



CLIL – BIOLOGY – ₃CSB

DNA duplication: how DNA makes copies of itself

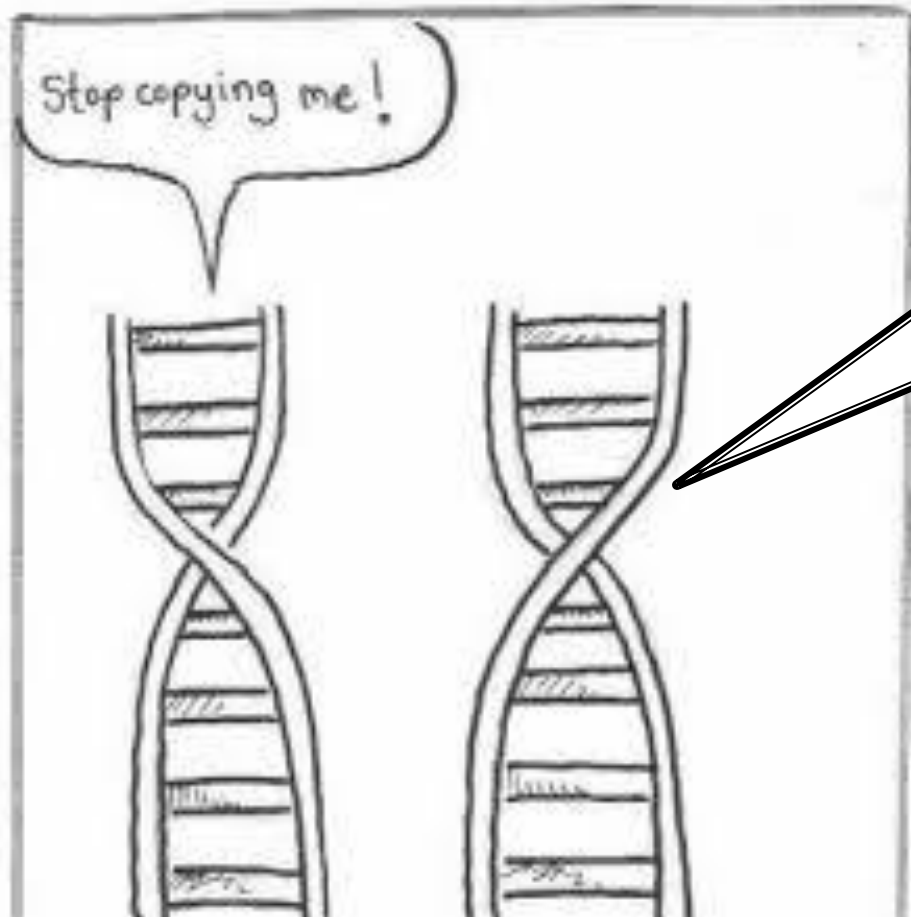
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Goals for today

- Learn why DNA duplication is important in the biological world
- Learn how the mechanism of DNA duplication was discovered through the Meselson- Stahl experiment
- Understand the process of mechanism of DNA duplication, knowing which enzymes are involved and what are their functions

Why do we need DNA duplication?

- Is it important?



Hey, bro! We are going through mitosis in a while. I HAD TO do it!

Everytime a cell divides, DNA duplication is needed

We need DNA duplication in order to:

- GROW (mitosis)
- REPAIR OUR TISSUES (mitosis)
- REPRODUCE (mitosis and meiosis)

But... How does duplication work?

1953 : Watson and Crick



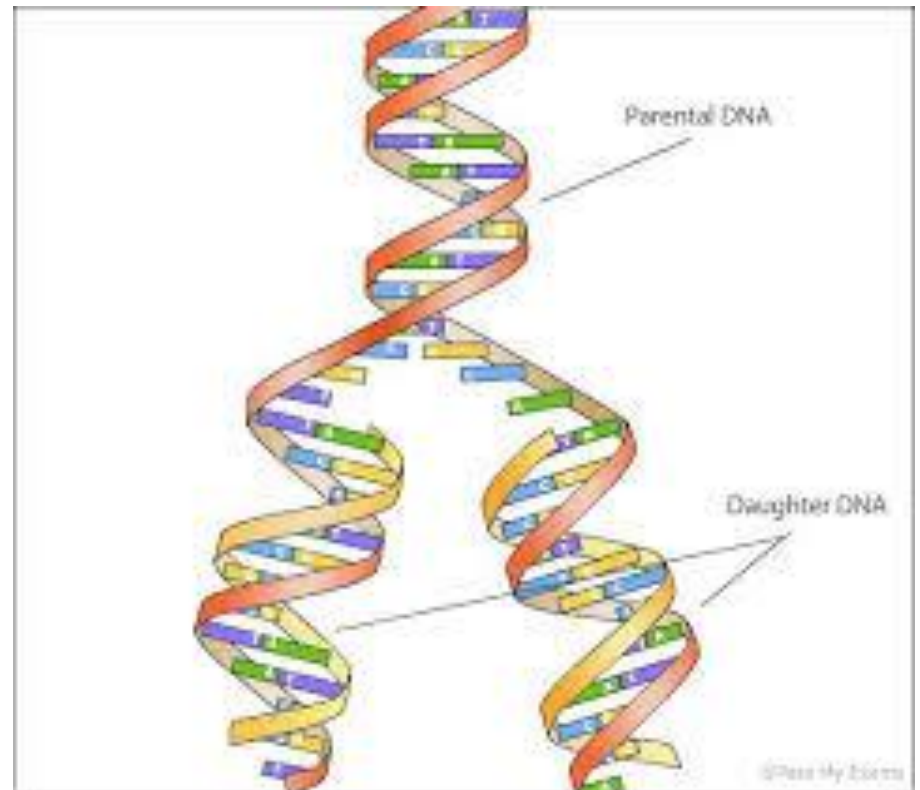
devised our structure, which rests mainly though not entirely on published experimental data and stereochemical arguments.

It has not escaped our notice that the specific pairing we have postulated immediately suggests a possible copying mechanism for the genetic material.

Full details of the structure, including the conditions assumed in building it, together with a set of co-ordinates for the atoms, will be published elsewhere.

Can you suggest a mechanism of duplication?

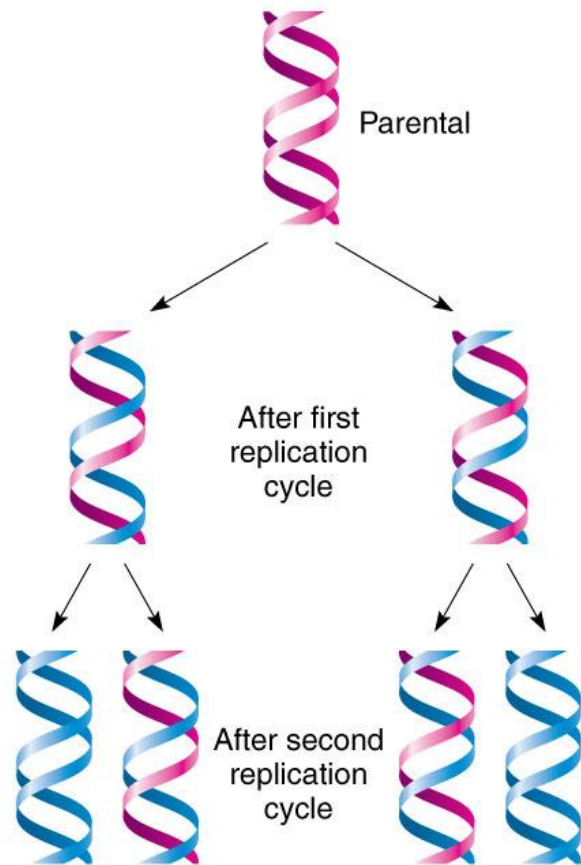
THINK ABOUT WHAT YOU KNOW ABOUT
DNA STRUCTURE



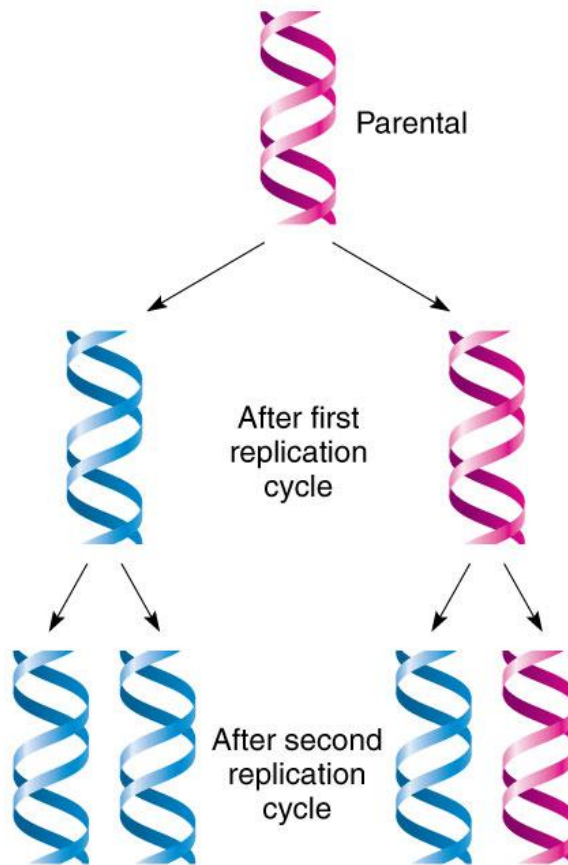
Models of DNA duplication

<http://pieiki.info/wp-content/uploads/2018/03/simple-dna-replication-diagram-beautiful-modes-of-dna-replication-of-simple-dna-replication-diagram.jpg>

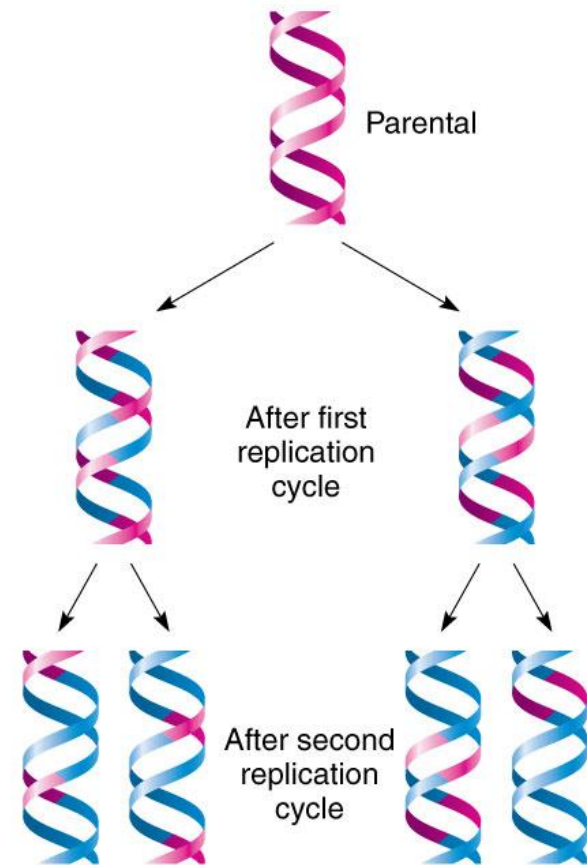
a) Semiconservative model



b) Conservative model



c) Dispersive model



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WHICH MODEL IS THE CORRECT ONE? Vote on [menti.com](https://www.menti.com)

Which model is the correct one?

TASK 1: Look at the video and answer to the questions on your worksheet

Before starting: do you remember what is an ISOTOPE?

<https://www.youtube.com/watch?v=JeoegQaF8ig>

Dna duplication: what do we need?

STEP 1:

UNWIND DNA AND UNZIP IT

STEP 2:

SYNTHESIZE NEW STRANDS BY
COPYING OLD STRANDS
(MATCHING A-T AND G-C)

STEP 3:

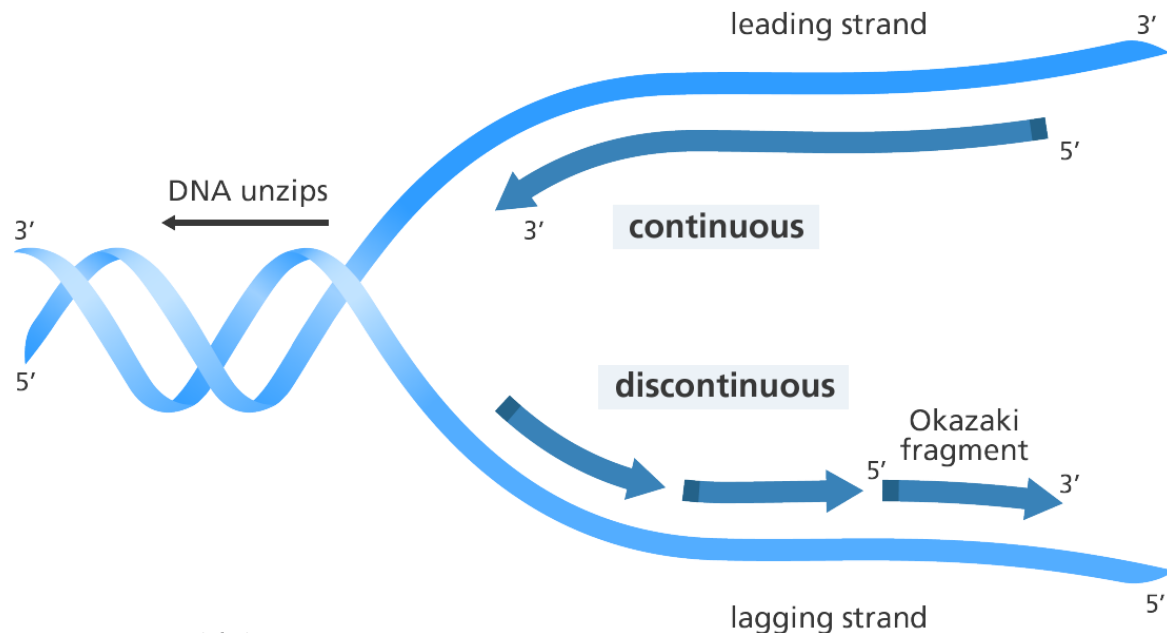
REWIND DNA

Task 2: read the
text and answer
the question on
your worksheet

Do you notice any differences between the two strands?

- **LEADING STRAND:** it is built continuously. Its replication goes in the same direction as the replication fork
- **LAGGING STRAND:** it is built in fragments. Its replication goes in the opposite direction if compared with the replication fork

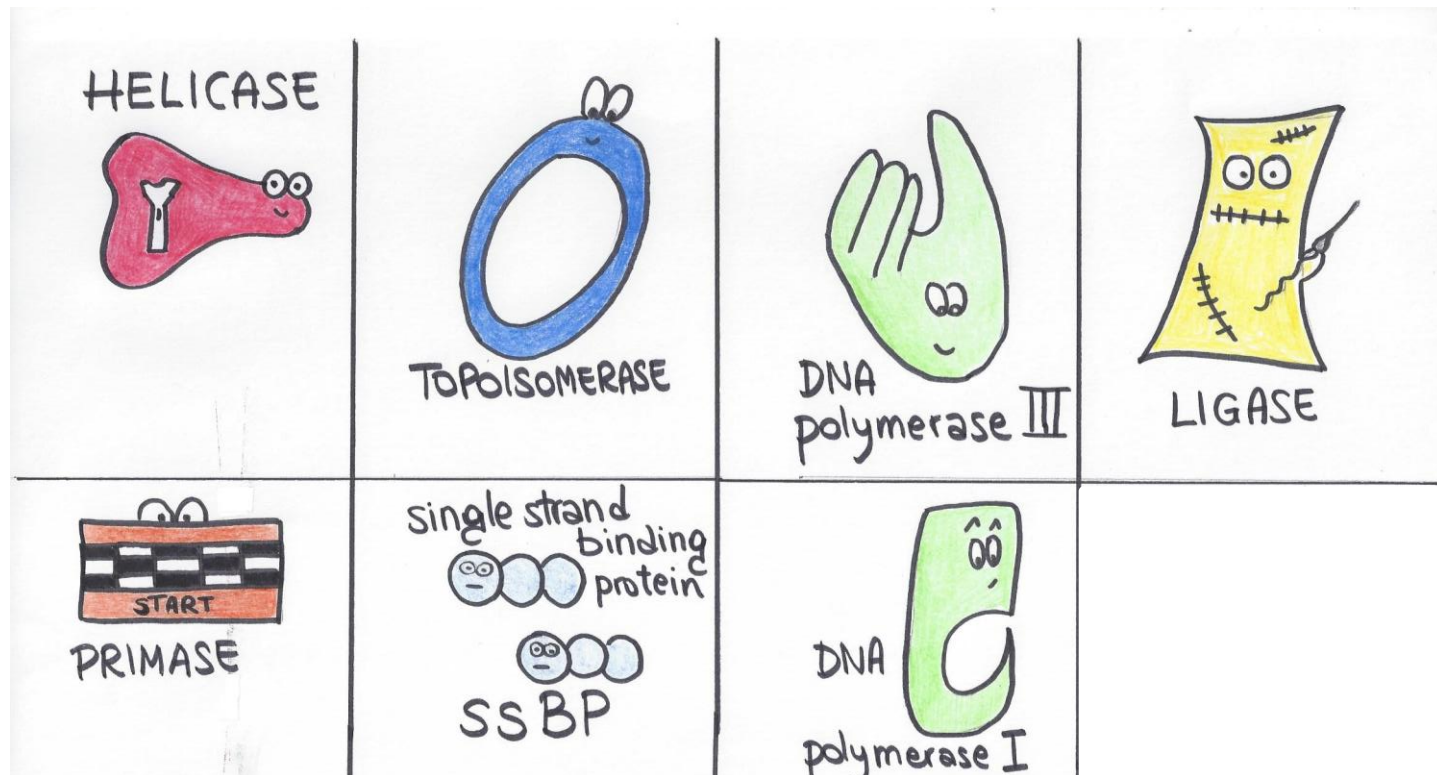
DNA replication fork



Who is going to do the whole job?

Our special friends....

ENZYMES



TASK 3: READ THE TEXT AND LEARN ABOUT ENZYMES AND MATCH ENZYME-FUNCTION FLASHCARDS

Task 3: on your worksheet

TASK 3 (from BIOZONE, Biochemistry and Biotechnology – Zanichelli 2014)

Dna duplication: the whole process

DNA duplication process:

Task 4: look at the video describing DNA duplication process and make some notes

<https://www.youtube.com/watch?v=TNKWgcFPHqw>

Task 5: speaking task. Enzyme game. The class is divide into groups of 4 people. Every students draw 2 cards. Your goal is to describe DNA duplication: when it's your enzyme turn, put the card on the table and explain what the enzyme does.