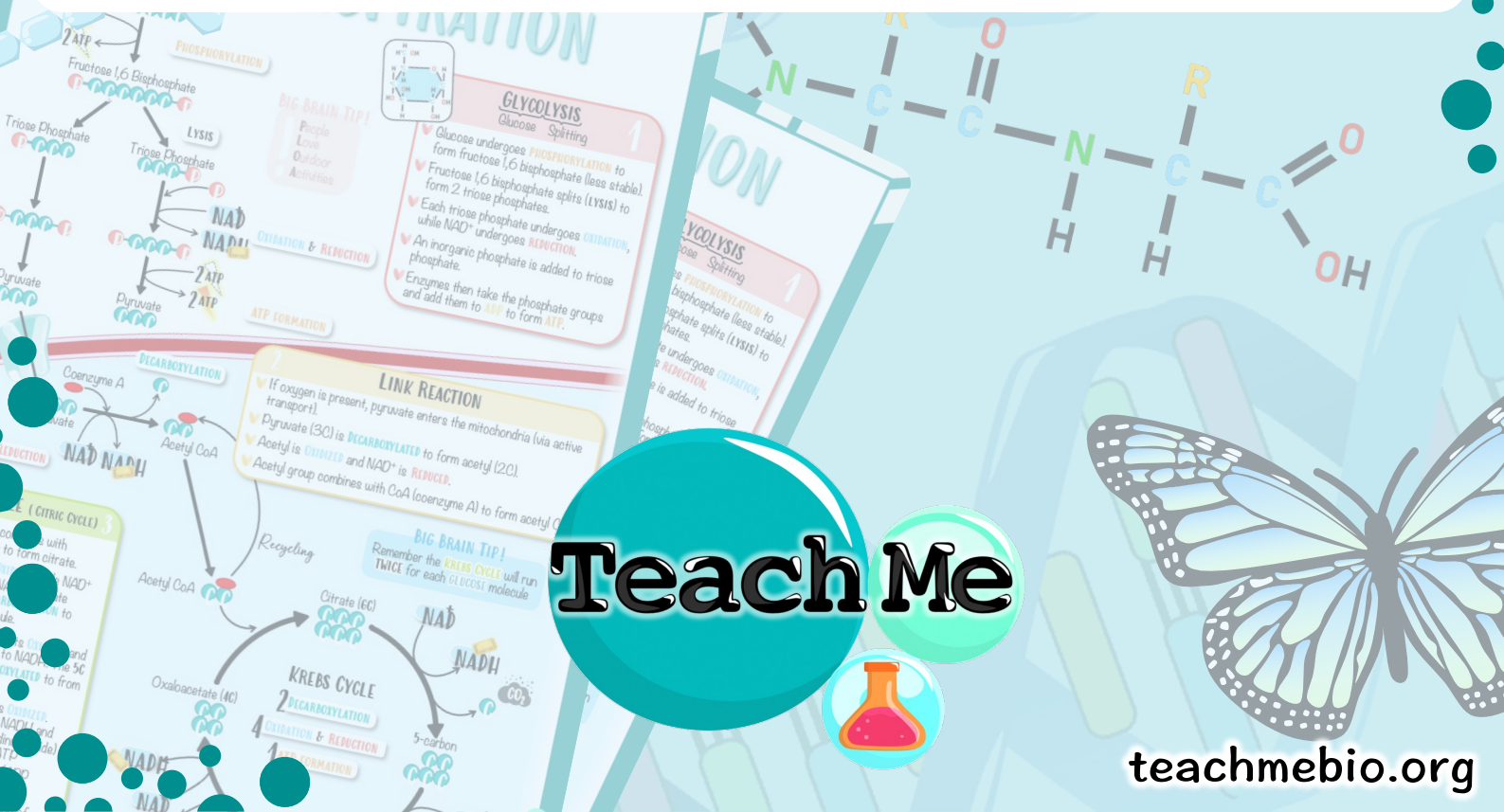


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STUDY NOTES

CHAPTER 6 – NUCLEIC ACIDS & PROTEIN SYNTHESIS

PROTEIN SYNTHESIS



PROTEIN SYNTHESIS

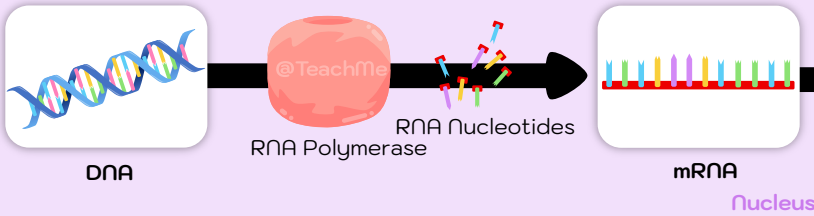
Protein synthesis is a two step process by which the genetic code contained within DNA is **transcribed** into mRNA and then **translated** into a specific sequence of amino acids, resulting in the formation of a protein.

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TRANSCRIPTION

Page 1

Process of copying a segment (gene) of DNA into mRNA.

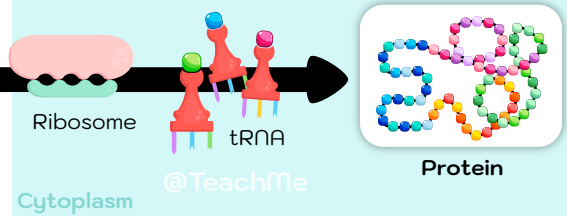


TRANSLATION

Page 3

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Process of synthesizing a protein from an mRNA sequence.

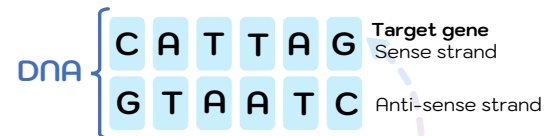


WHAT IS THE Goal OF Transcription?

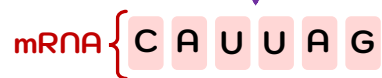
Say you are bleeding and your body needs to produce a protein that will help your blood clot.

The **genetic information** needed to make this protein is contained within a specific **gene (DNA)**. To make this protein, the genetic information contained within the gene must first be copied into an **mRNA** molecule. To do this, the **opposite DNA strand**, known as the antisense (template) strand is **transcribed**.

Sense-strand = Coding strand
Anti-sense-strand = Non-coding strand = Template strand



Transcription



Notice the similarities between the DNA sense strand and the mRNA sequence (except T's are U's)

WHY mRNA?

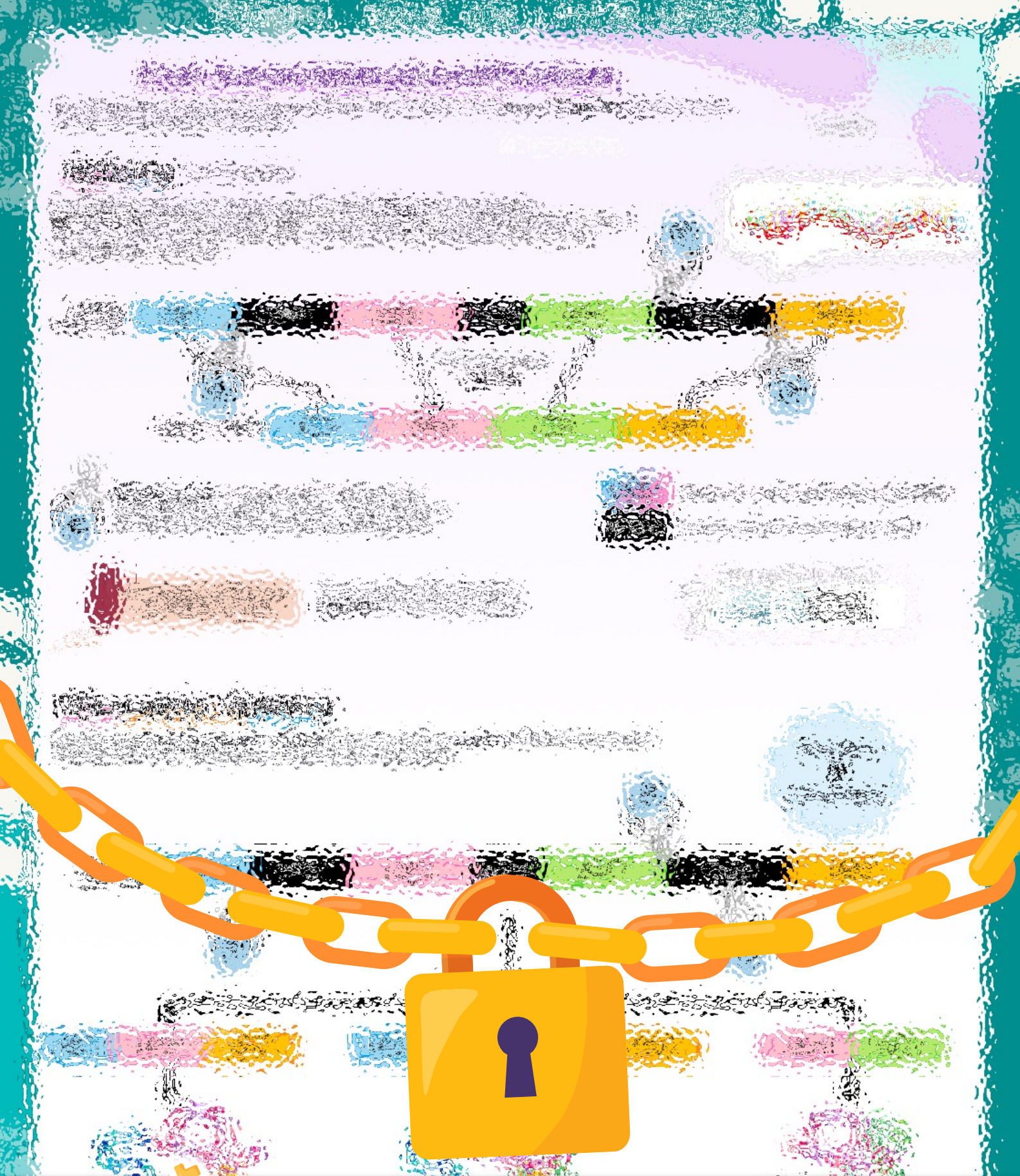


DNA is transcribed into mRNA because DNA remains in the nucleus, while protein synthesis occurs at ribosomes in the cytoplasm. mRNA carries only the information needed to make a specific protein, making the process more efficient.

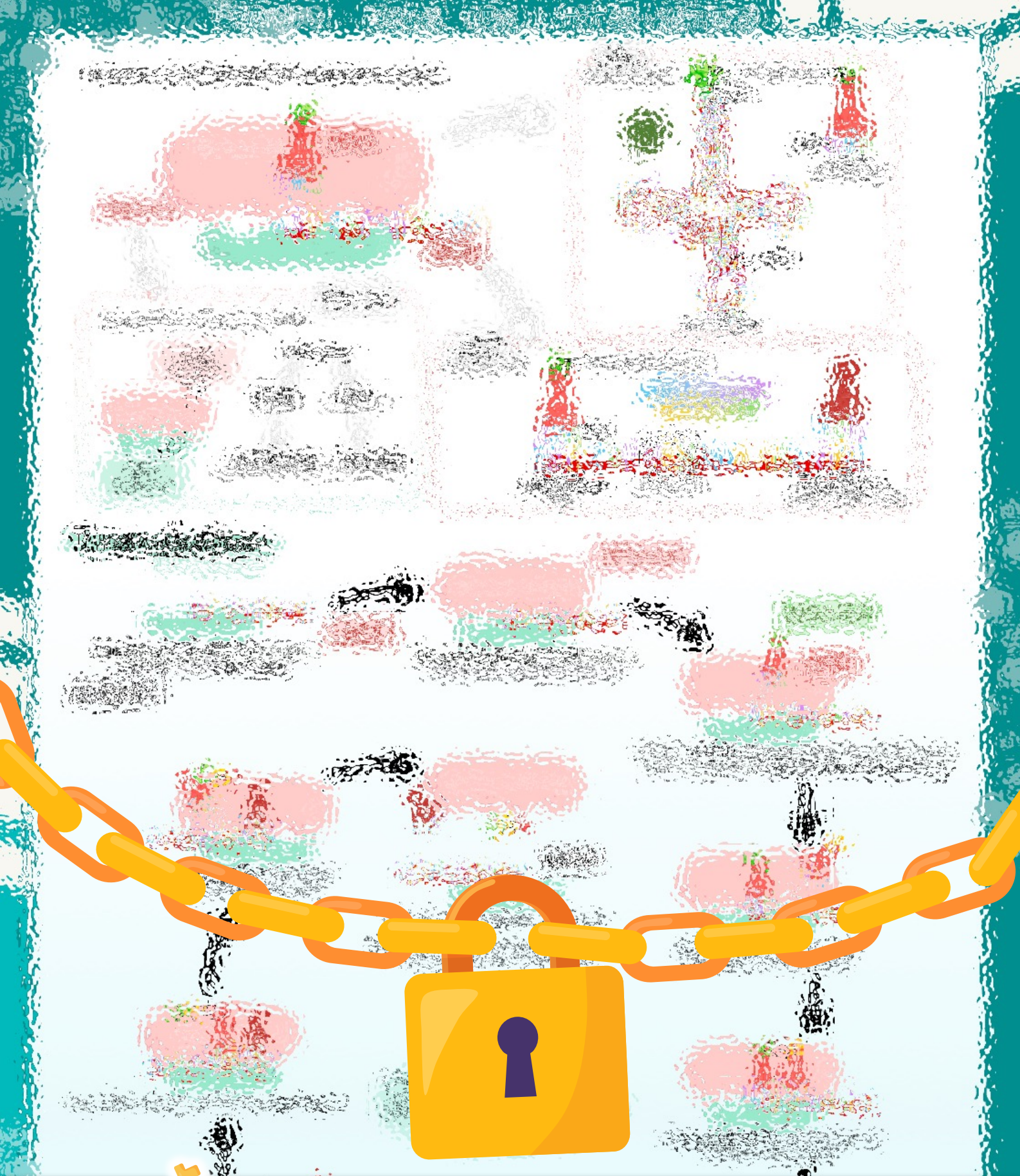
Transcription

In the Nucleus

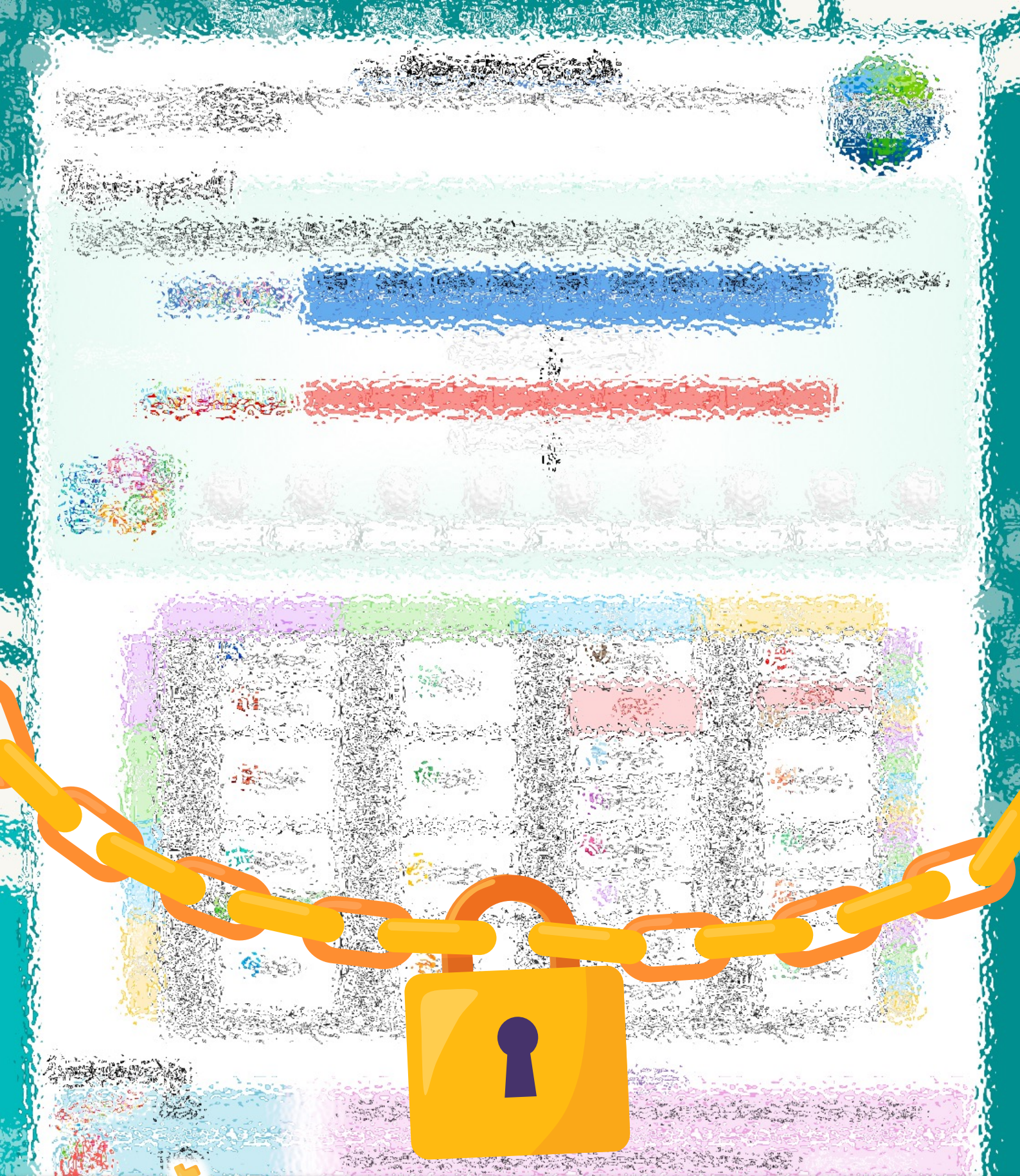
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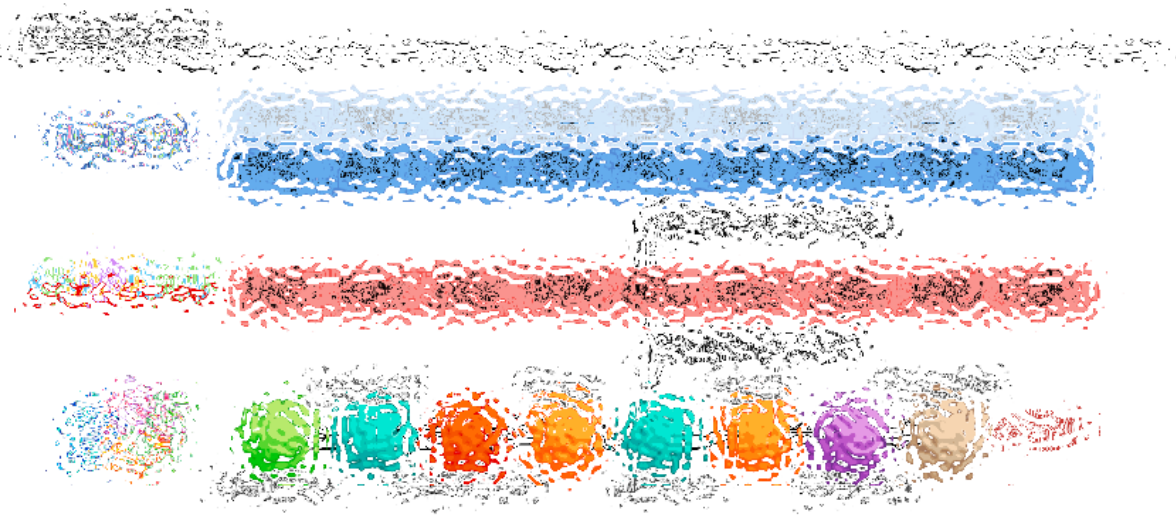
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CELLS

Cells are the basic units of life. They are the smallest structures that can carry out all the processes of life. Cells are found in all living organisms, from single-celled organisms like bacteria to multicellular organisms like plants and animals. The structure of a cell is determined by its function. For example, a muscle cell is long and thin to allow it to contract, while a nerve cell has long projections to carry electrical signals. Cells are surrounded by a cell membrane, which controls what enters and leaves the cell. Inside the cell, there are various organelles that perform specific functions. For example, the nucleus contains the cell's genetic material, and the mitochondria are responsible for producing energy. Cells are constantly dividing and growing, and they die and are replaced. This process is essential for the growth and development of all living organisms.



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