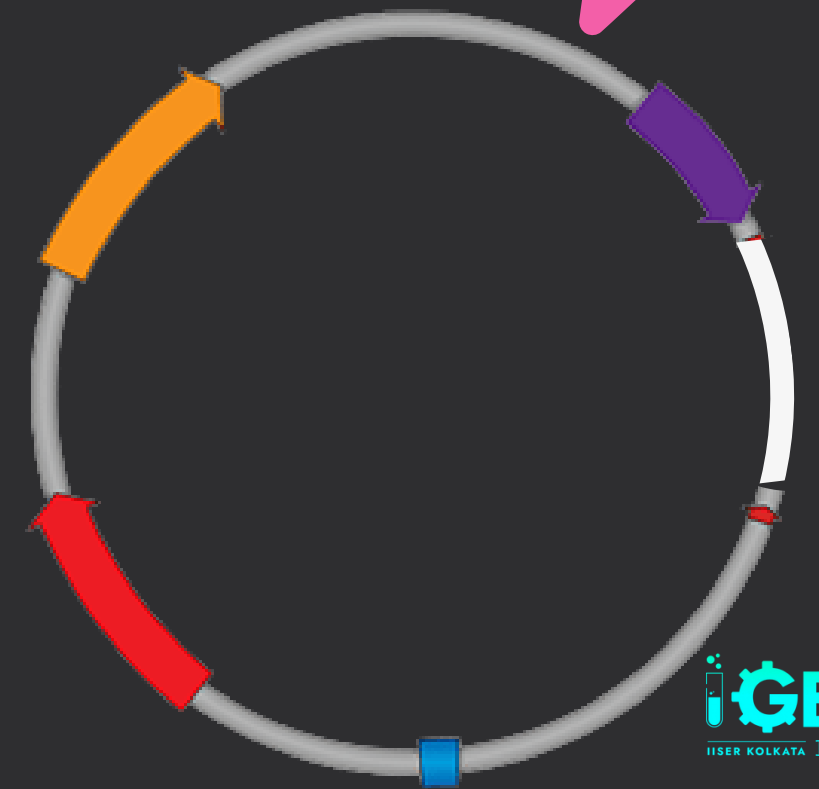
Restriction Enzymes

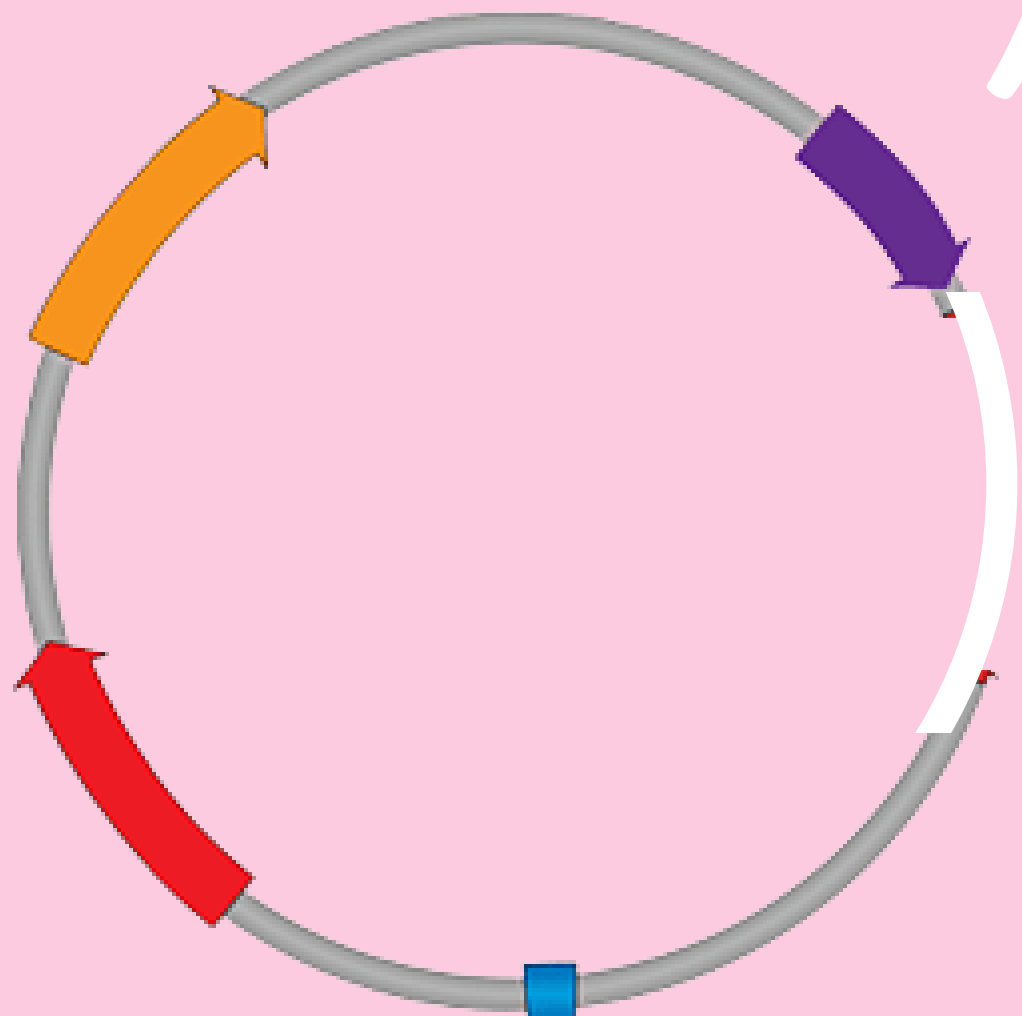


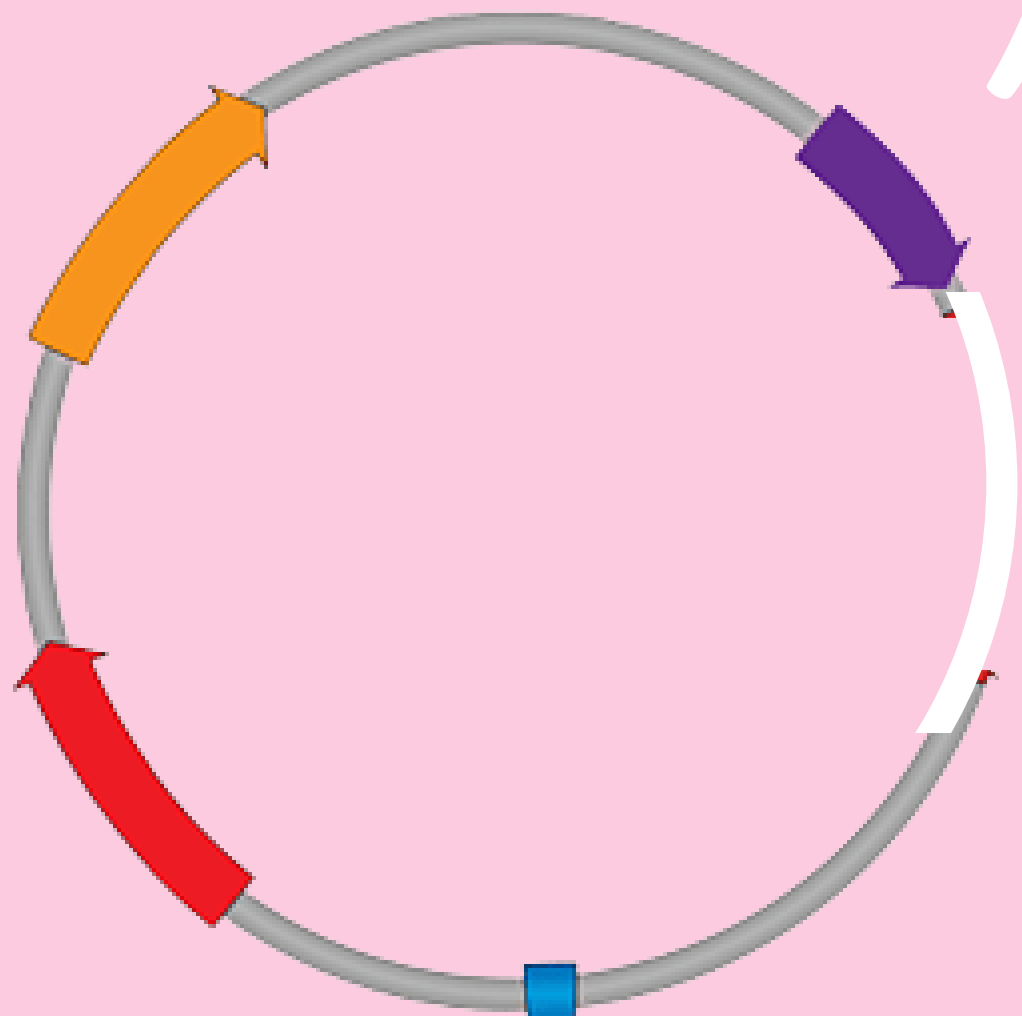
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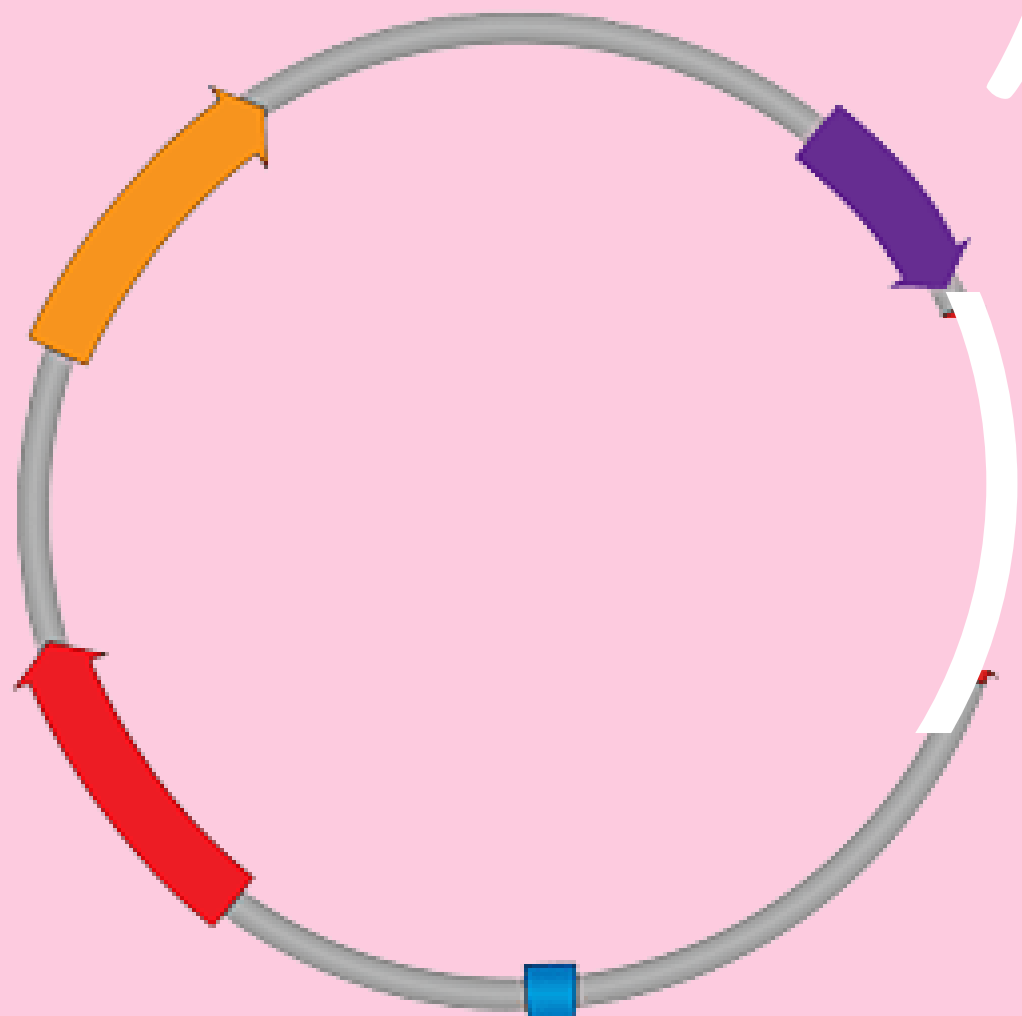
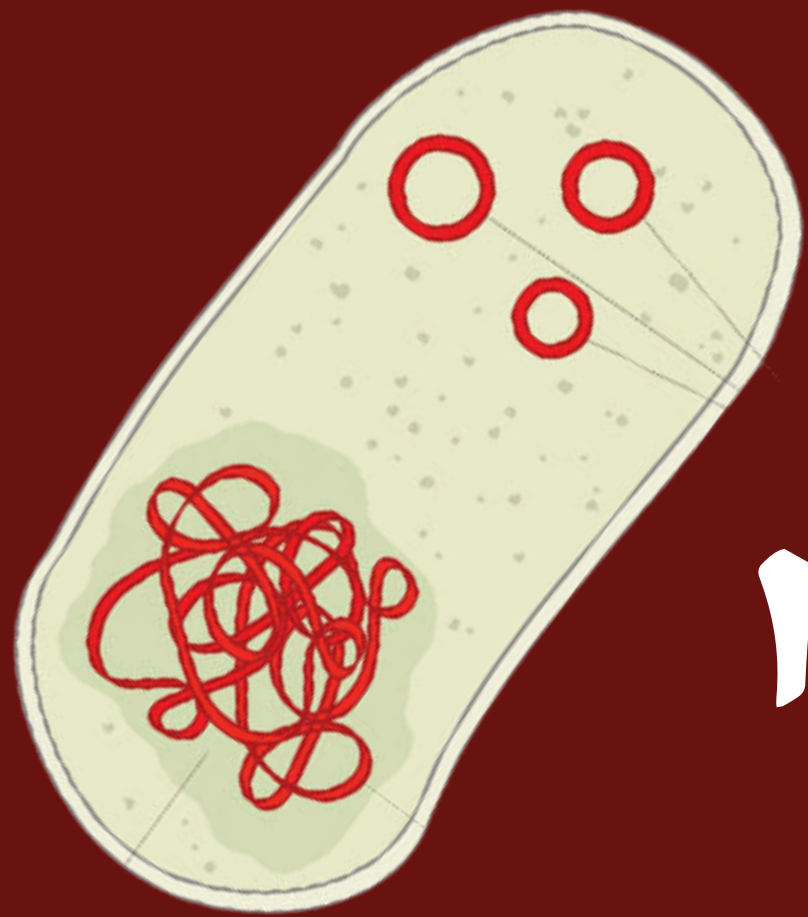


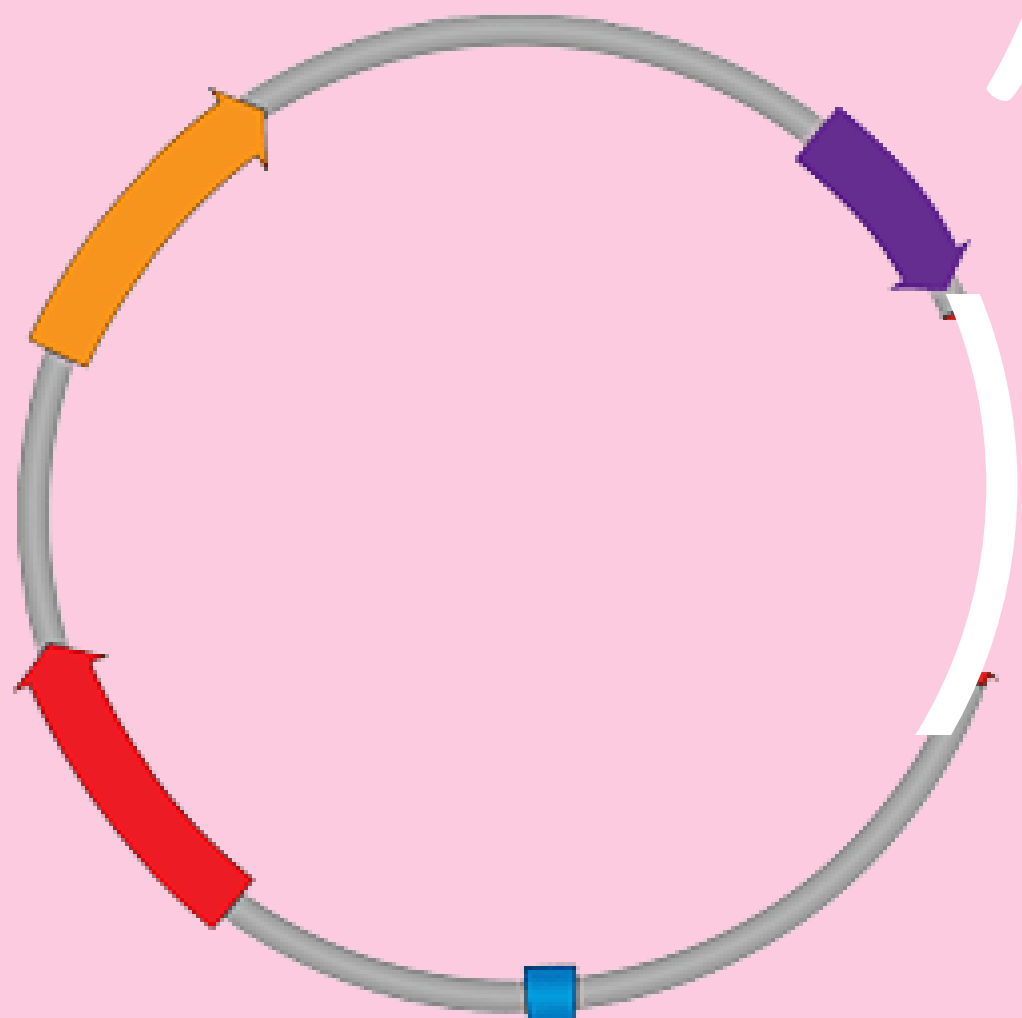
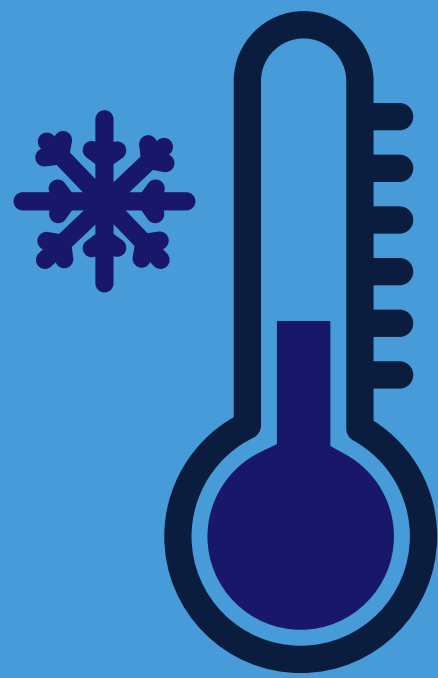
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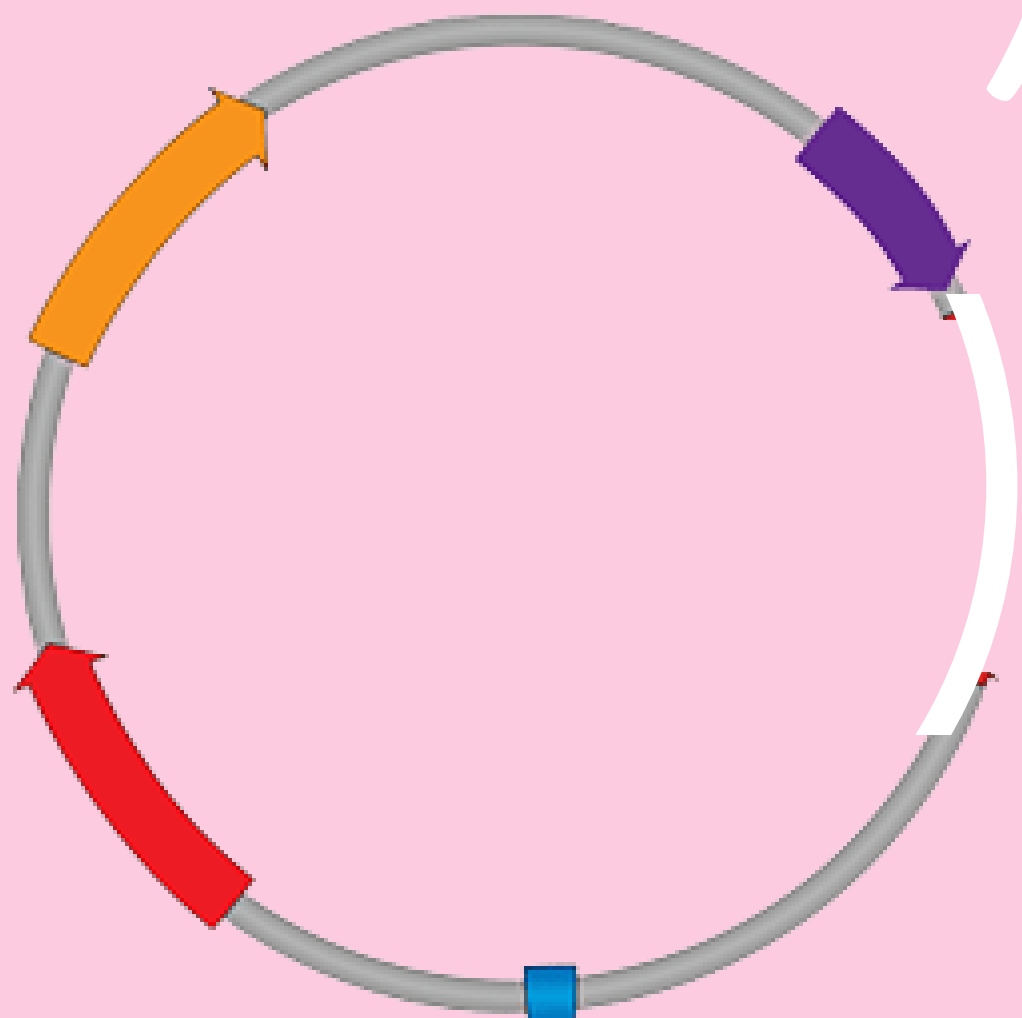
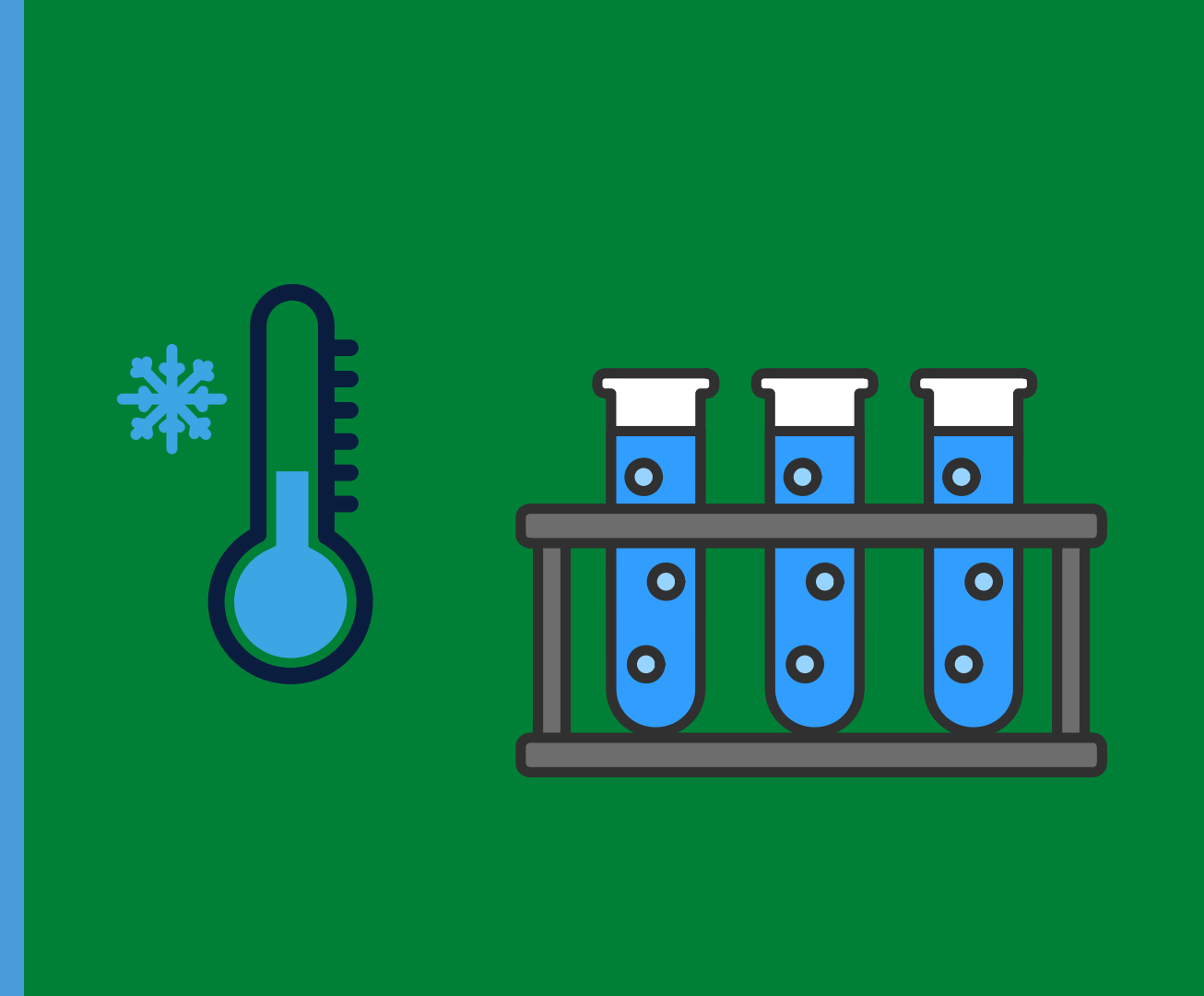
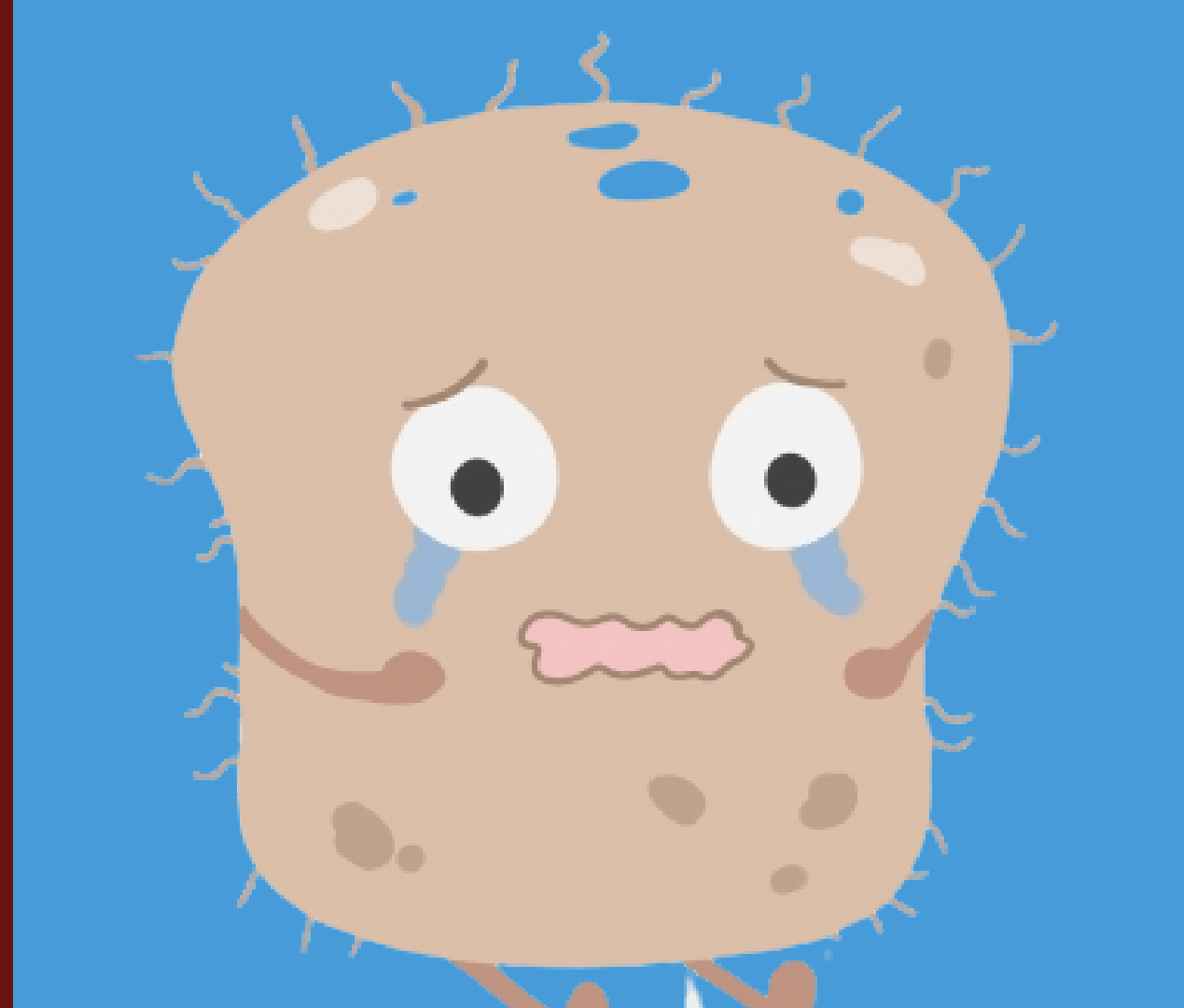
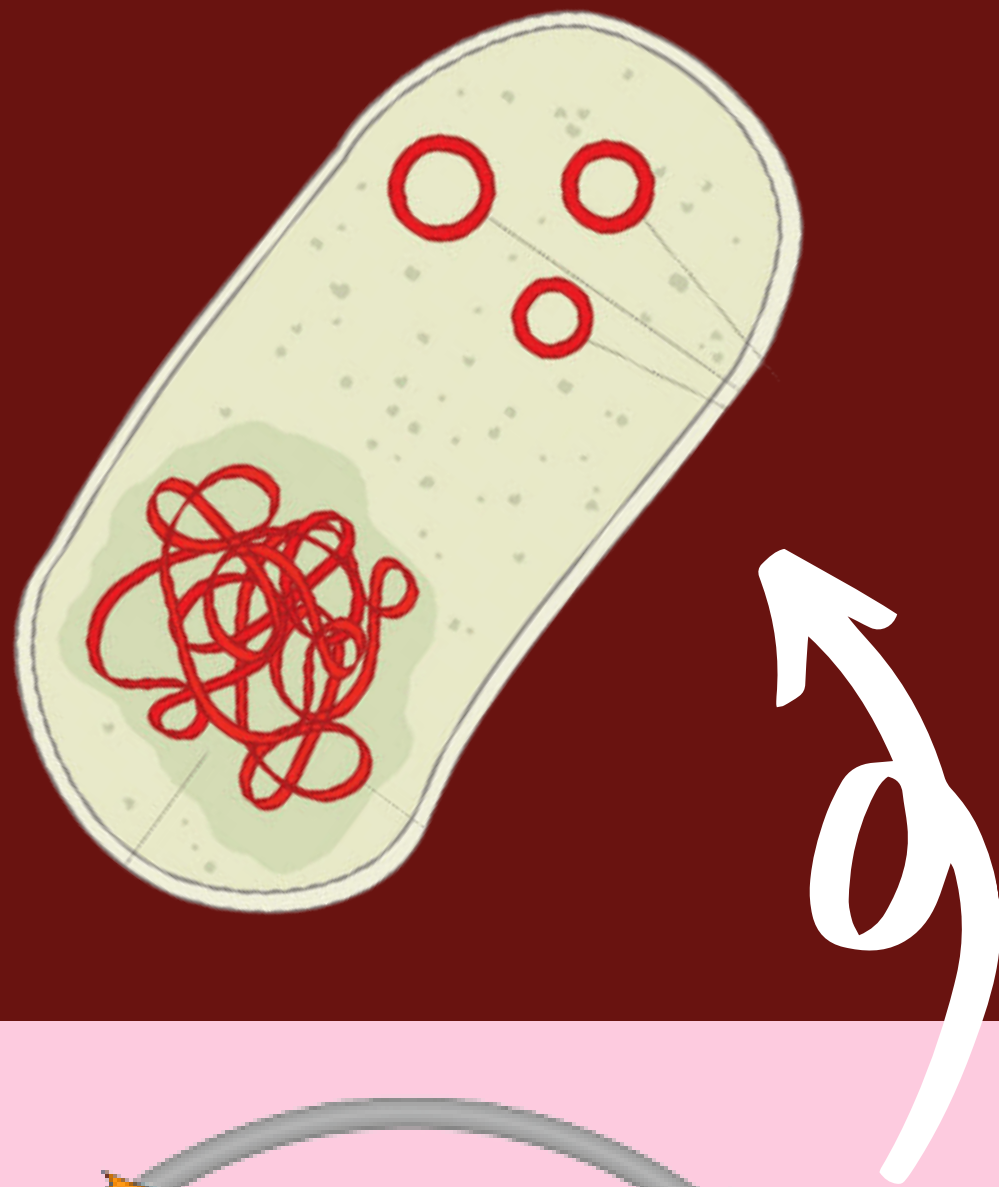




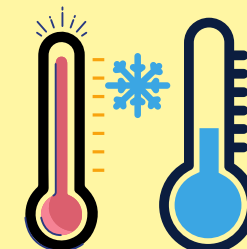
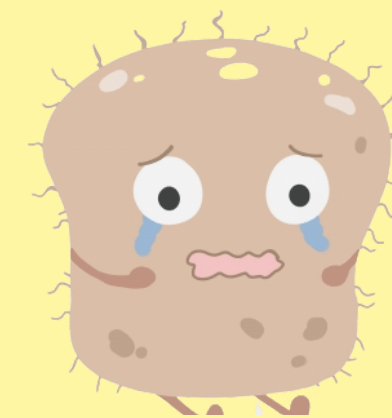
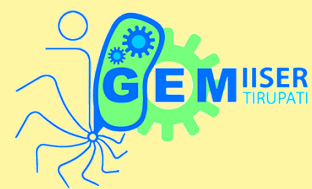


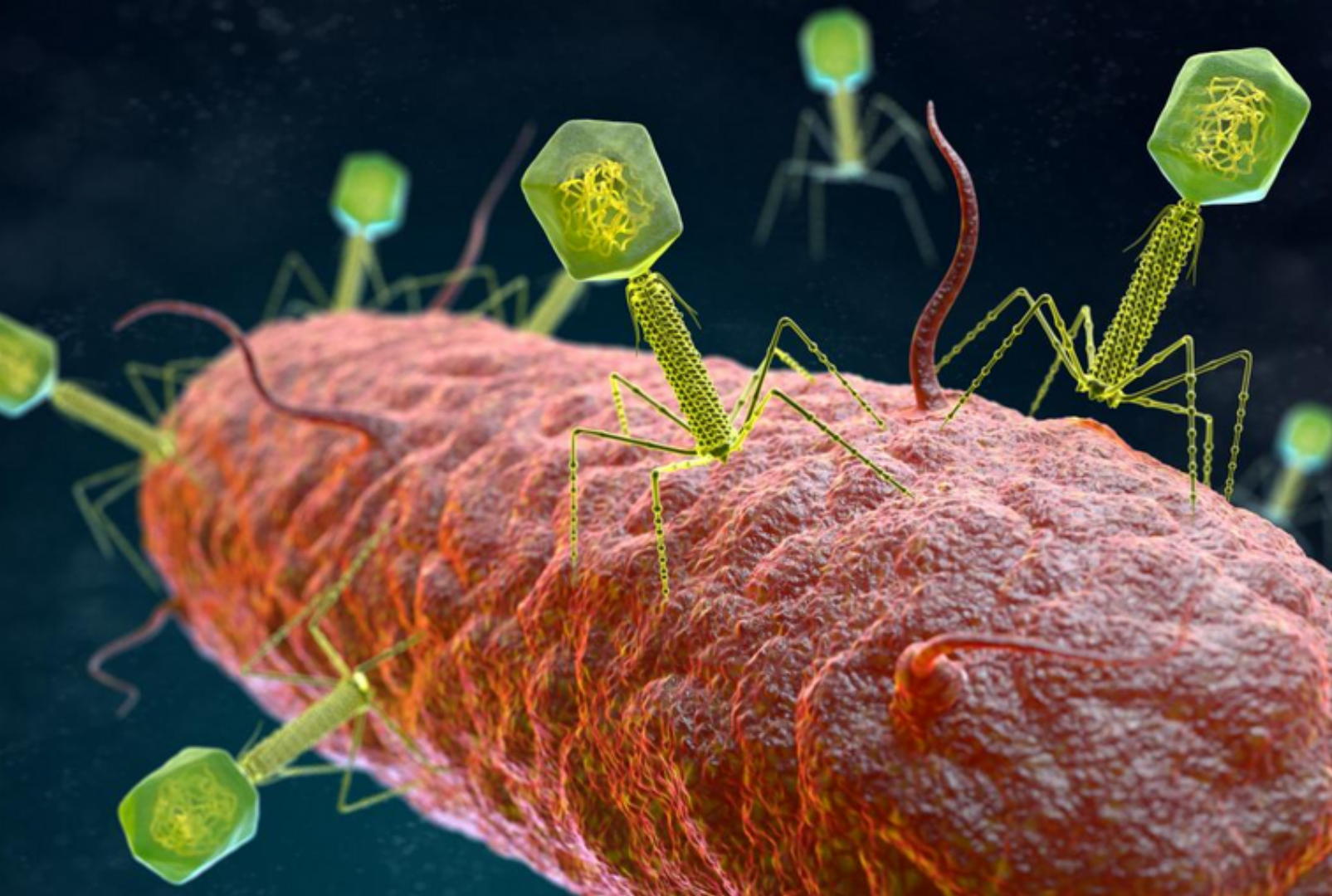






# Transformation

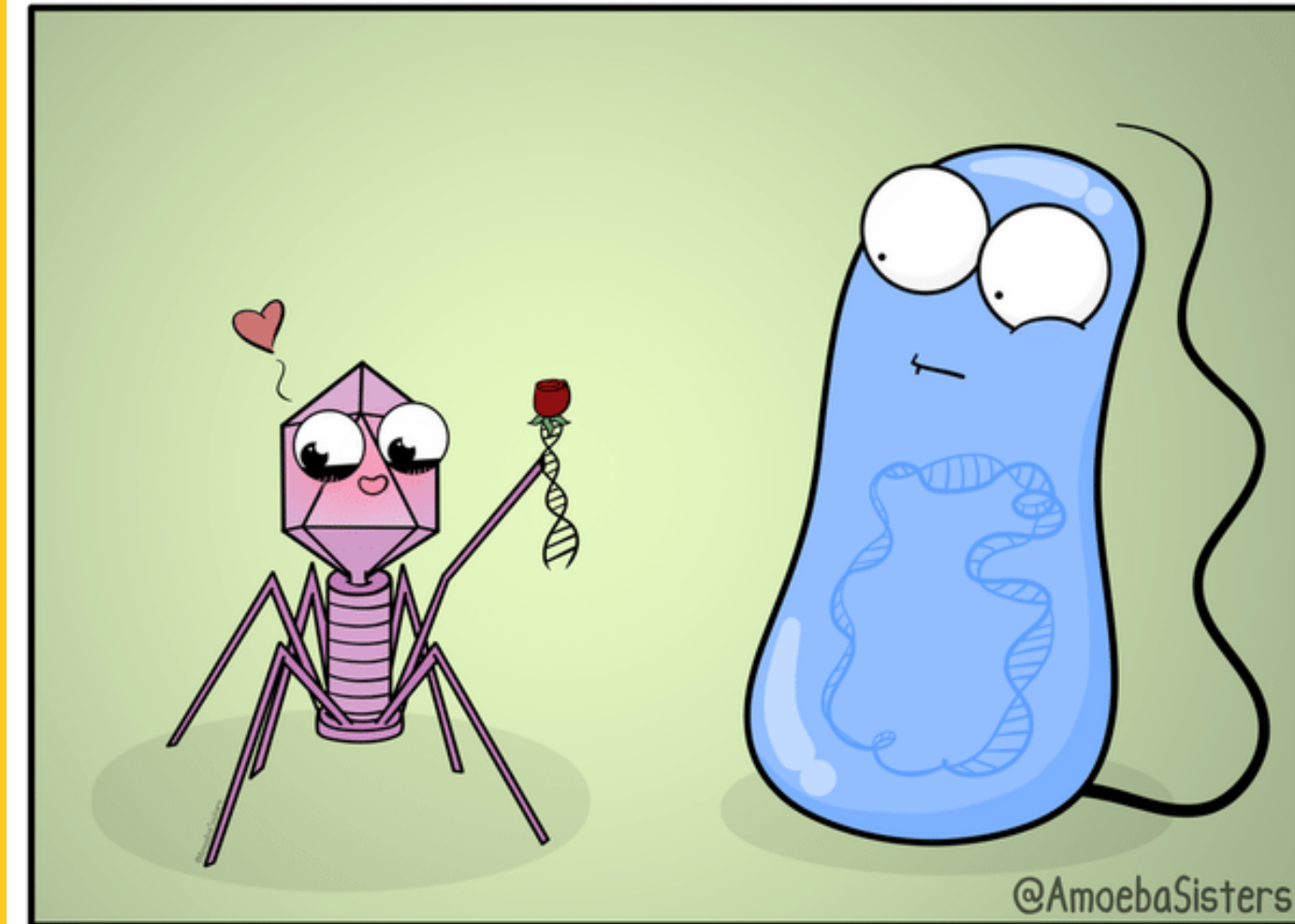




High efficiency

High level of replication and gene expression

Paramecium Parlor



Billy the bacterium had to quickly consider the etiquette for declining a bacteriophage's valentine.

# Transduction



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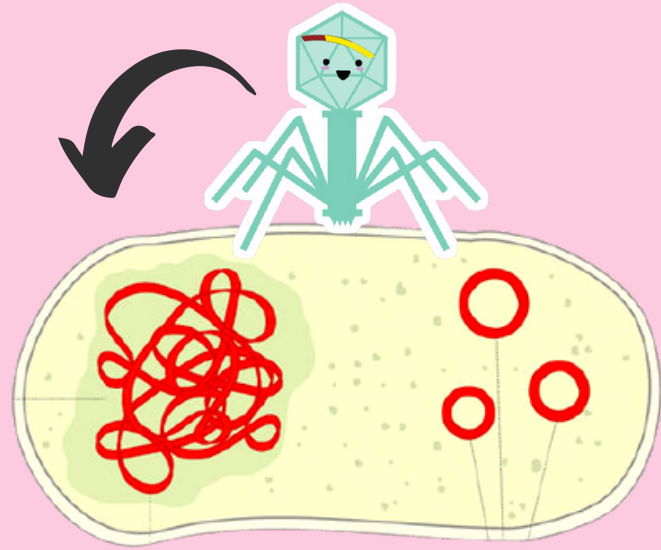
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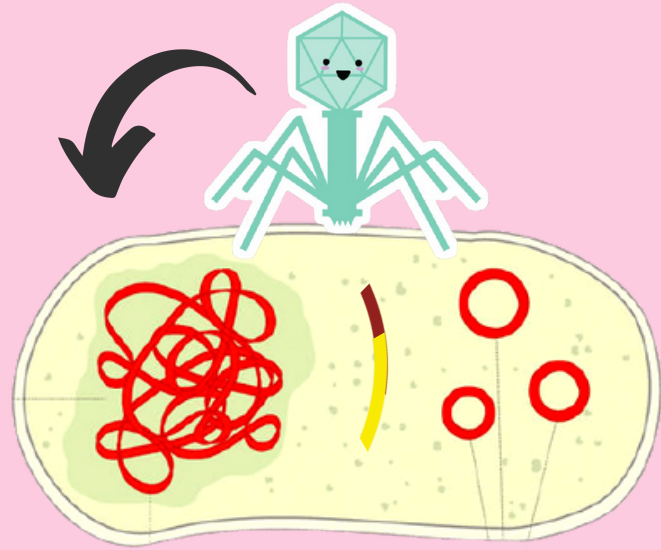
# Transduction





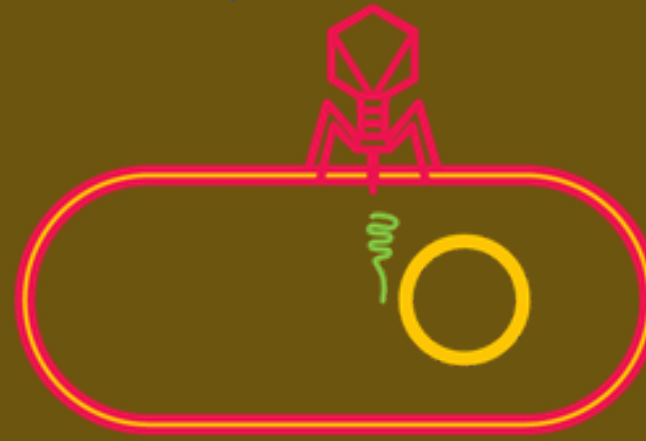
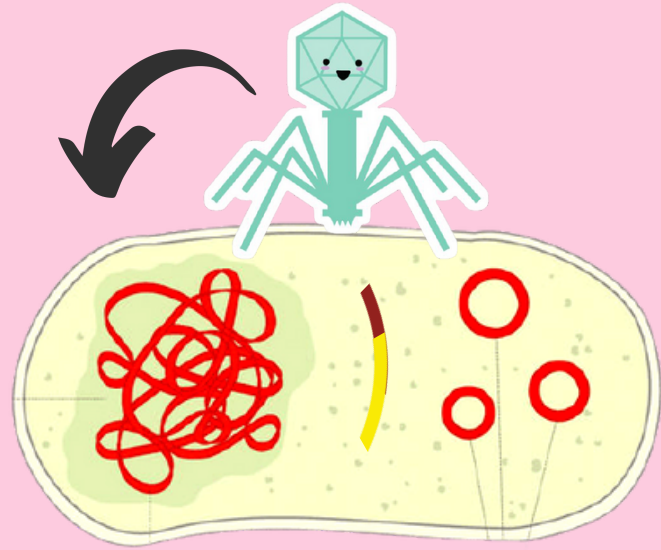
# Transduction





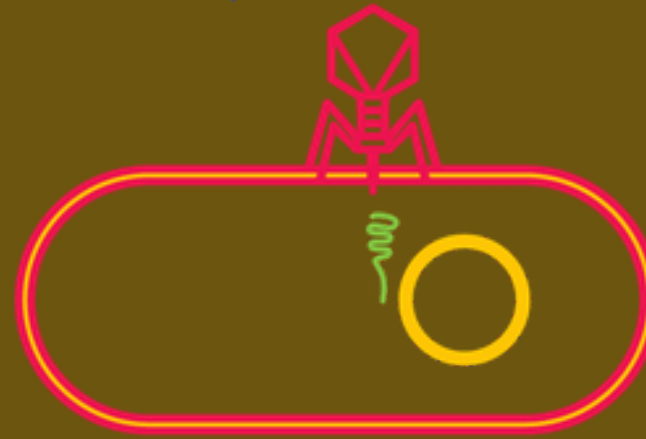
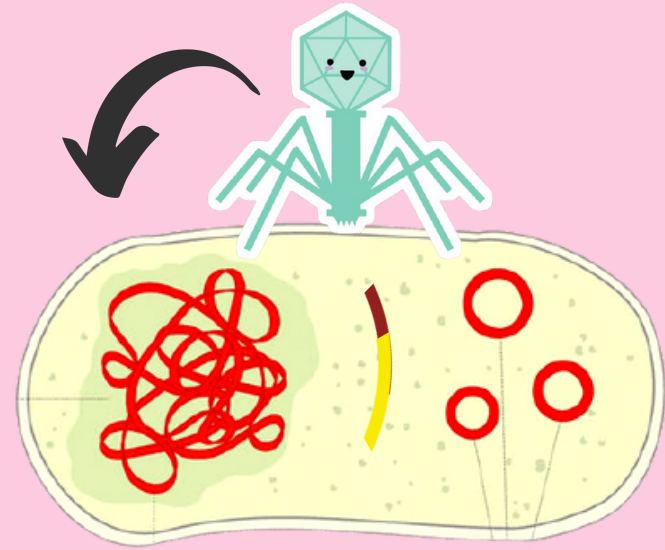
# Transduction



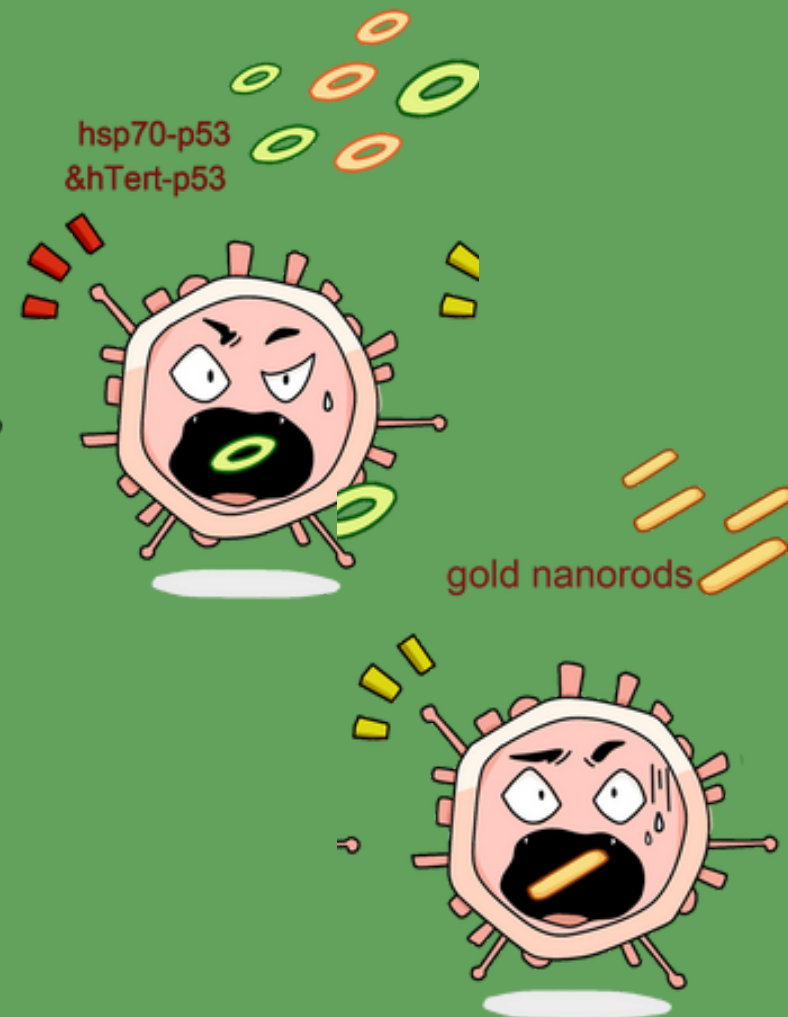
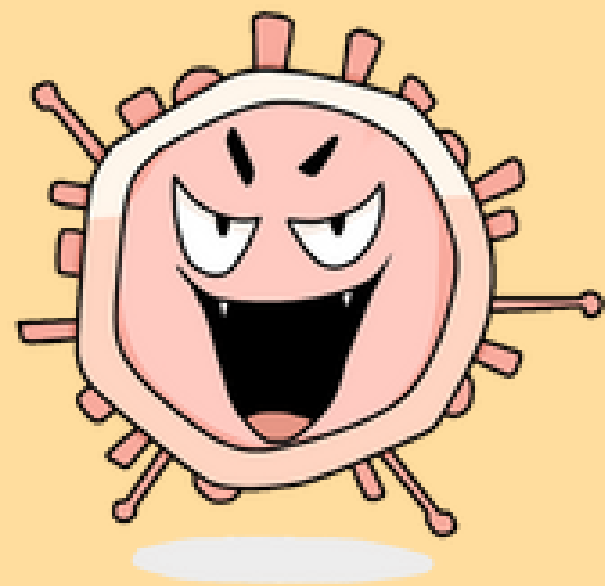


# Transduction





# Transduction

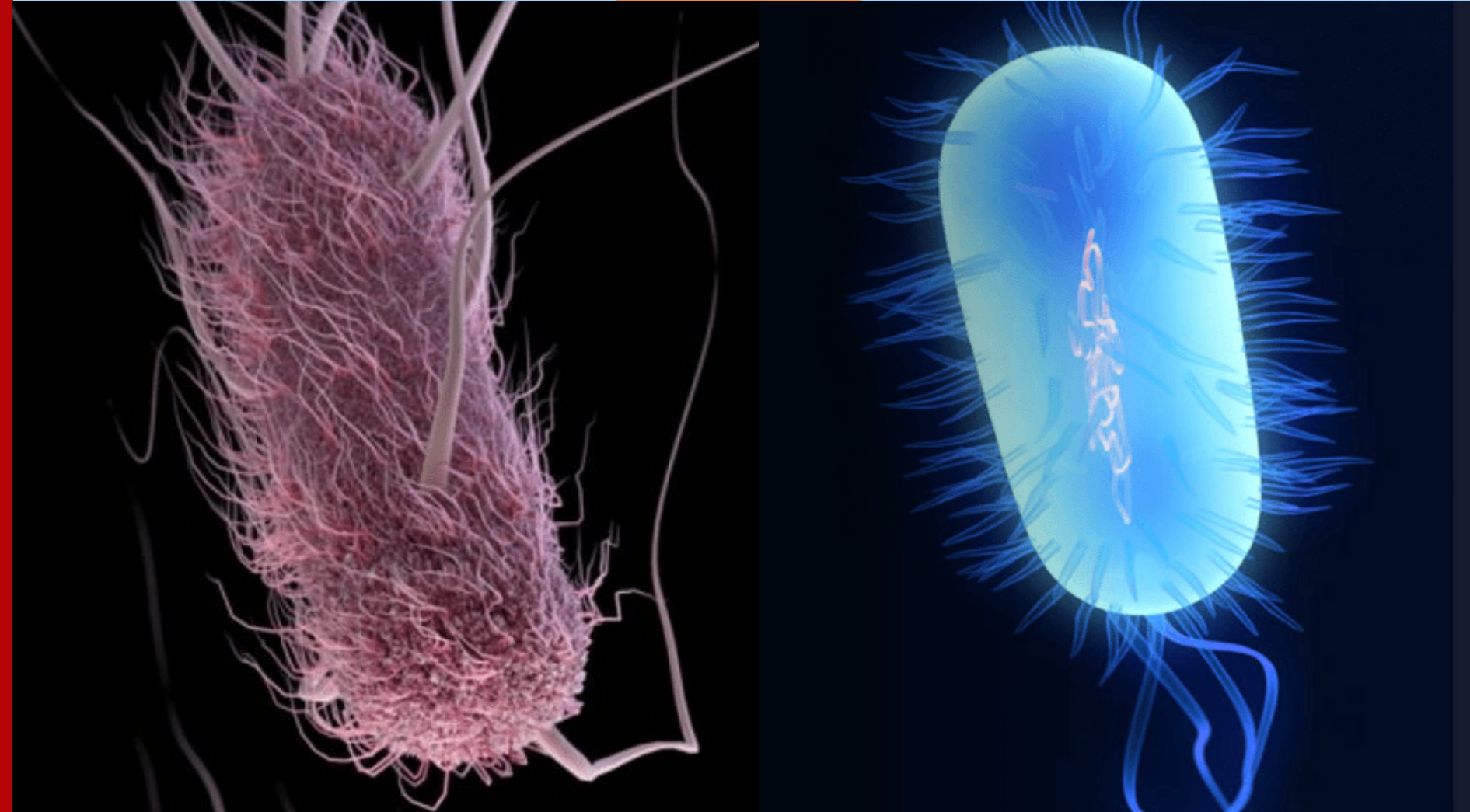


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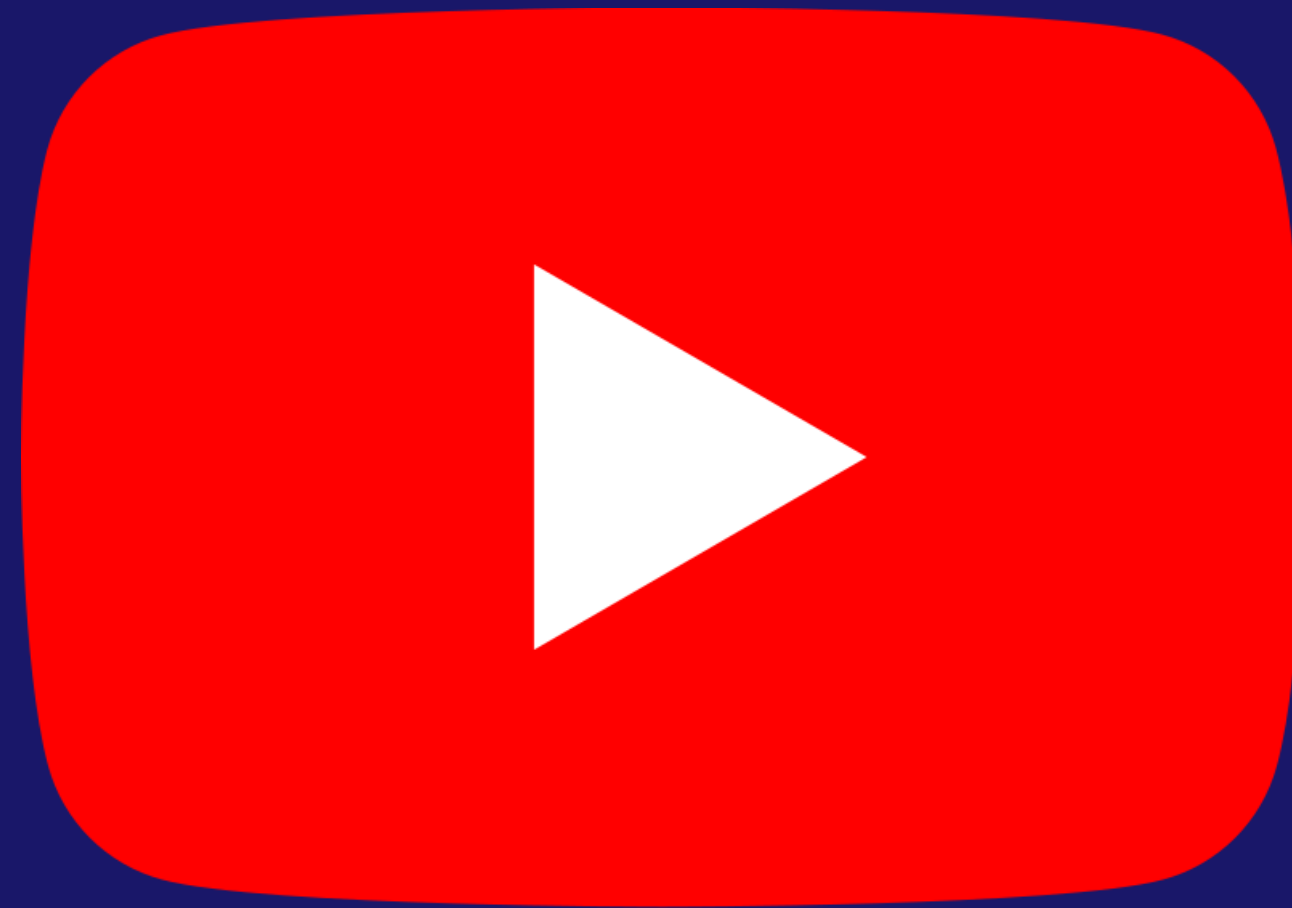




# Blue White Screening



# Blue White Screening




Source - [How to Perform Blue-White Screening](#)

EVERY  
THING  
CLONING  
VIDEO  
SERIES

# Blue- White Screening

Let's know about the Art of  
Genetics in a funny way!!





**SCIENCE  
WITH TOM**

**PRESENTS**

**Thank You for listening!**  
**Let's move on to the**  
**Activity Section...**

# SYN-BIO LEGO

## LET'S BUILD A PLASMID

PLASMID LOADING...



I LOST MY PLASMID,  
CAN U HELP ME  
BUILD ONE?

# SYN-BIO LEGO

## LET'S BUILD A PLASMID

PLASMID LOADING...



of course,  
by now,  
I know some basic  
concepts!  
So, shall we begin?

I Lost my plasmid,  
can u help me build  
one?



# SYN-BIO LEGO

LET'S BUILD A PLASMID



# SYN-BIO LEGO

## LET'S BUILD A PLASMID

PLASMID LOADING...



Yeah,  
that will help!

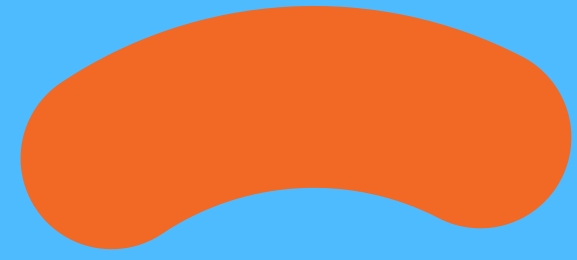
I will share with  
you some  
memories of the  
different regions  
of my plasmid.



# SYN-BIO LEGO

LET'S BUILD A PLASMID

THIS REGION  
HELPED ME  
GROW MORE  
PLASMIDS ?



**ORI**



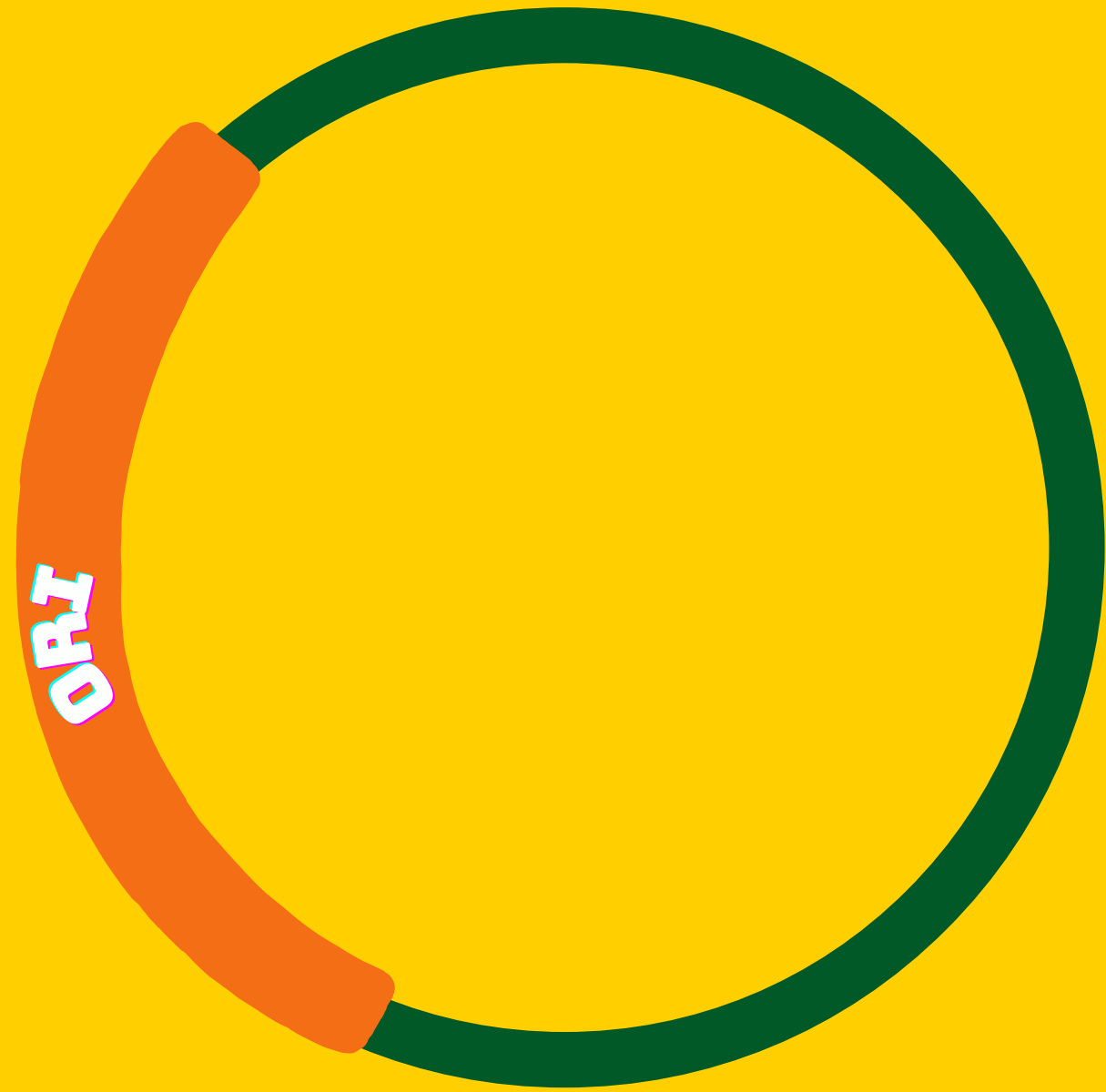
**PROMOTER**



**RESTRICTION SITES**

# SYN-BIO LEGO

LET'S BUILD A PLASMID



**PROMOTER**



**RESTRICTION SITES**

# SYN-BIO LEGO

LET'S BUILD A PLASMID

THIS REGION  
HELPS YOU KNOW  
WHETHER I  
CARRY A  
PLASMID

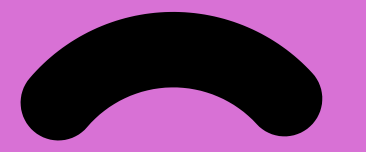


**ORI**

**PROMOTER**

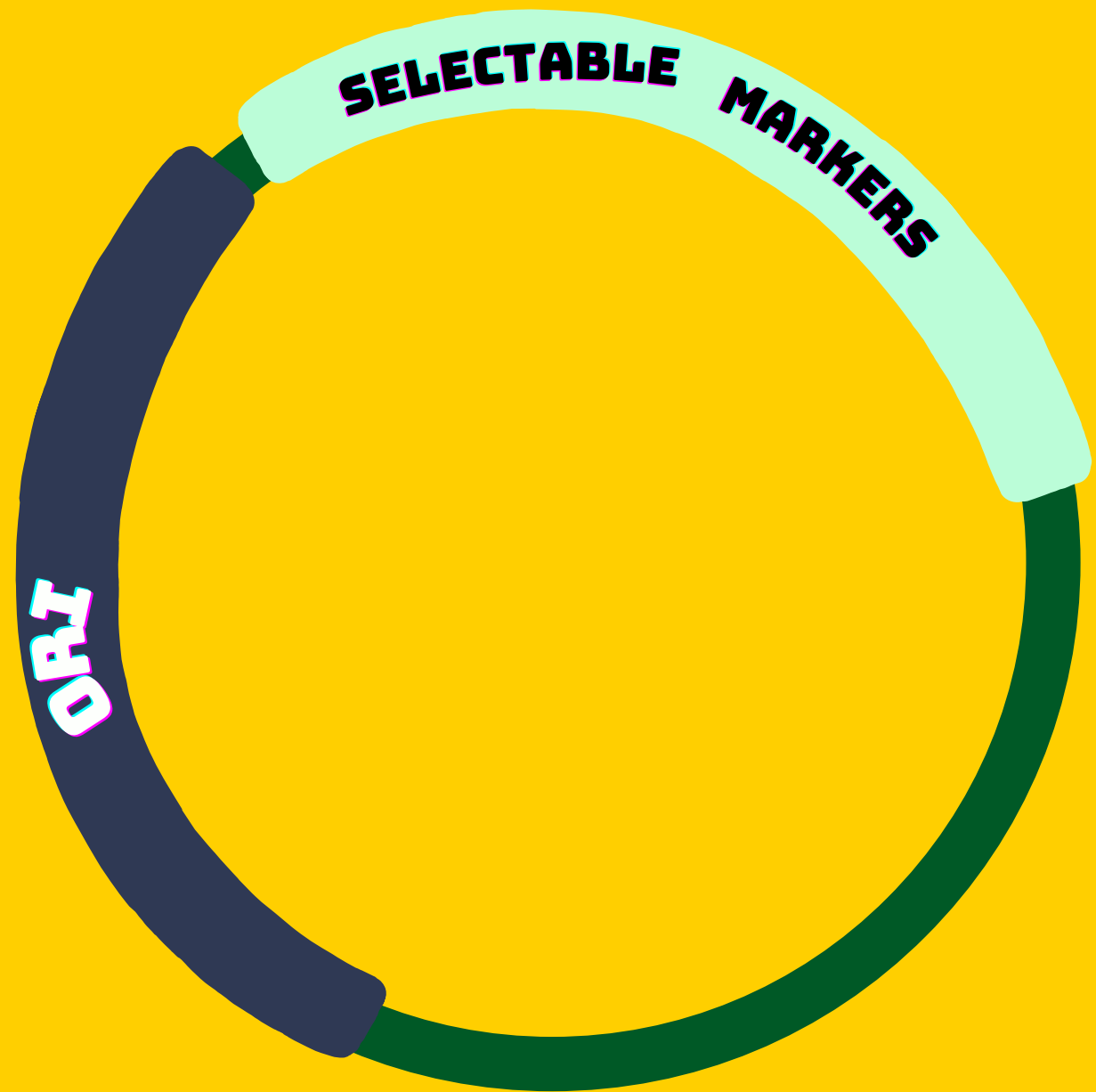
**SELECTION MARKER**

**RESTRICTION SITES**



# SYN-BIO LEGO

LET'S BUILD A PLASMID

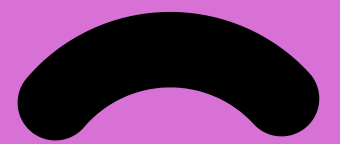


**ORI**

**PROMOTER**

**RESTRICTION SITES**

**SELECTION MARKER**



# SYN-BIO LEGO

LET'S BUILD A PLASMID

THIS REGION  
WHERE THE RNA  
POLYMERASE  
BINDS TO IN  
THE OPERON?

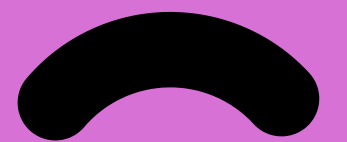


**ORI**

**PROMOTER**

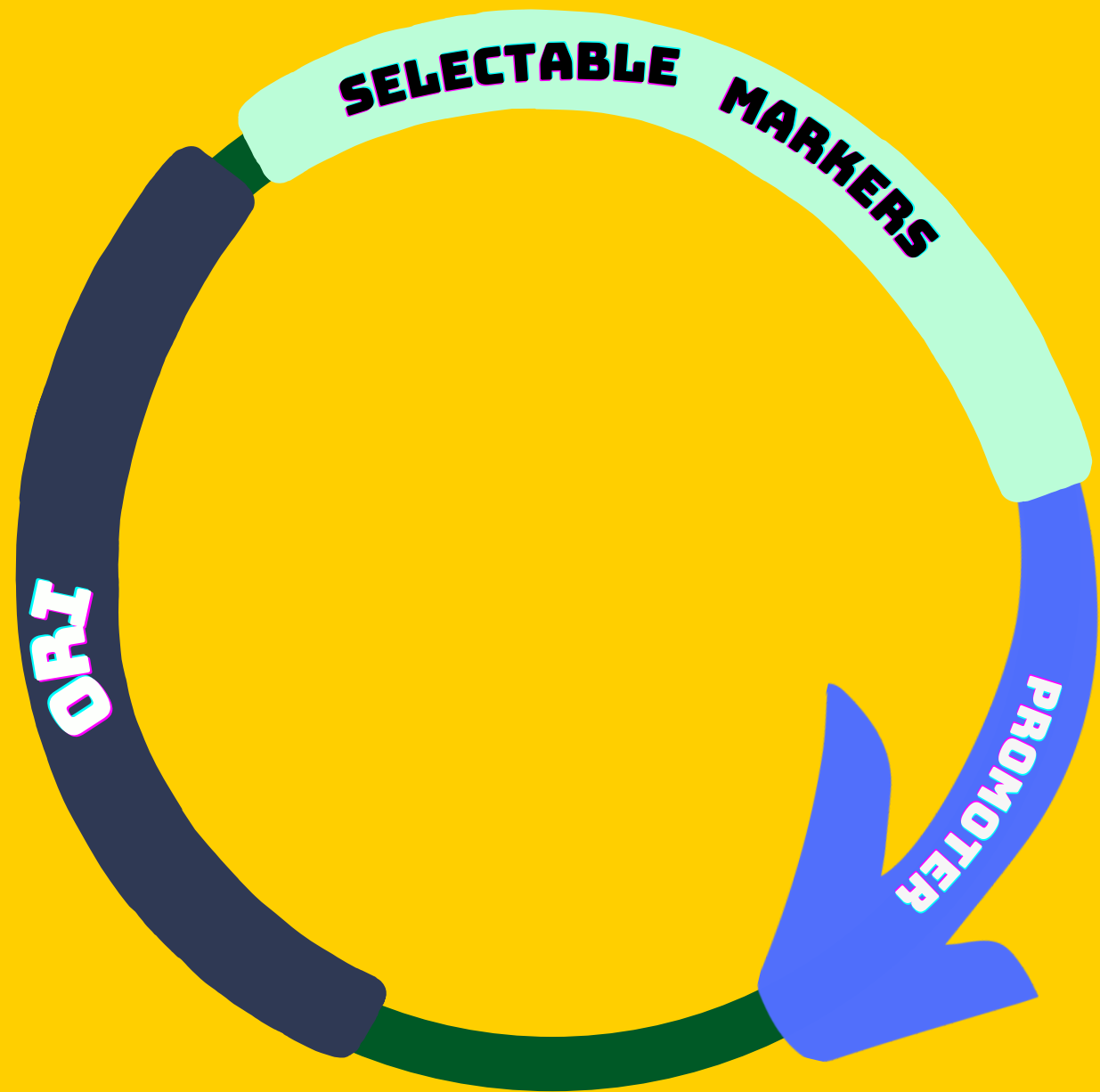
**RESTRICTION SITES**

**SELECTION MARKER**



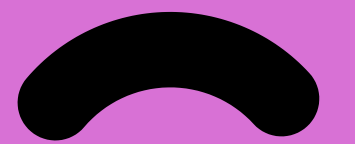
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LET'S BUILD A PLASMID



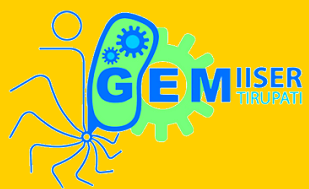
**ORI**

**PROMOTER**



**RESTRICTION SITES**

**SELECTION MARKER**



# SYN-BIO LEGO

LET'S BUILD A PLASMID

THE REGIONS  
THAT HELPS  
YOU INSERT  
THE GENE OF  
INTEREST?

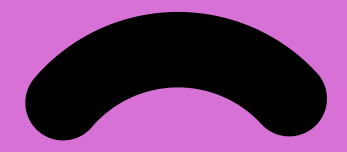


**ORI**

**PROMOTER**

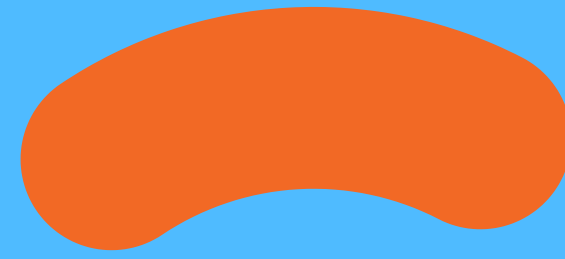
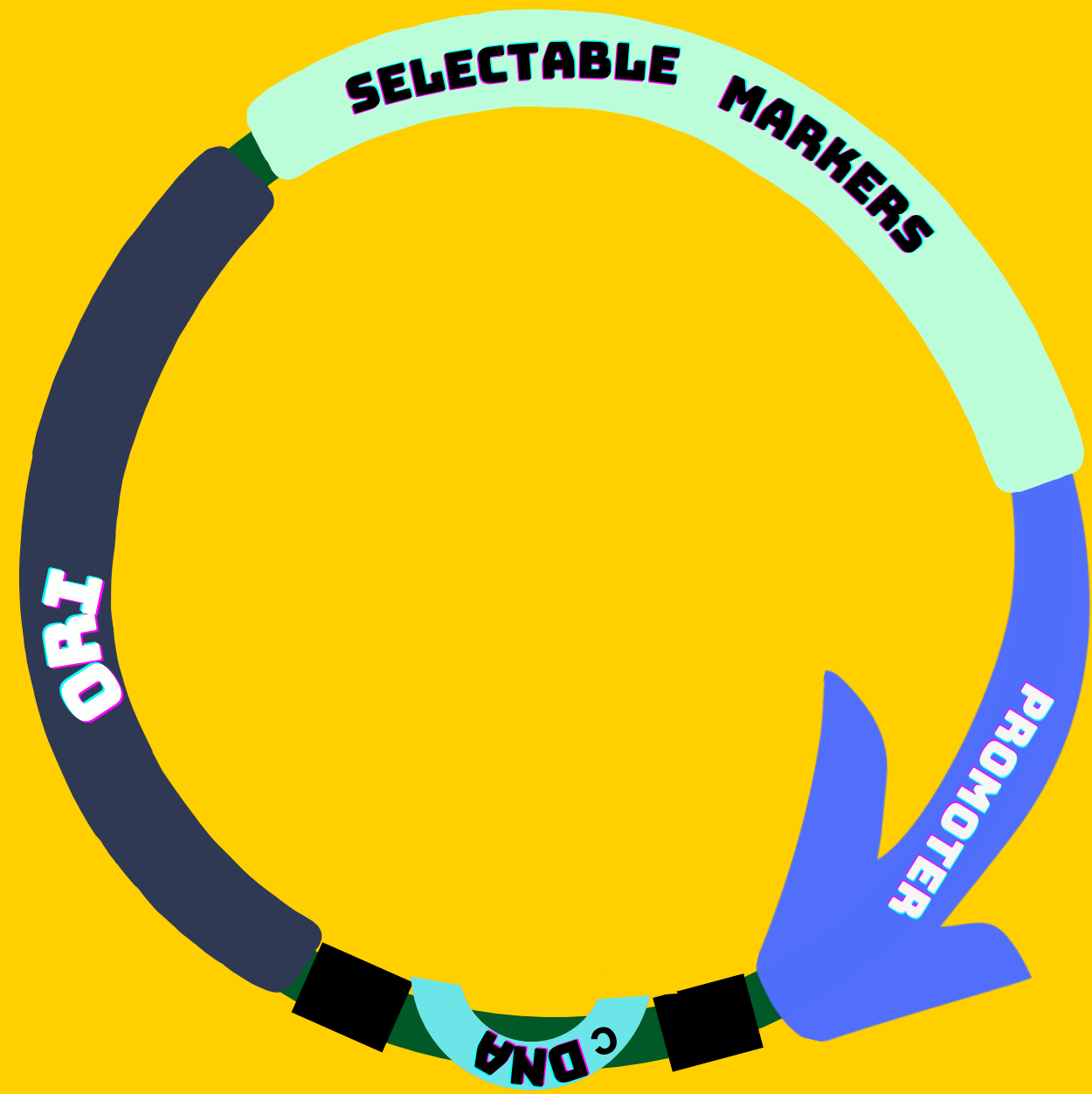
**SELECTION MARKER**

**RESTRICTION SITES**

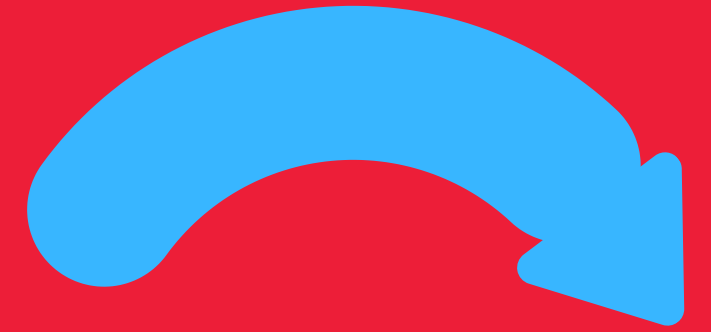


# SYN-BIO LEGO

LET'S BUILD A PLASMID



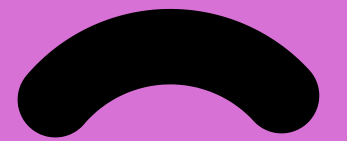
**ORI**



**PROMOTER**



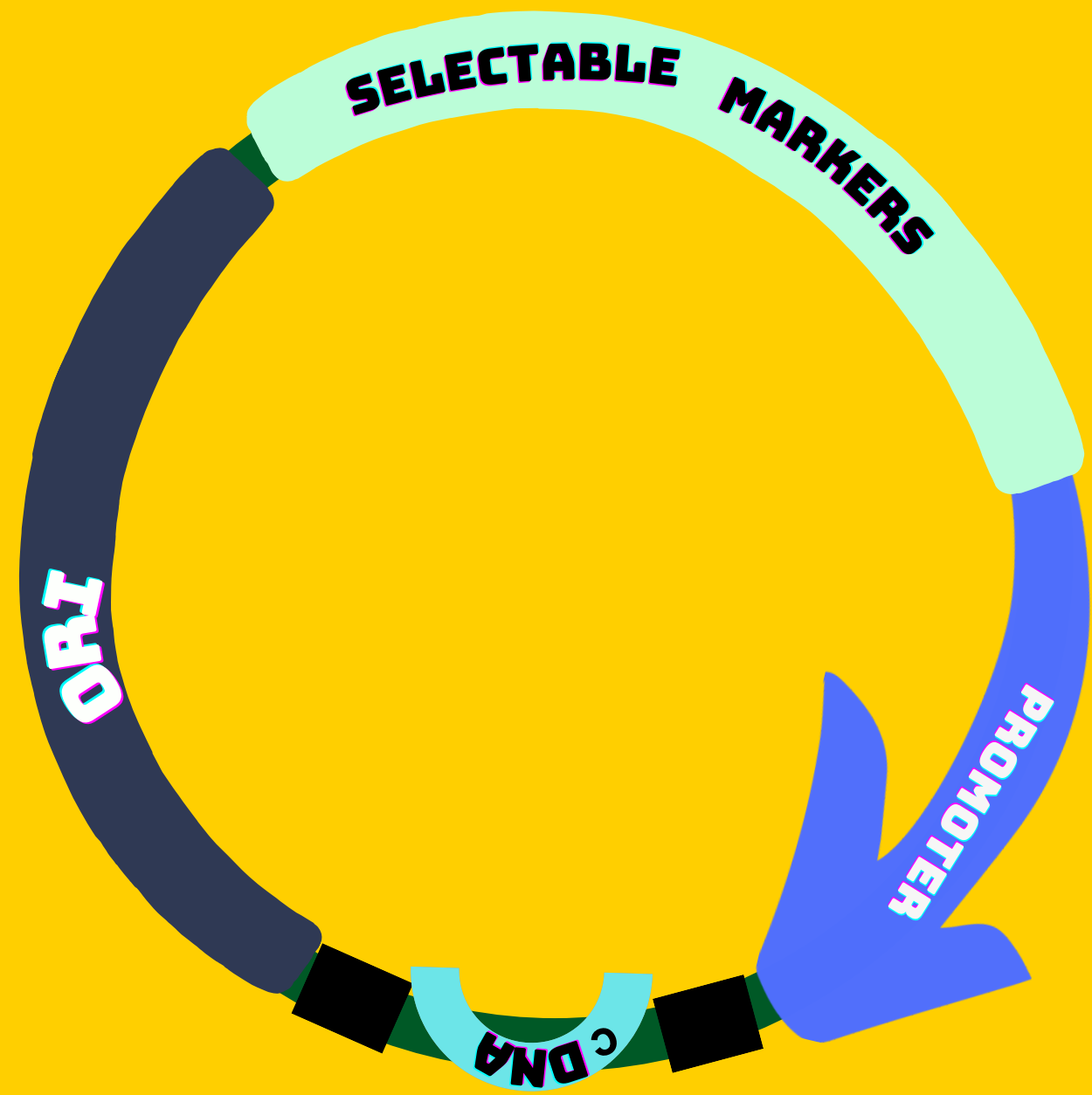
**SELECTION MARKER**



**RESTRICTION SITES**

# SYN-BIO LEGO

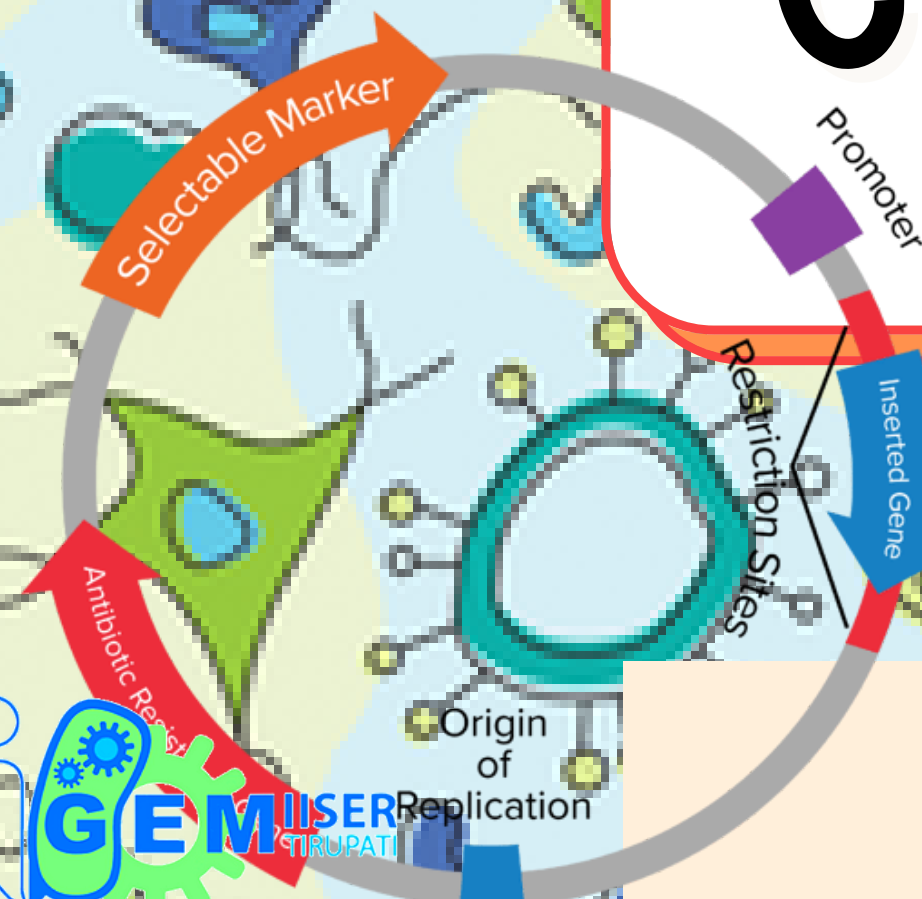
LET'S BUILD A PLASMID



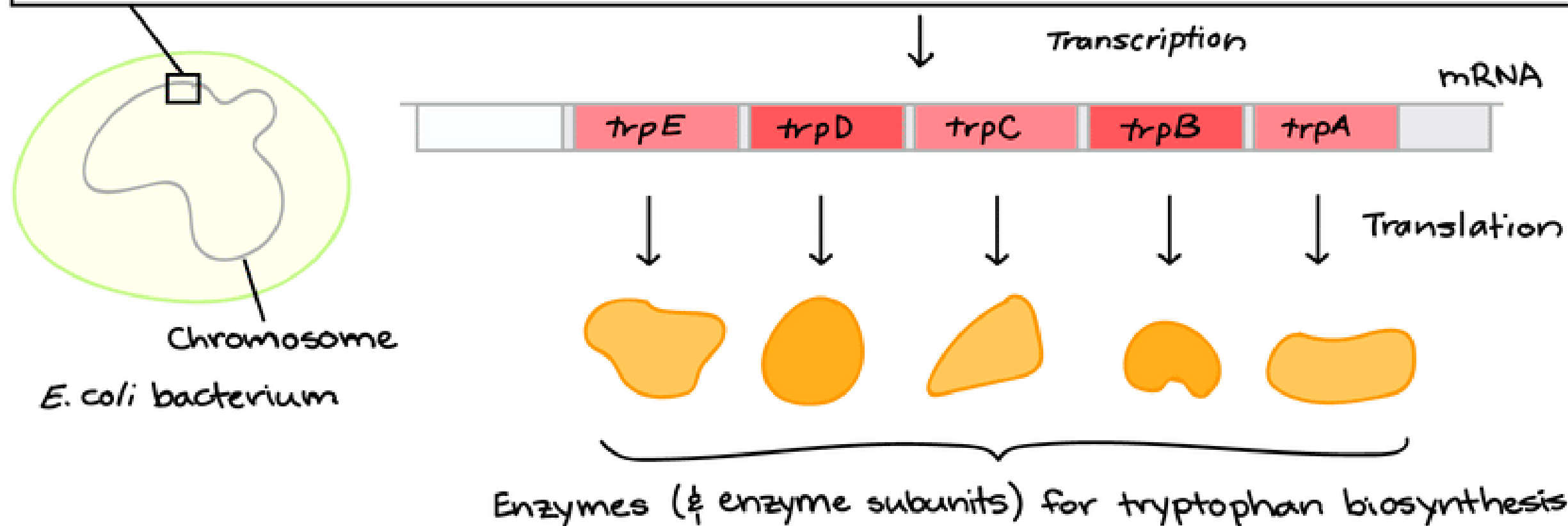
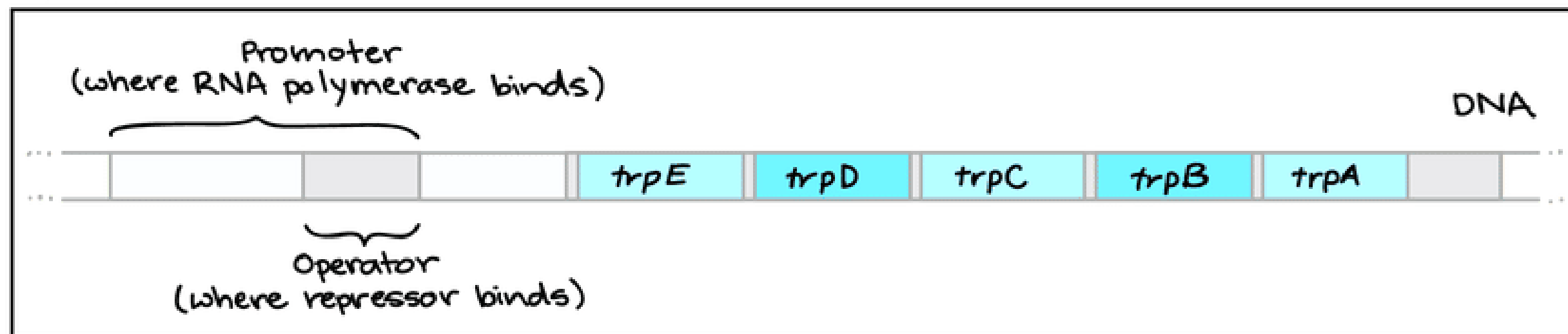
# Find out!

## Can there be 2 ori?

HINT : Vector

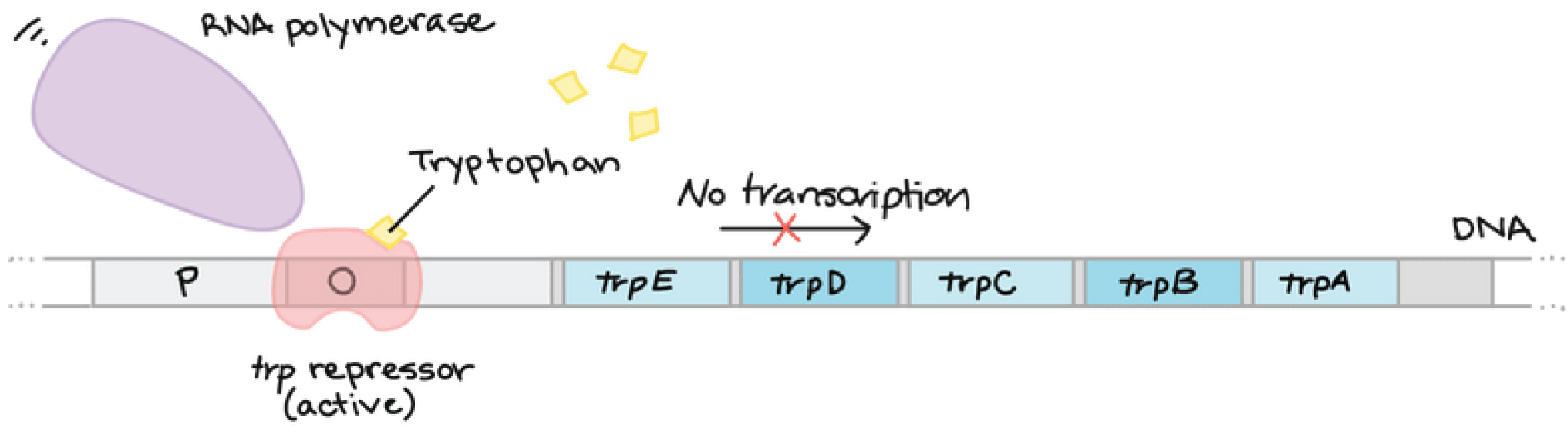


# Trp operon



# Operon Switched Off

HIGH TRYPTOPHAN:



# Operon Switched ON

LOW TRYPTOPHAN:

