

ALCOHOLIC FERMENTATION

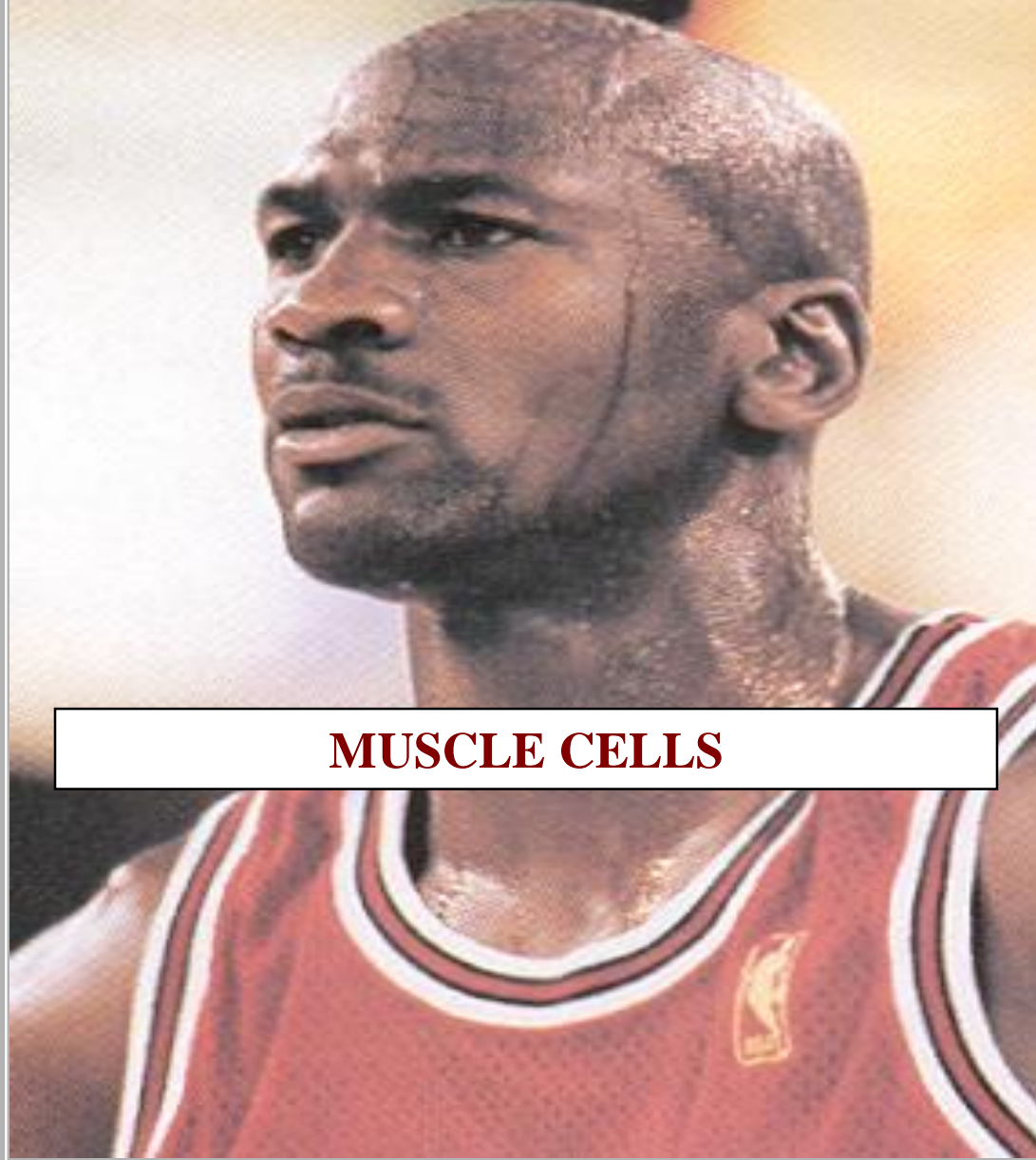


LACTIC ACID FERMENTATION



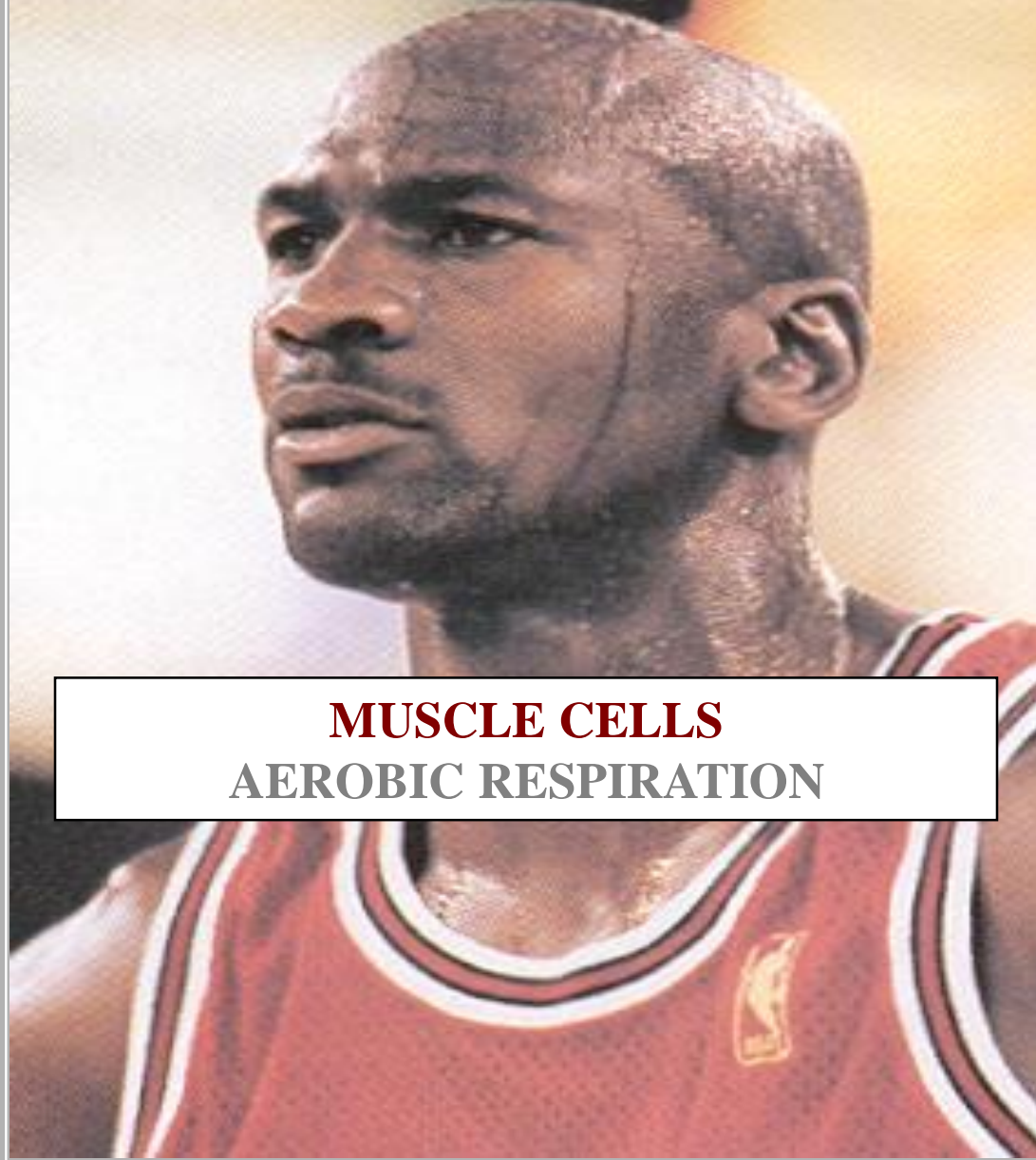
EXAMPLE
LACTIC ACID
FERMENTATION
MUSCLE CELLS

HUMAN METABOLISM



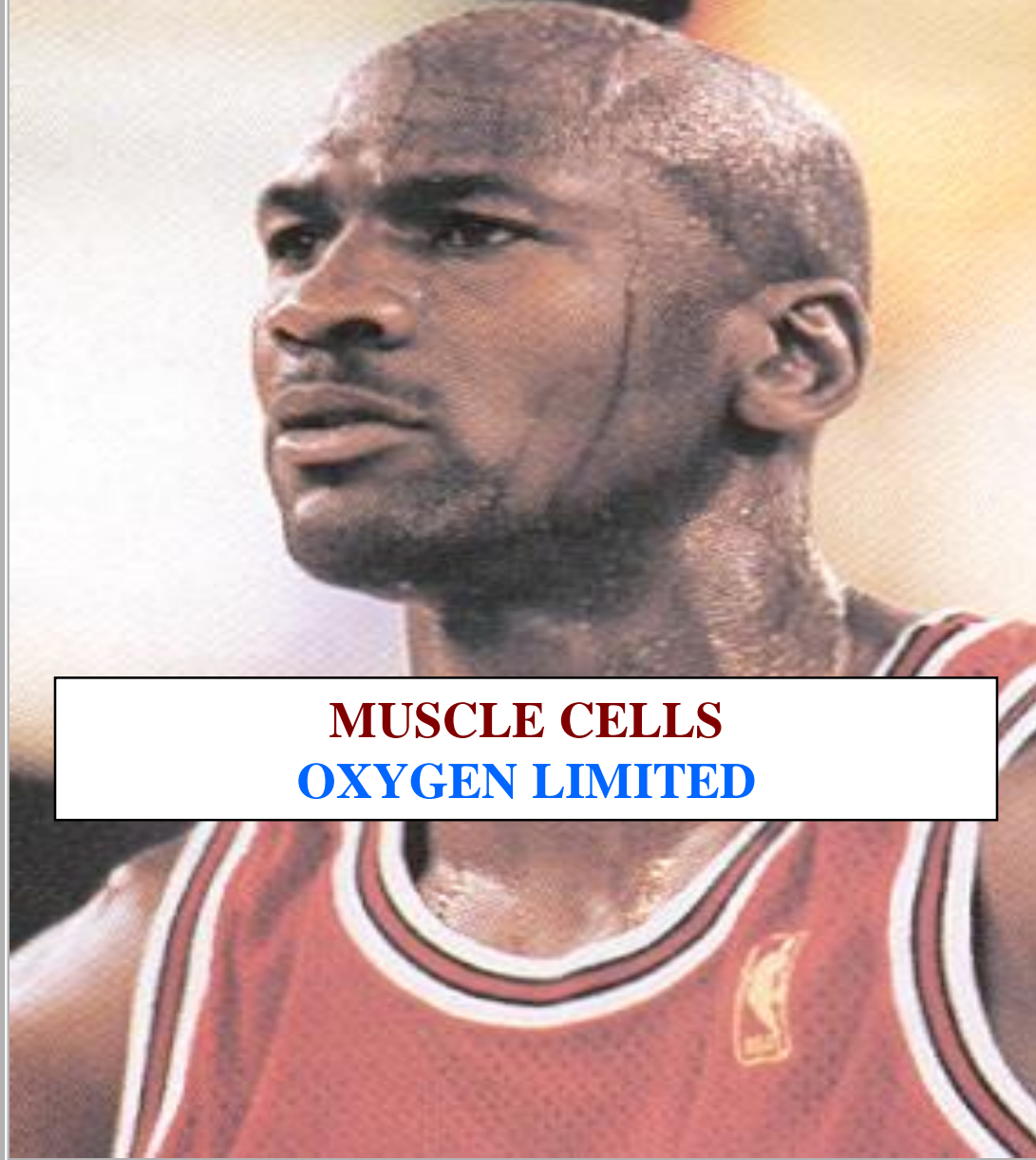
MUSCLE CELLS

HUMAN METABOLISM



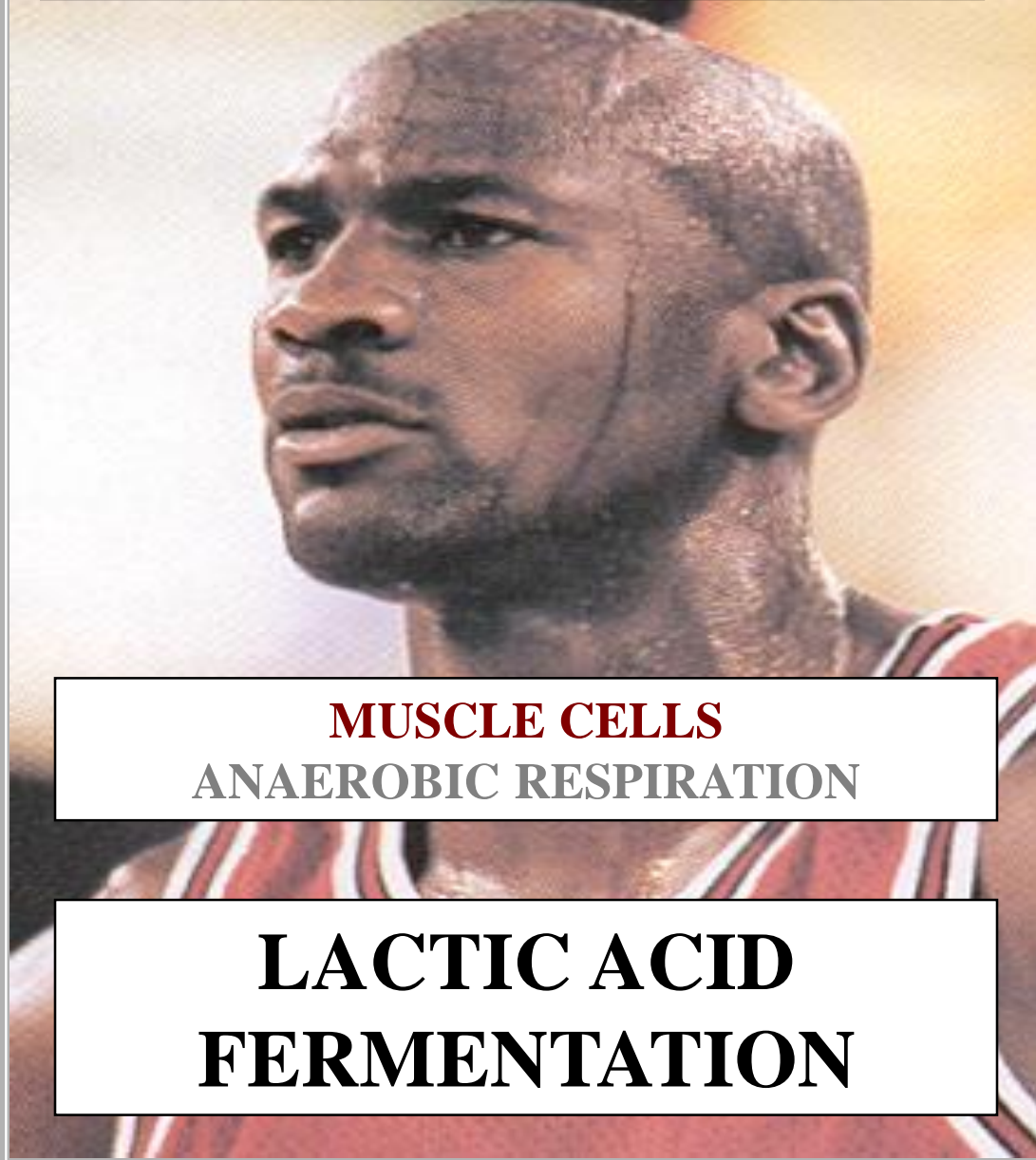
MUSCLE CELLS
AEROBIC RESPIRATION

HUMAN METABOLISM



MUSCLE CELLS
OXYGEN LIMITED

HUMAN METABOLISM



MUSCLE CELLS
ANAEROBIC RESPIRATION

LACTIC ACID
FERMENTATION

MUSCLE CELL

P

N

LACTIC ACID FERMENTATION

PYRUVATE

MUSCLE CELL

PYRUVATE

NADH

NADH

LACTIC ACID FERMENTATION

PYRUVATE

MUSCLE CELL

PYRUVATE

NADH

NADH

GLYCOLYSIS



LACTIC ACID FERMENTATION

PYRUVATE

MUSCLE CELL

PYRUVATE

NADH

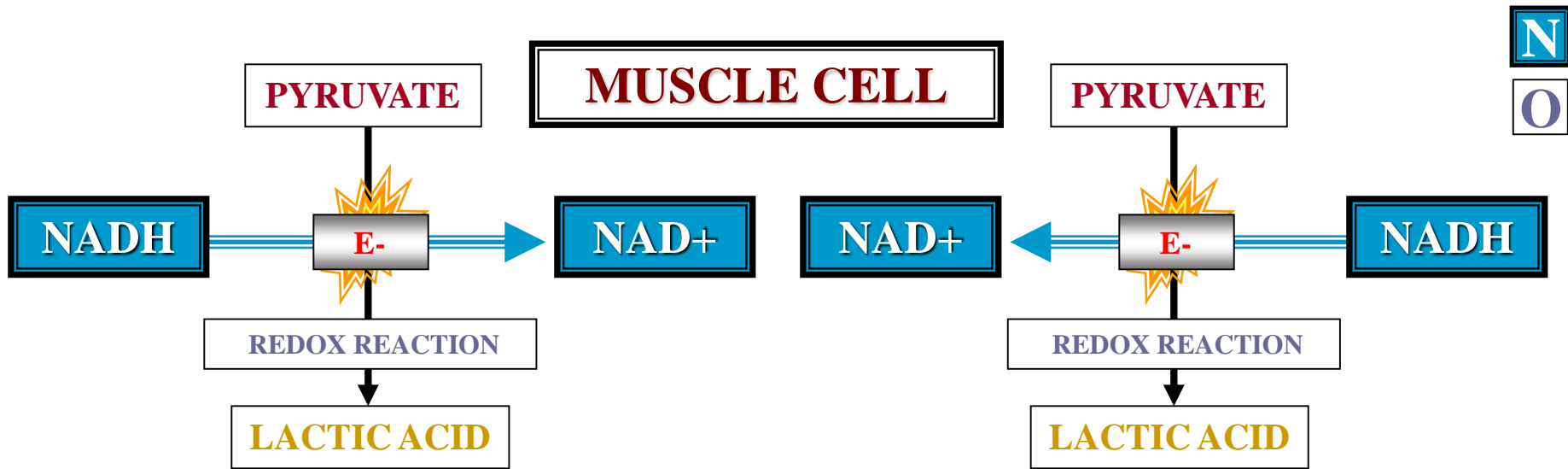
E-

E-

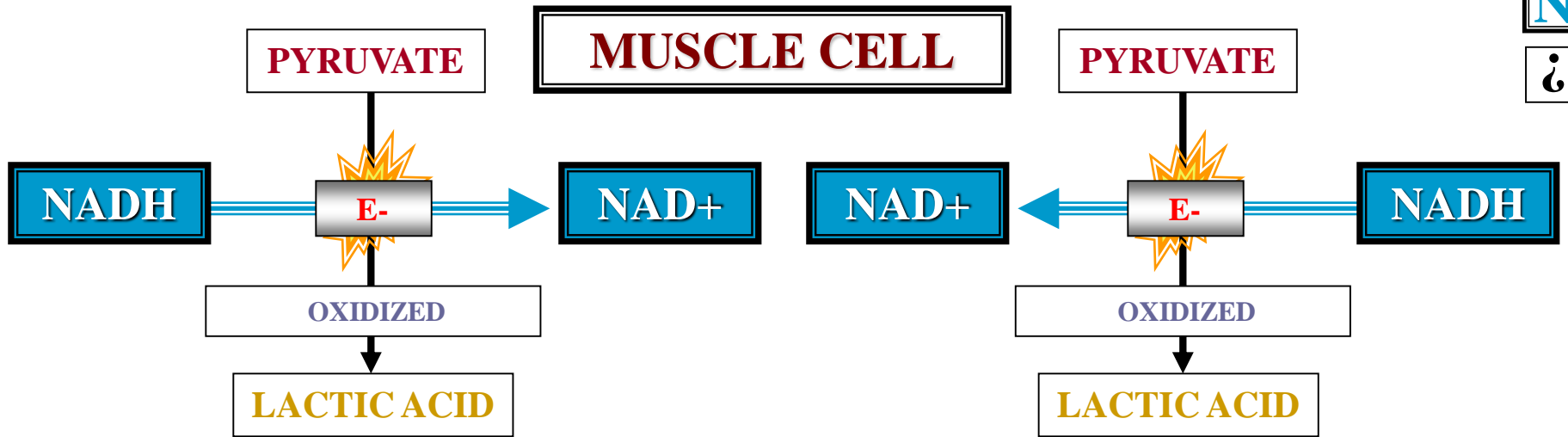
REDOX REACTION

REDOX REACTION

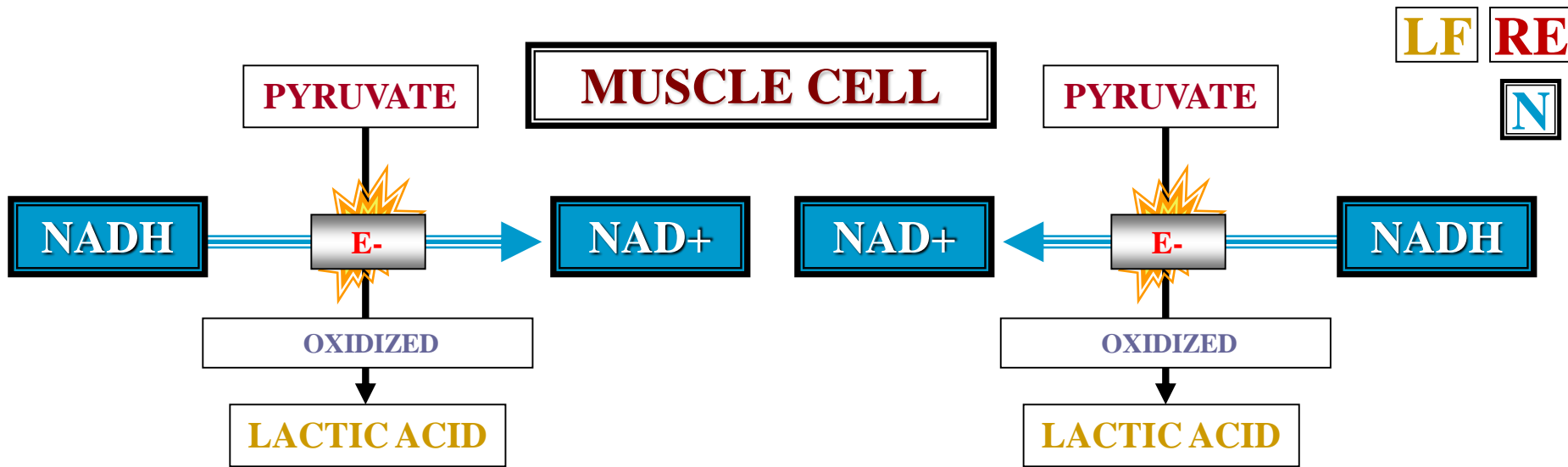
LACTIC ACID FERMENTATION



LACTIC ACID FERMENTATION

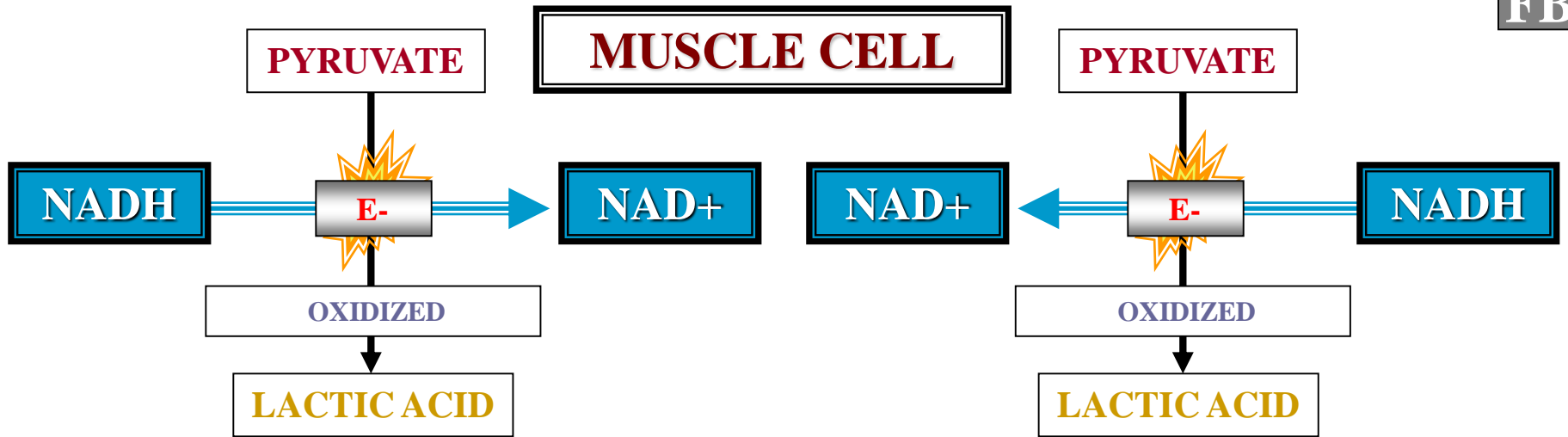


LACTIC ACID FERMENTATION



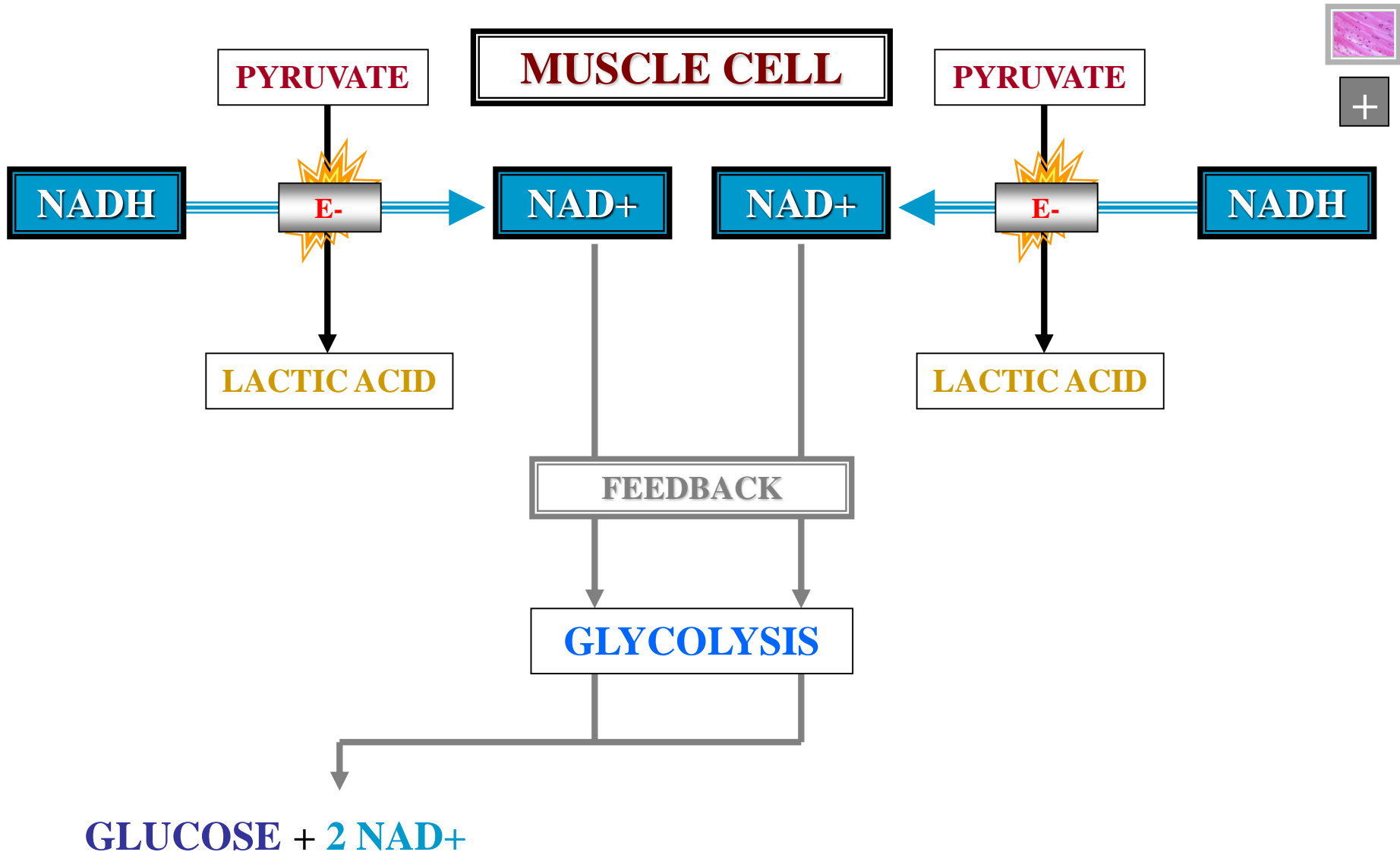
NAD+ LIMITED SUPPLY WITHIN CELL CYTOSOL

LACTIC ACID FERMENTATION



LACTIC ACID FERMENTATION REGENERATES NAD+

LACTIC ACID FERMENTATION



!!!NAD+ REQUIRED ANAEROBIC GLYCOLYSIS!!!

The background of the slide is a microscopic image of muscle fibers, showing their characteristic striated pattern and nuclei. The text is overlaid on this image.

GLYCOLYSIS

N

+

GLUCOSE

*LACTIC ACID
FERMENTATION
REGENERATES*

**ANAEROBIC
RESPIRATION**

NAD⁺

W/IN CYTOSOL

GLYCOLYSIS

GLUCOSE

NAD⁺

NAD⁺

NAD⁺

NAD⁺

NAD⁺

NAD⁺

***LACTIC ACID
FERMENTATION
REGENERATES***

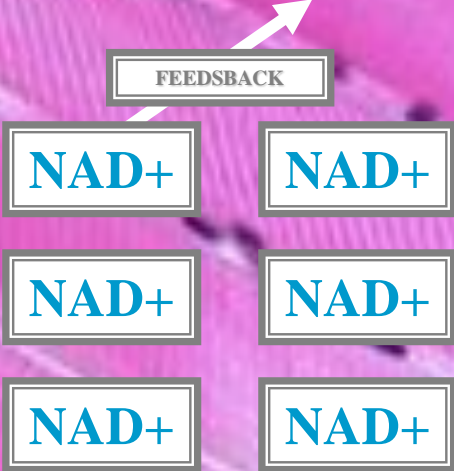
**ANAEROBIC
RESPIRATION**

***NAD⁺
W/IN CYTOSOL***



GLYCOLYSIS

GLUCOSE + 2 NAD⁺



*LACTIC ACID
FERMENTATION
REGENERATES*

**ANAEROBIC
RESPIRATION**

*NAD⁺
W/IN CYTOSOL*

GLYCOLYSIS



FEEDBACK

NAD⁺

NAD⁺

NAD⁺

NAD⁺

NAD⁺

NAD⁺

*LACTIC ACID
FERMENTATION
REGENERATES*

**ANAEROBIC
RESPIRATION**

NAD⁺

W/IN CYTOSOL

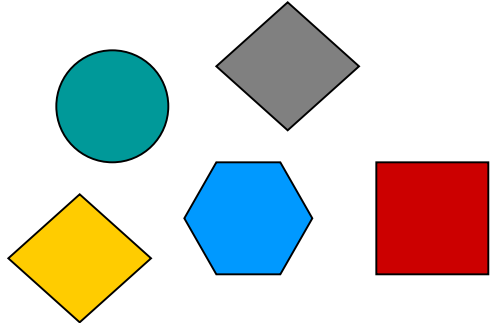
METABOLISM

GLUCOSE



CATABOLIC METABOLISM

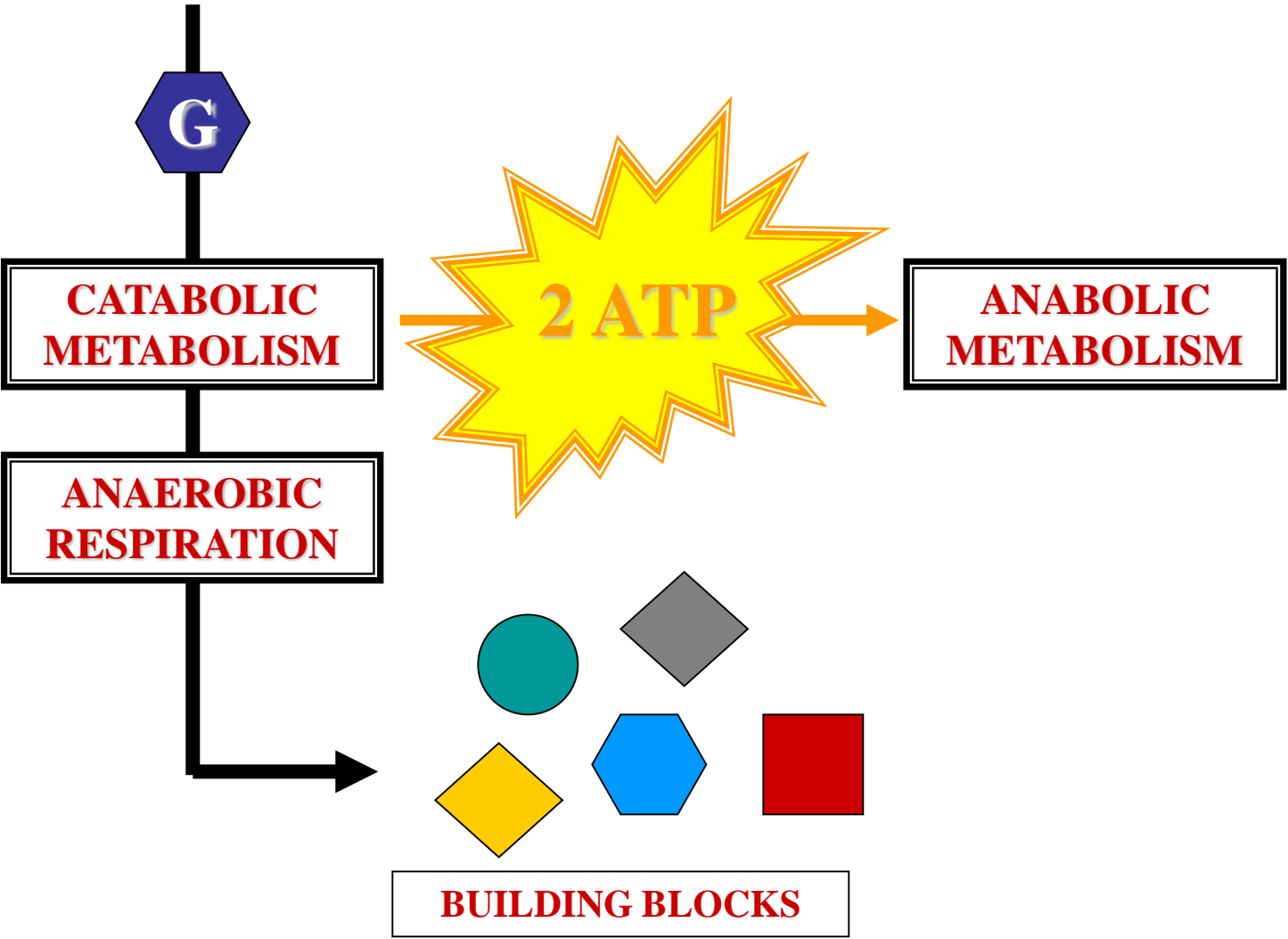
ANAEROBIC RESPIRATION



BUILDING BLOCKS

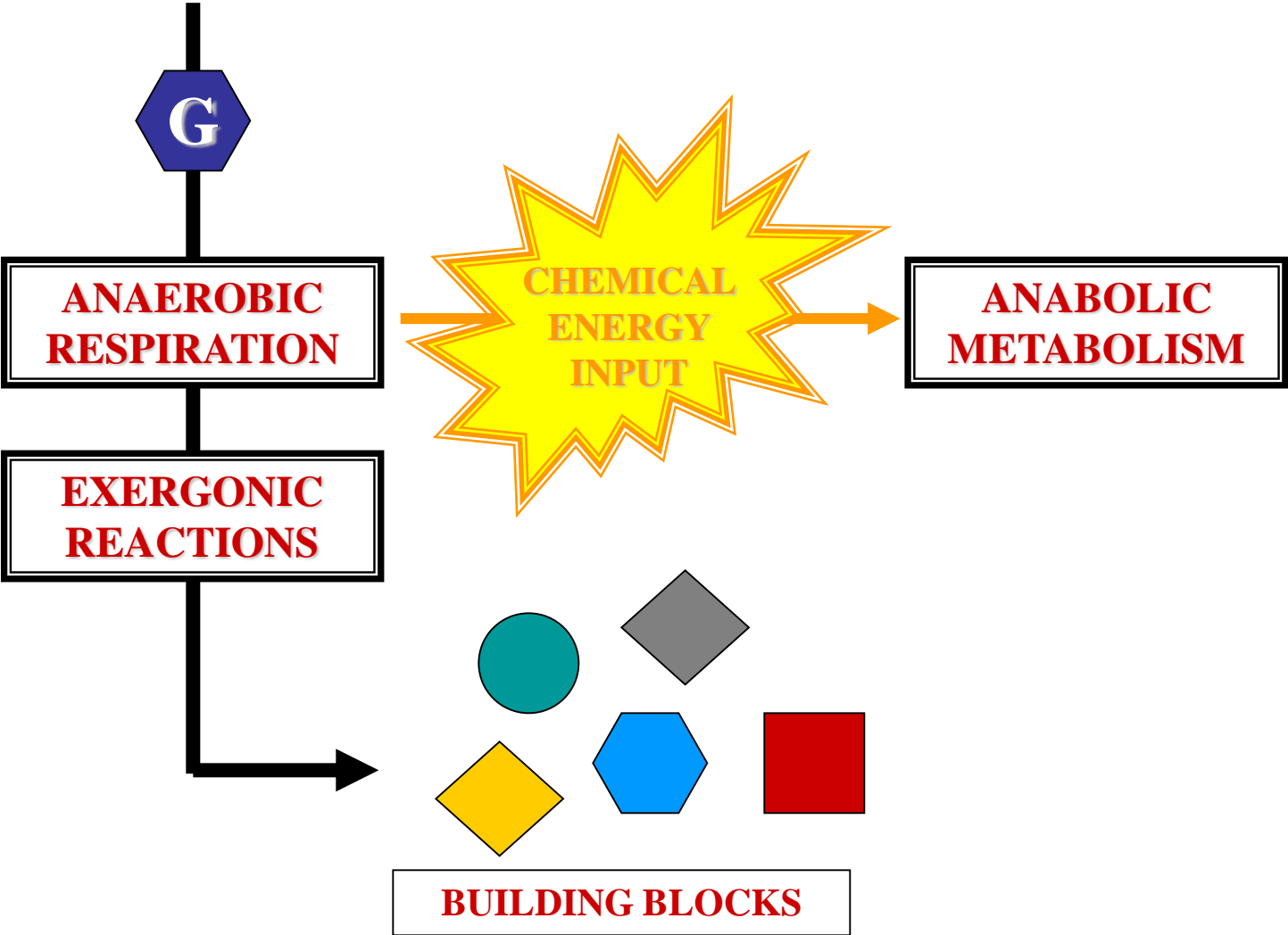
METABOLISM

GLUCOSE



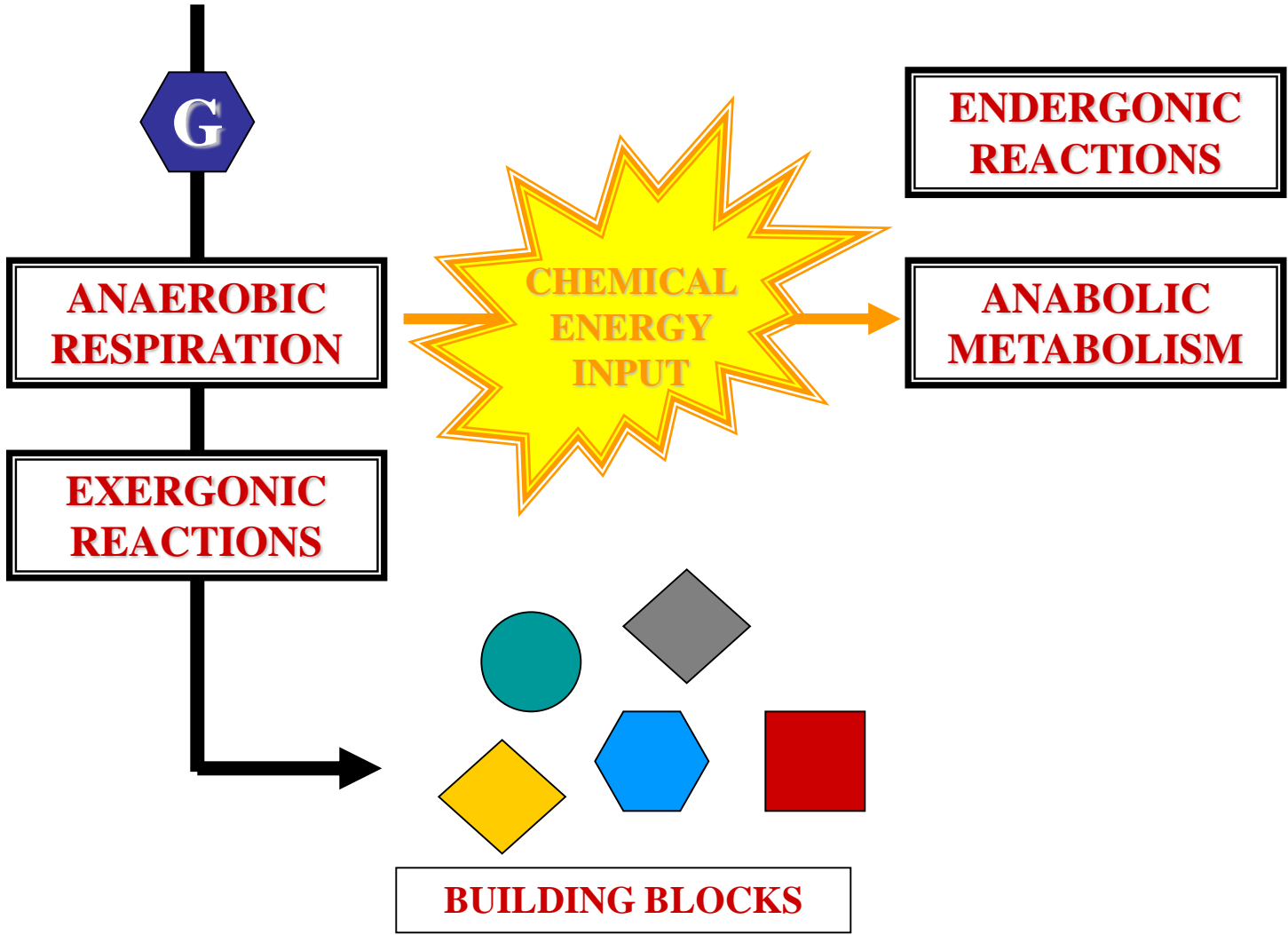
METABOLISM

GLUCOSE



METABOLISM

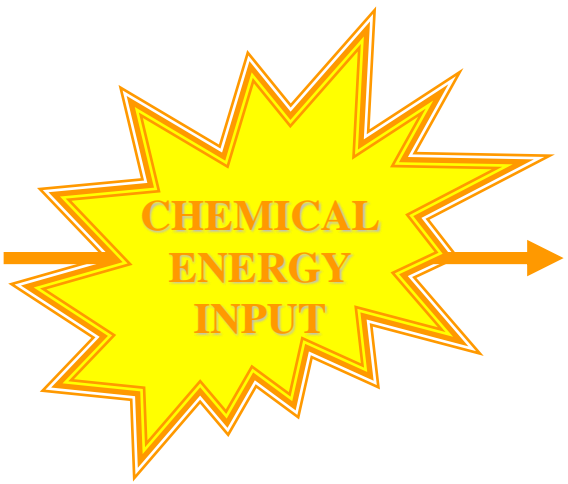
GLUCOSE





METABOLISM

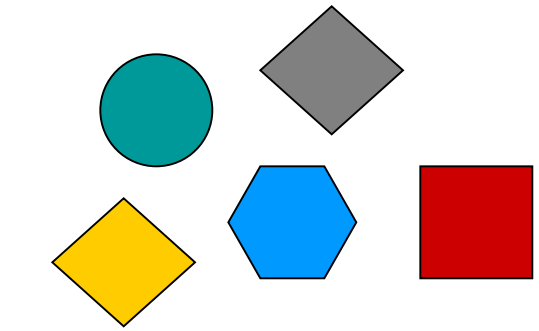
GLUCOSE



ENDERGONIC REACTIONS

ANABOLIC METABOLISM

BIOSYNTHESIS METABOLISM

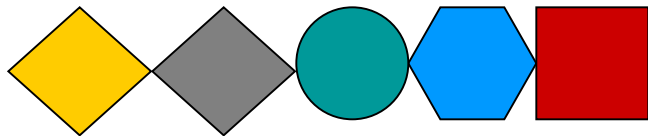


BUILDING BLOCKS

METABOLISM

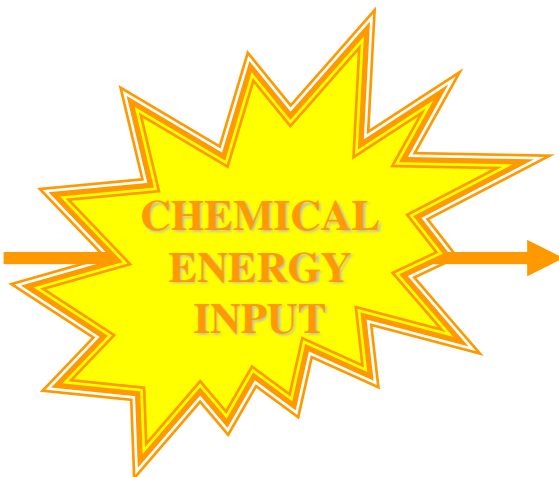
GLUCOSE

COMPLEX BIO-CHEM-CMPS



ANAEROBIC RESPIRATION

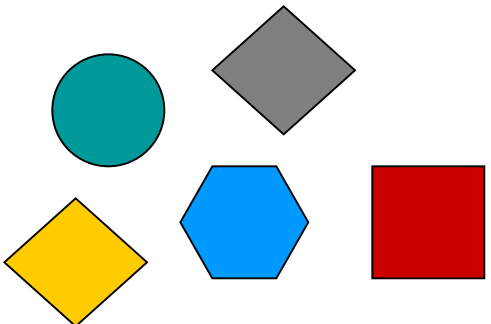
EXERGONIC REACTIONS



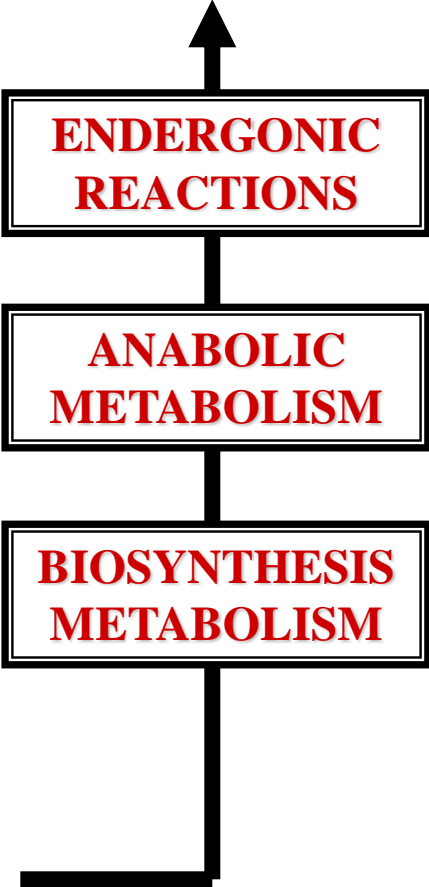
ENDERGONIC REACTIONS

ANABOLIC METABOLISM

BIOSYNTHESIS METABOLISM



BUILDING BLOCKS



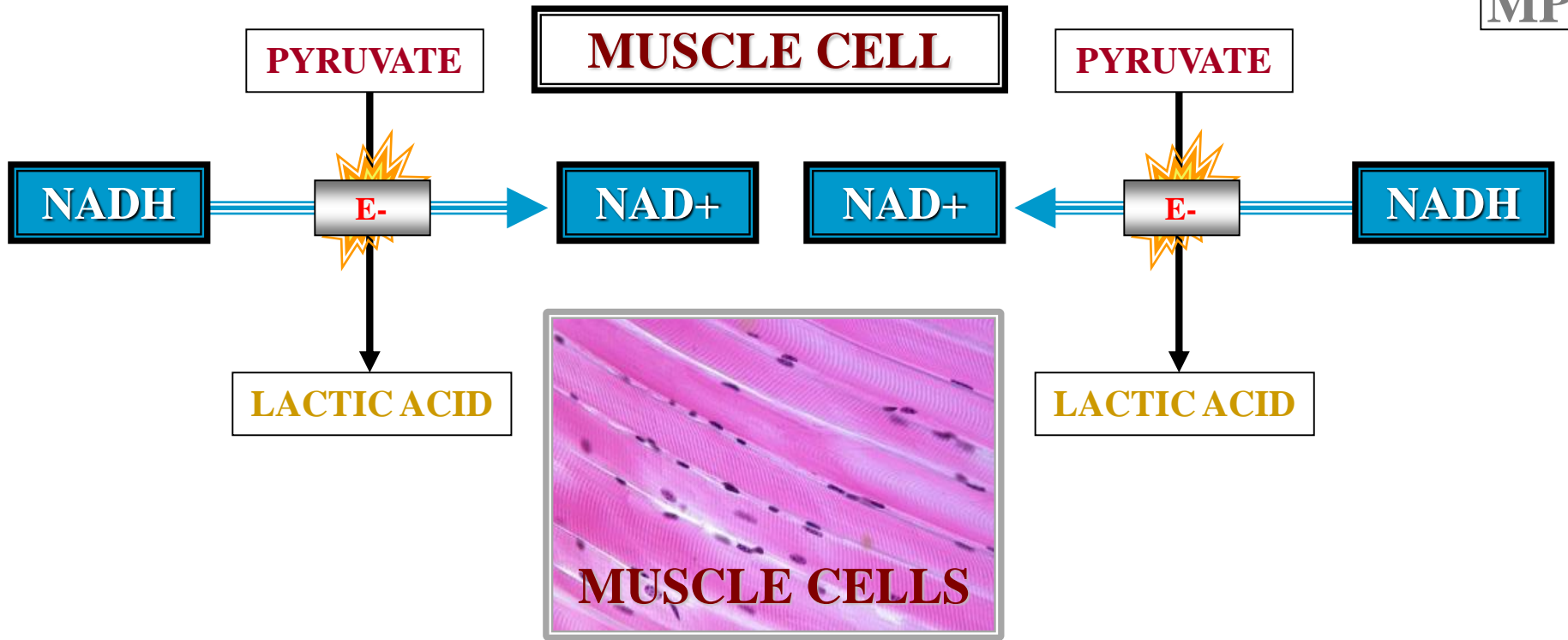
*CELL
GROWTH
&
MAINTENANCE*

HOMEOSTASIS

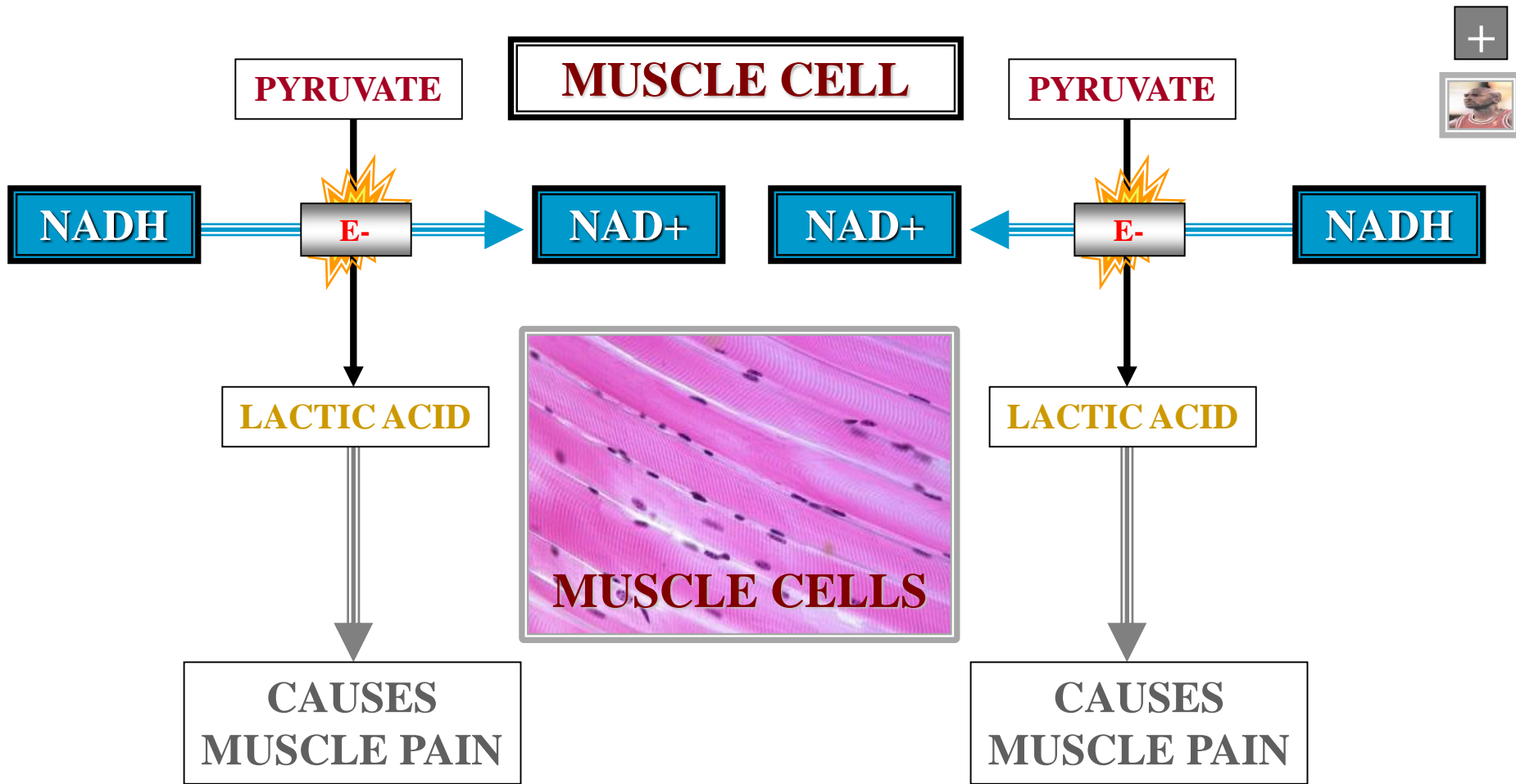




**LACTIC ACID
FERMENTATION
CAUSES
MUSCLE PAIN**

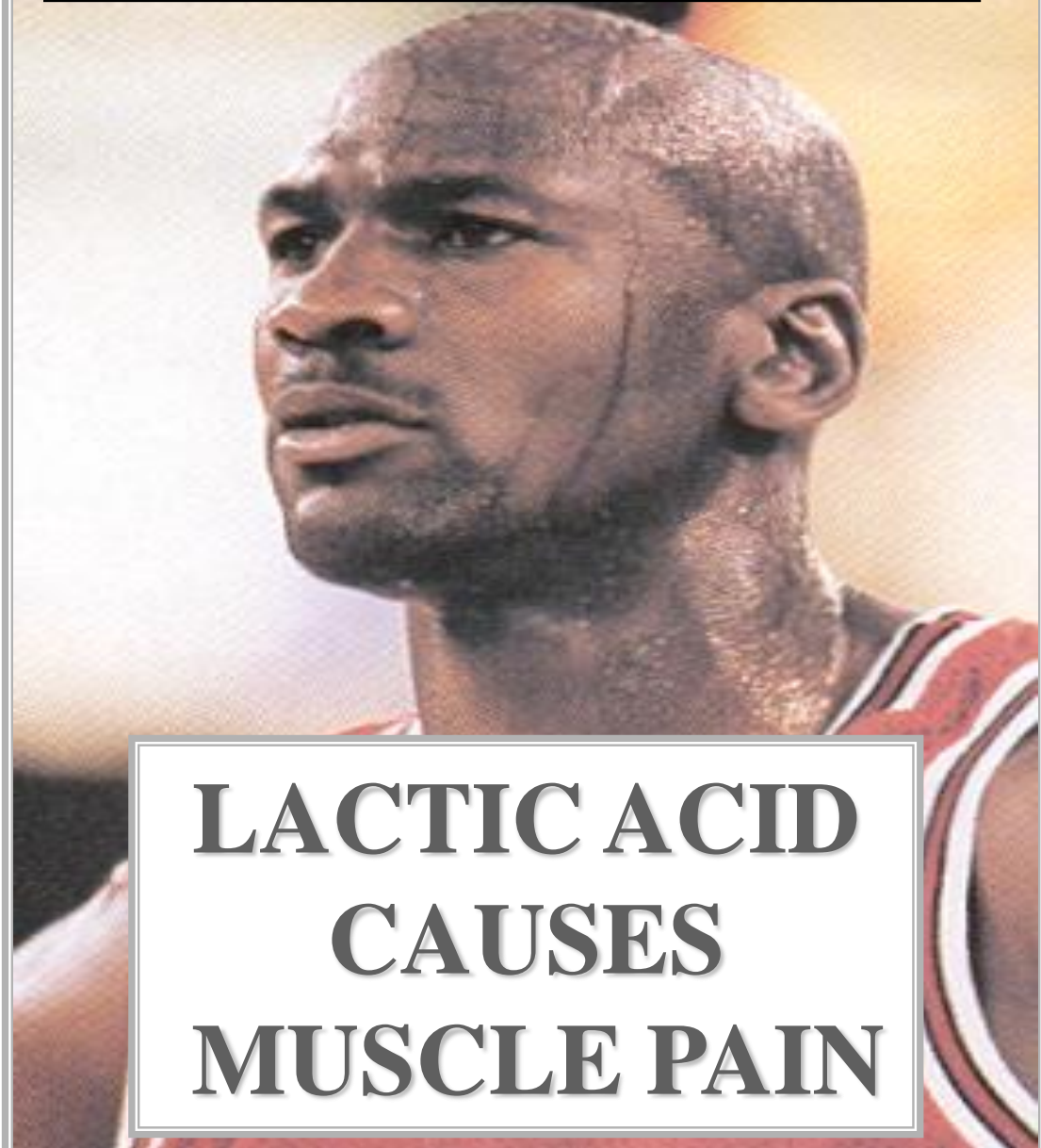


LACTIC ACID FERMENTATION



LACTIC ACID FERMENTATION

HUMAN METABOLISM



**LACTIC ACID
CAUSES
MUSCLE PAIN**



**ANAEROBIC
RESPIRATION
PHOSPHORYLATION**

QUESTION

PHOSPHORYLATION
OCCURS DURING WHICH
COMPONENT PATHWAY OF
ANAEROBIC RESPIRATION?

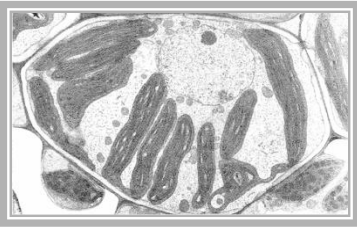
QUESTION



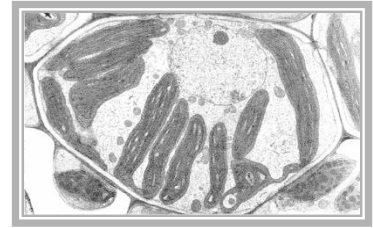
ANSWER

GLYCOLYSIS

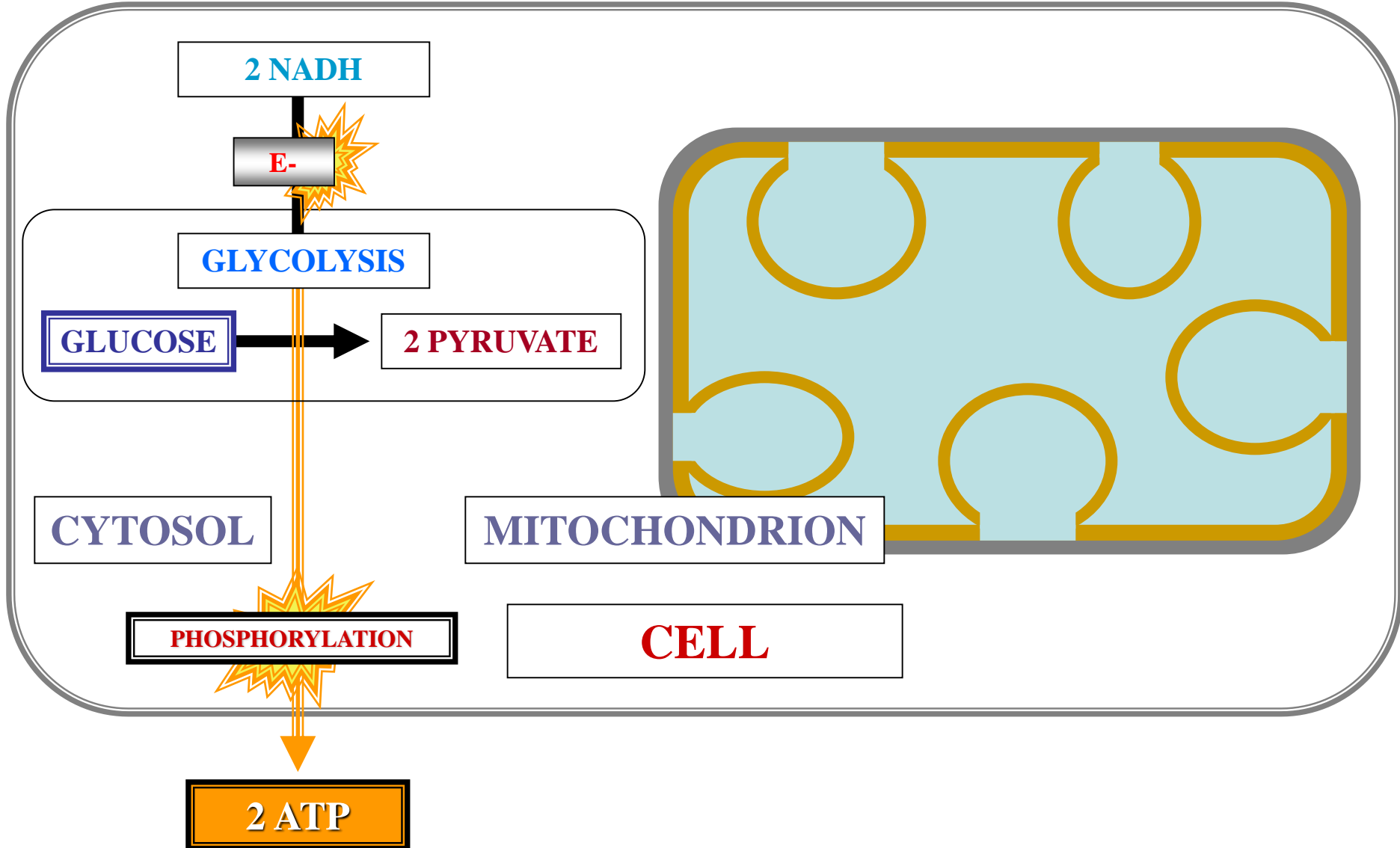
ANSWER



ANAEROBIC RESPIRATION



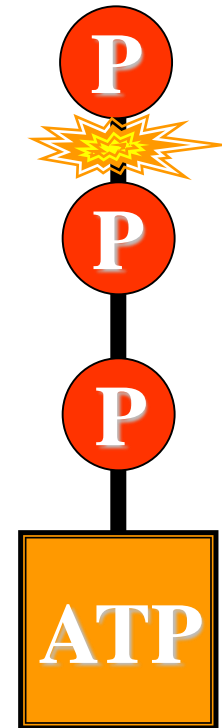
P
D



GLYCOLYSIS

SUBSTRATE PHOSPHORYLATION

**DIRECT ENZYME
SUBSTRATE
PHOSPHORYLATION**



!!!ETC: ABSENT!!!

 = CHEMICAL ENERGY



ANAEROBIC RESPIRATION

ATP NET / GLUCOSE

ANAEROBIC RESPIRATION

ATP NET / GLUCOSE

?



ANAEROBIC RESPIRATION

ATP NET / GLUCOSE

2 ATP

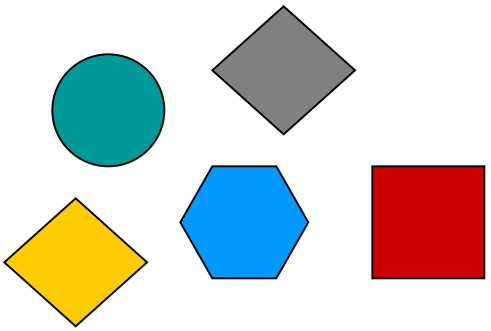
METABOLISM

GLUCOSE



CATABOLIC METABOLISM

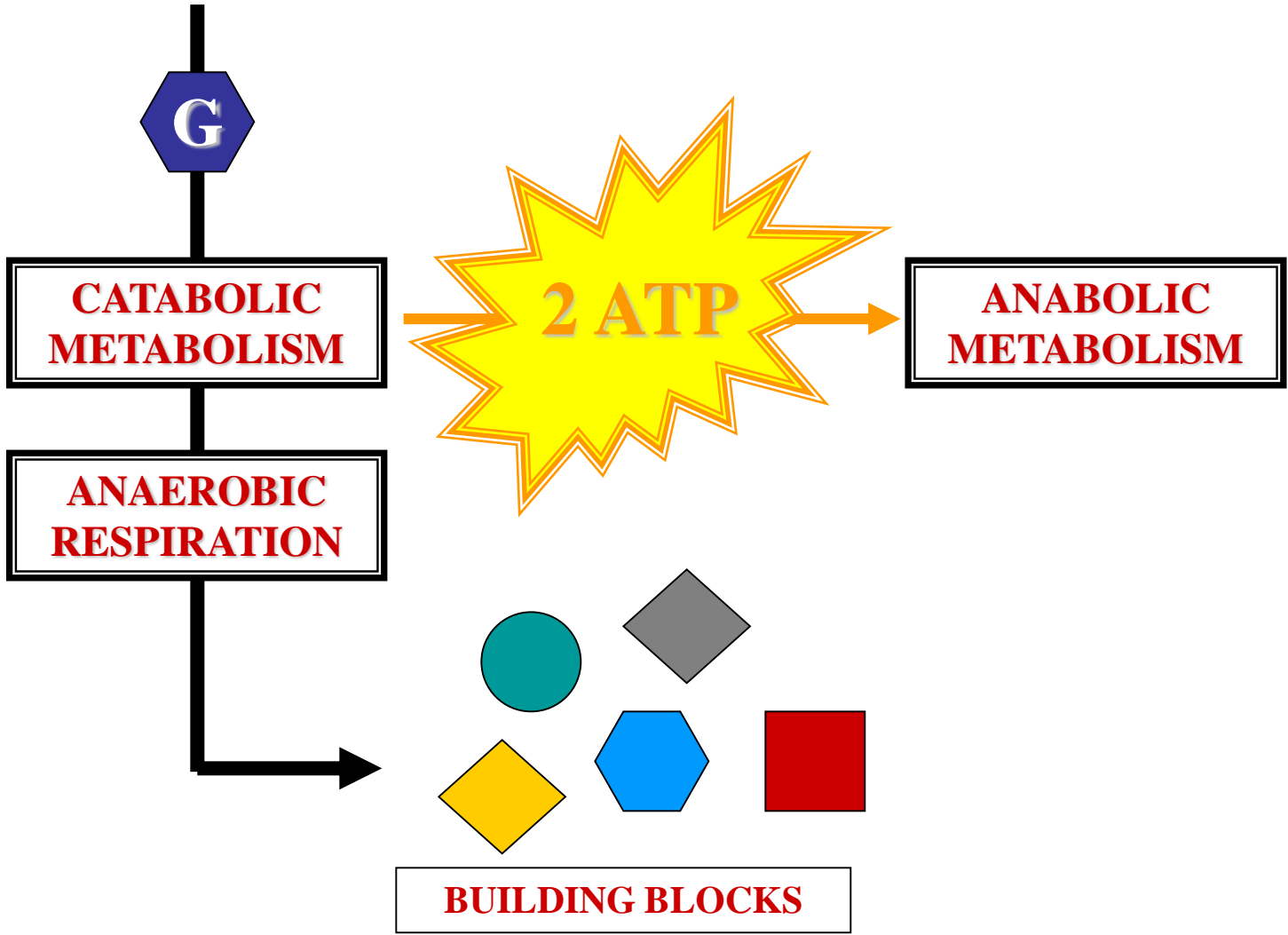
ANAEROBIC RESPIRATION



BUILDING BLOCKS

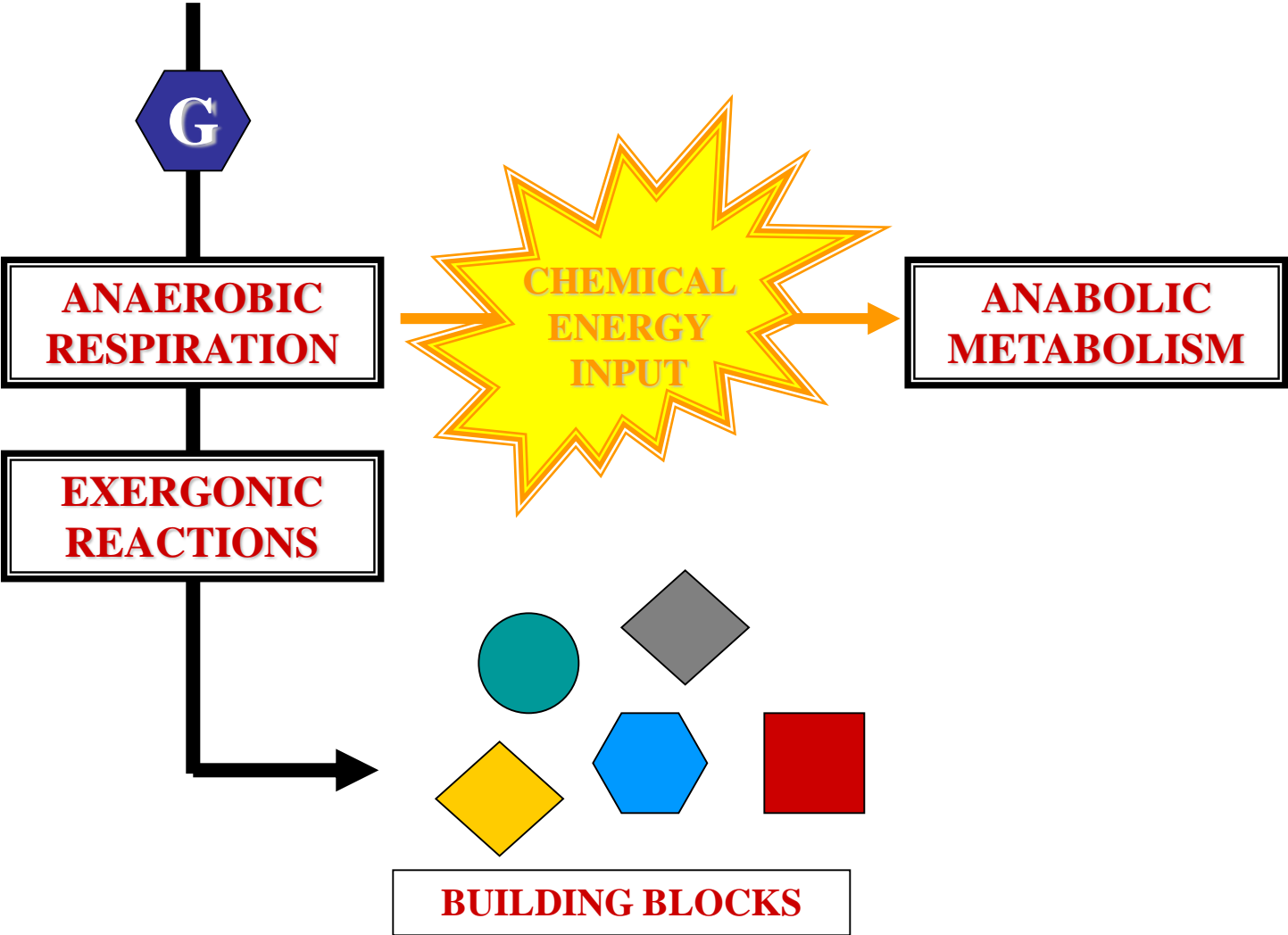
METABOLISM

GLUCOSE



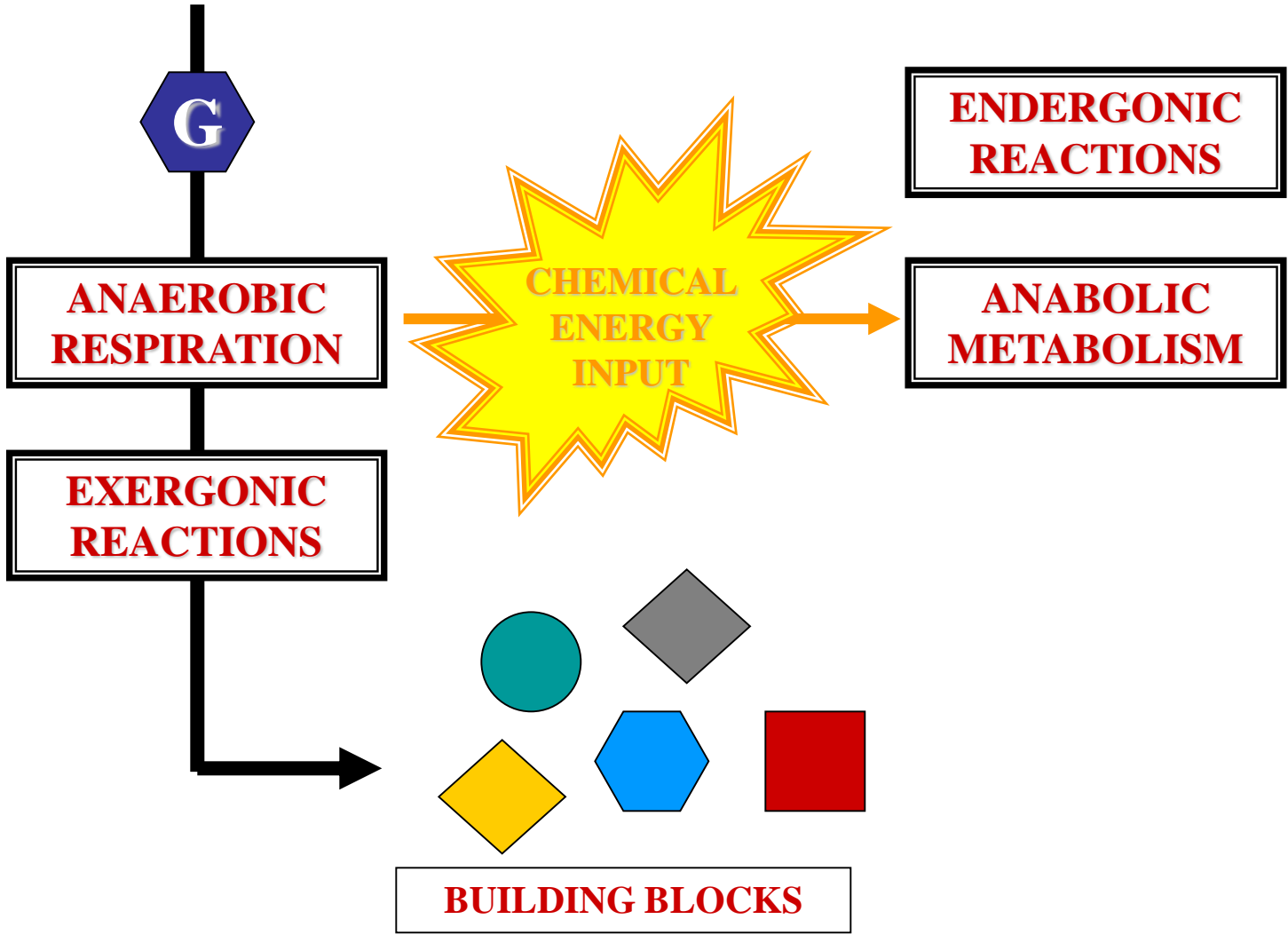
METABOLISM

GLUCOSE



METABOLISM

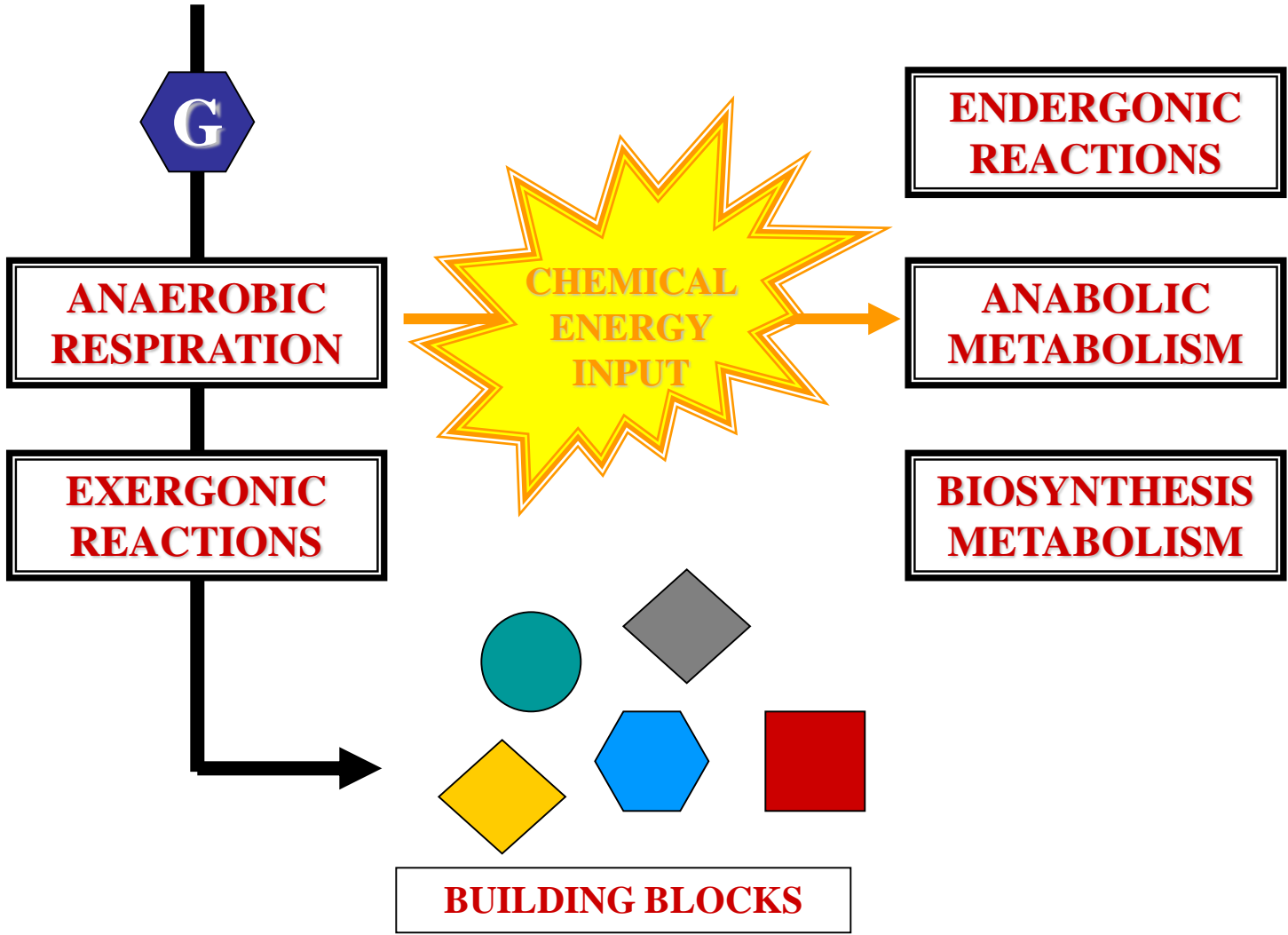
GLUCOSE





METABOLISM

GLUCOSE

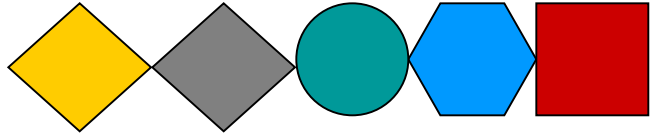




METABOLISM

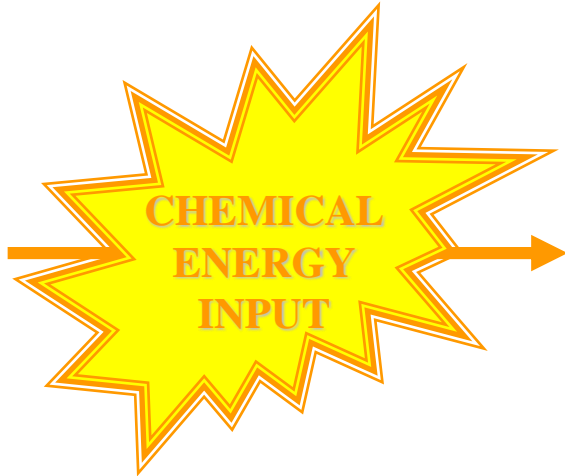
GLUCOSE

COMPLEX BIO-CHEM-CMPS



**ANAEROBIC
RESPIRATION**

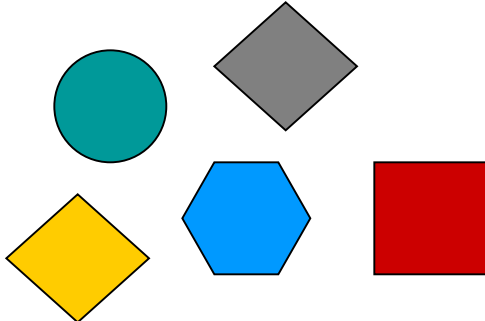
**EXERGONIC
REACTIONS**



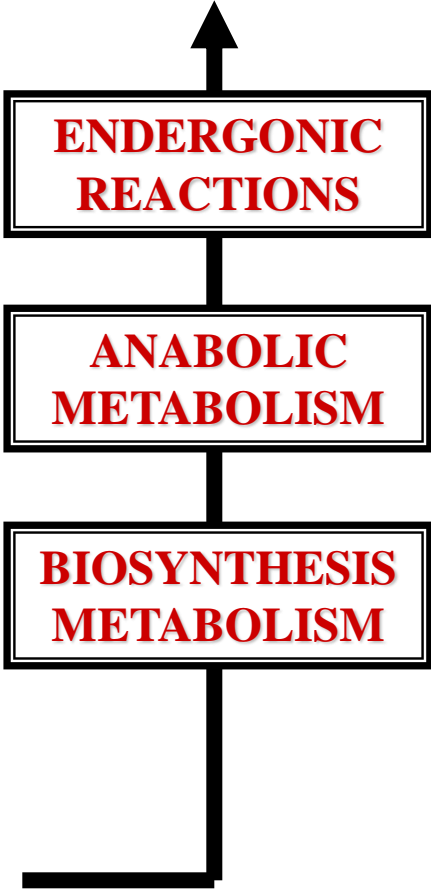
**ENDERGONIC
REACTIONS**

**ANABOLIC
METABOLISM**

**BIOSYNTHESIS
METABOLISM**



BUILDING BLOCKS



*CELL
GROWTH
&
MAINTENANCE*



HOMEOSTASIS

END
LECTURE
MATERIAL
2ND EXAM

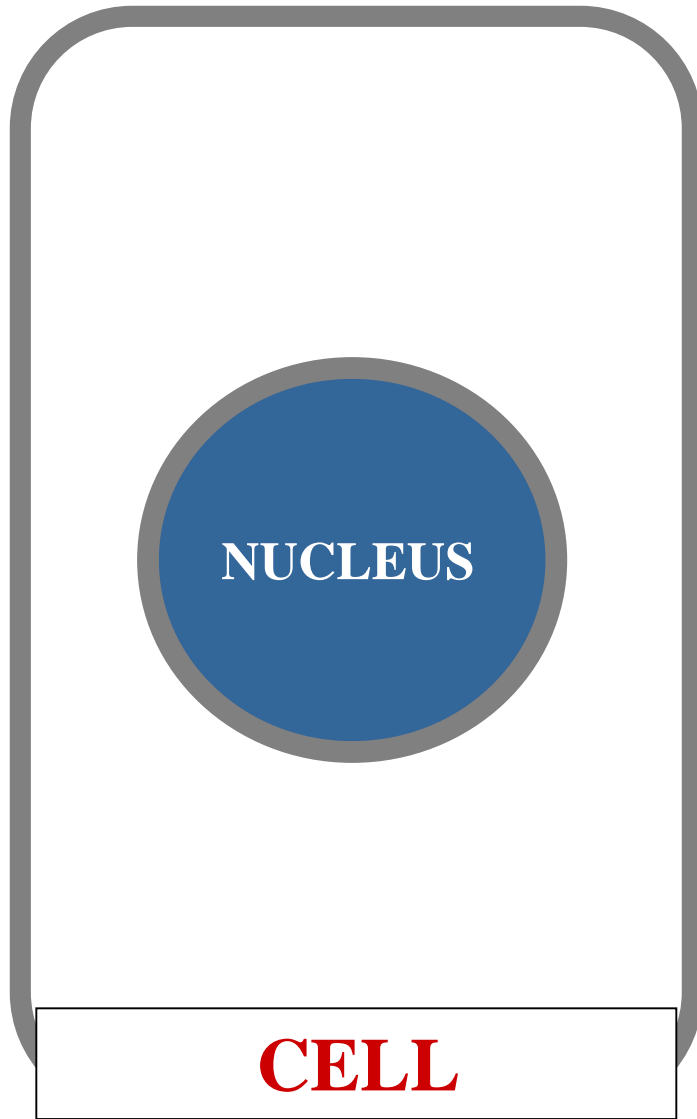
CHAPTER 12

CELL REPRODUCTION

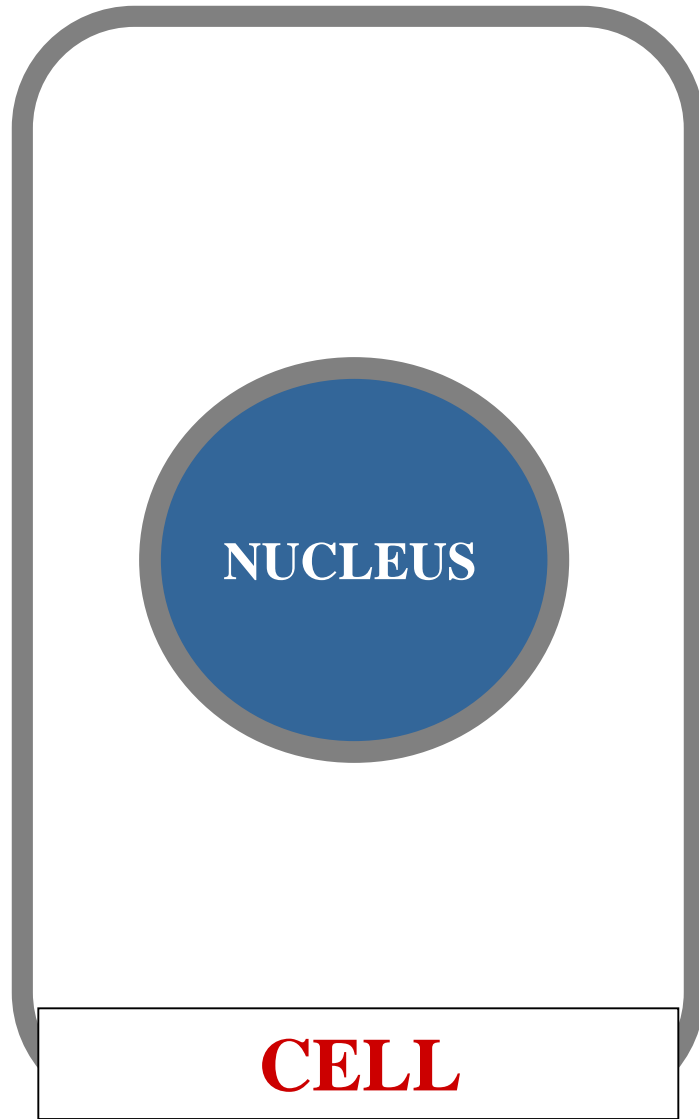


CELL REPRODUCTION

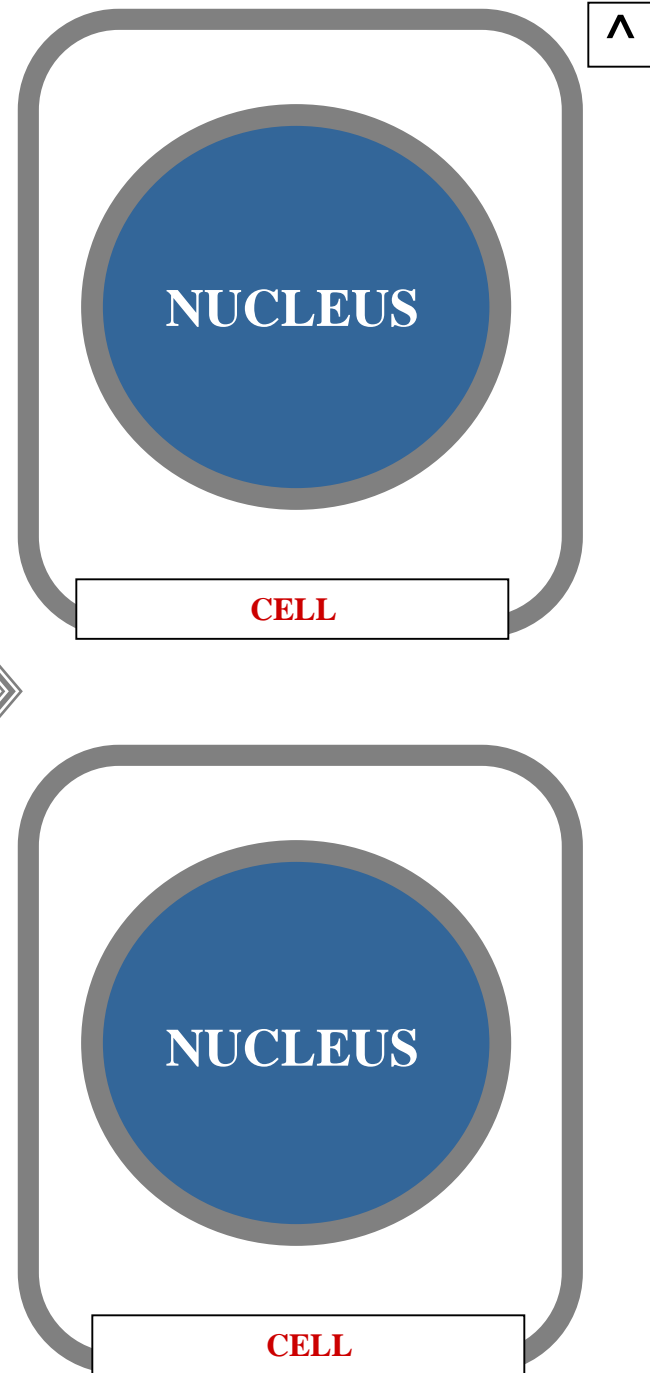
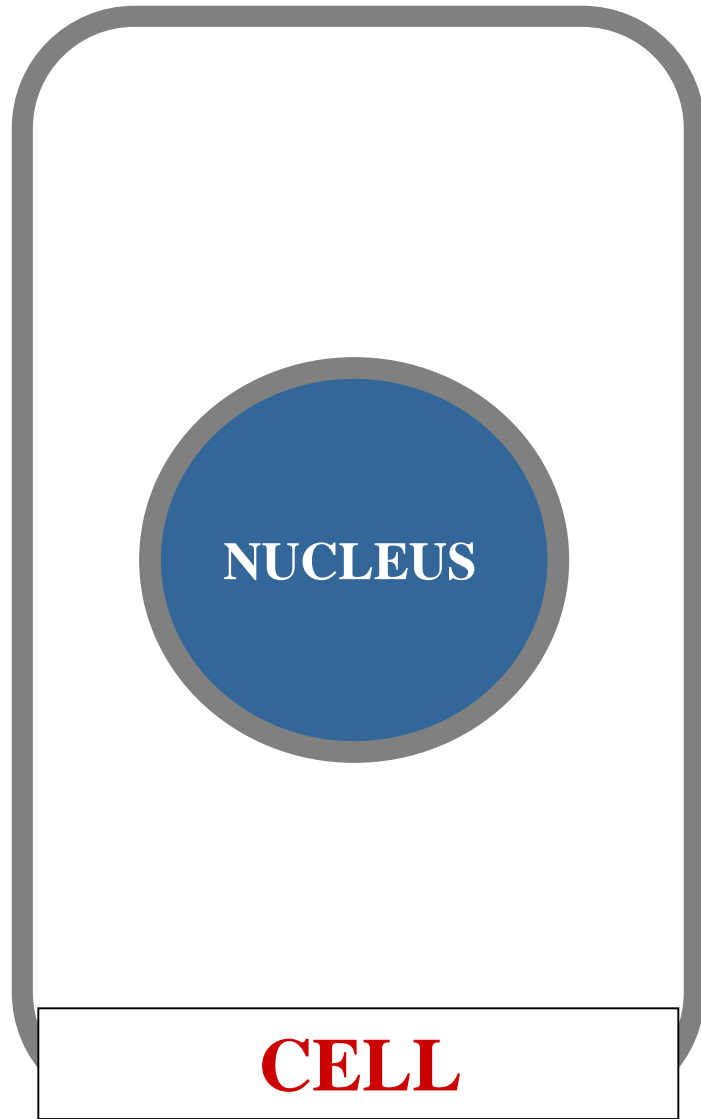
CELL REPRODUCTION



CELL REPRODUCTION

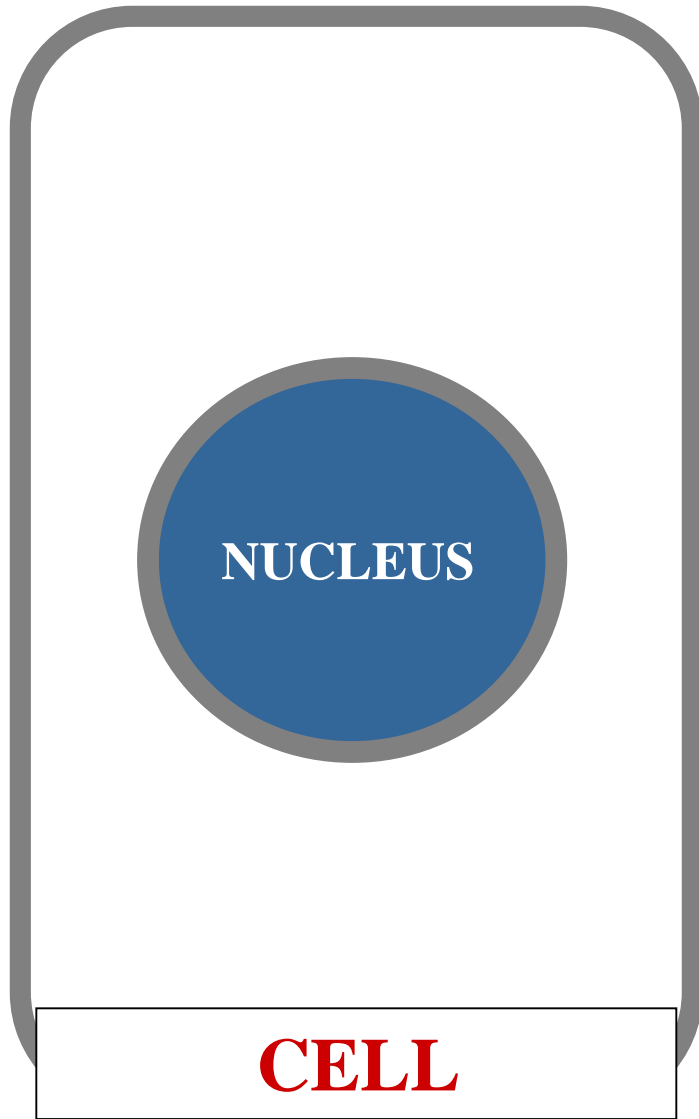


CELL REPRODUCTION

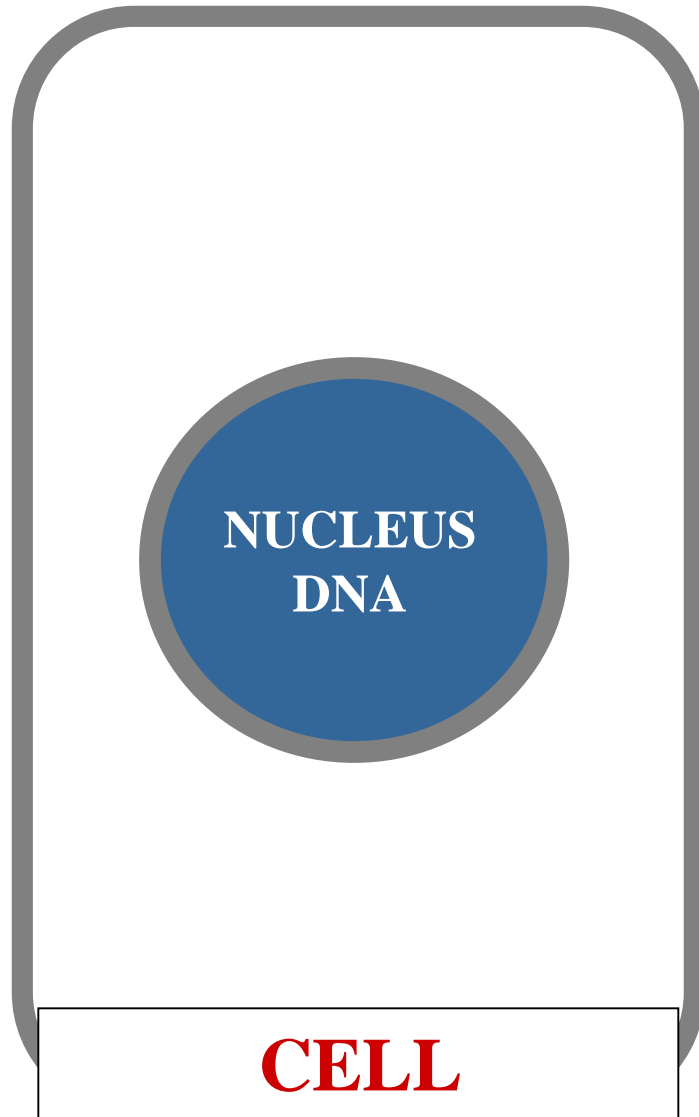


CELLS ARISE FROM CELLS

CELL REPRODUCTION

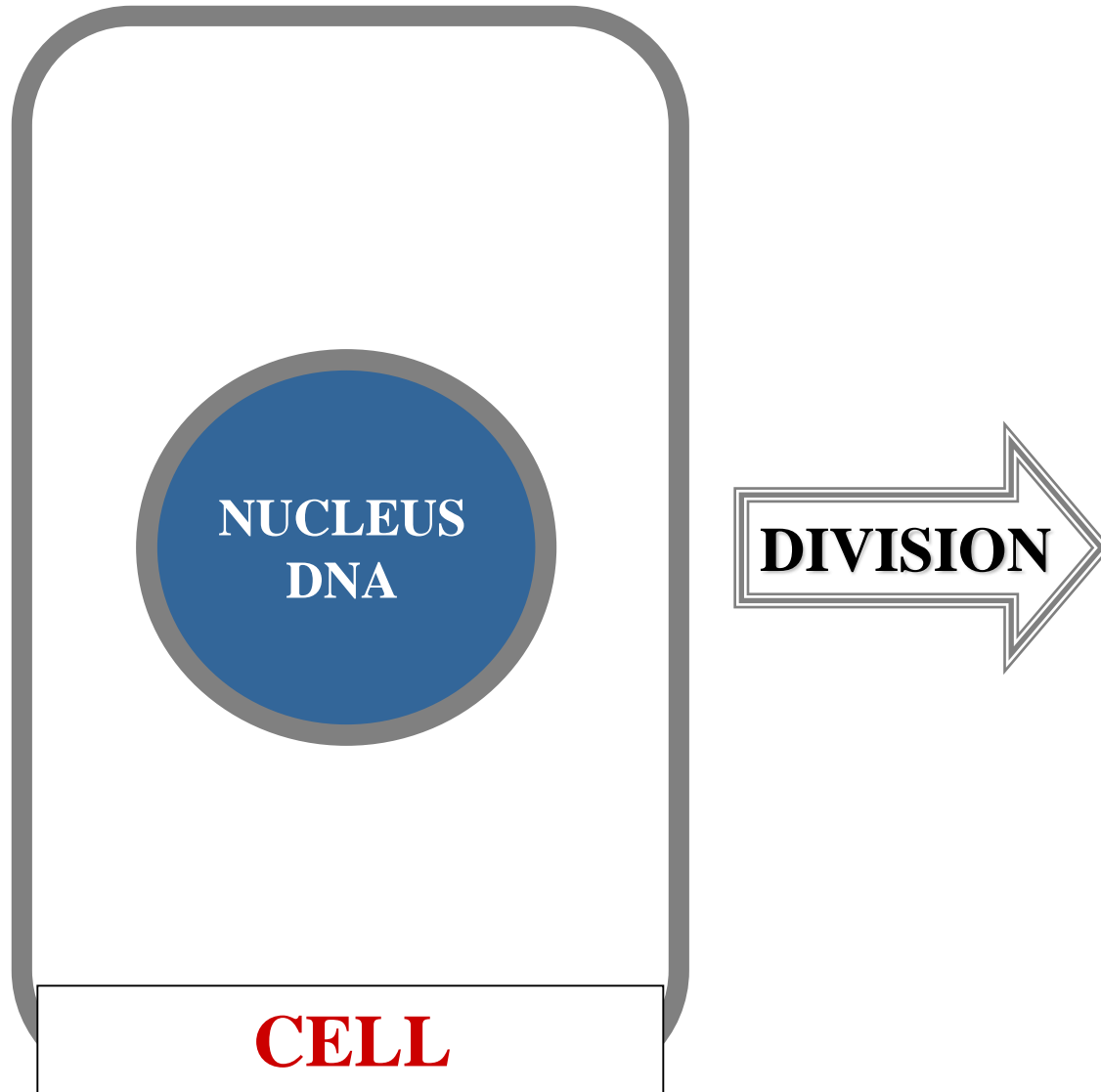


CELL REPRODUCTION



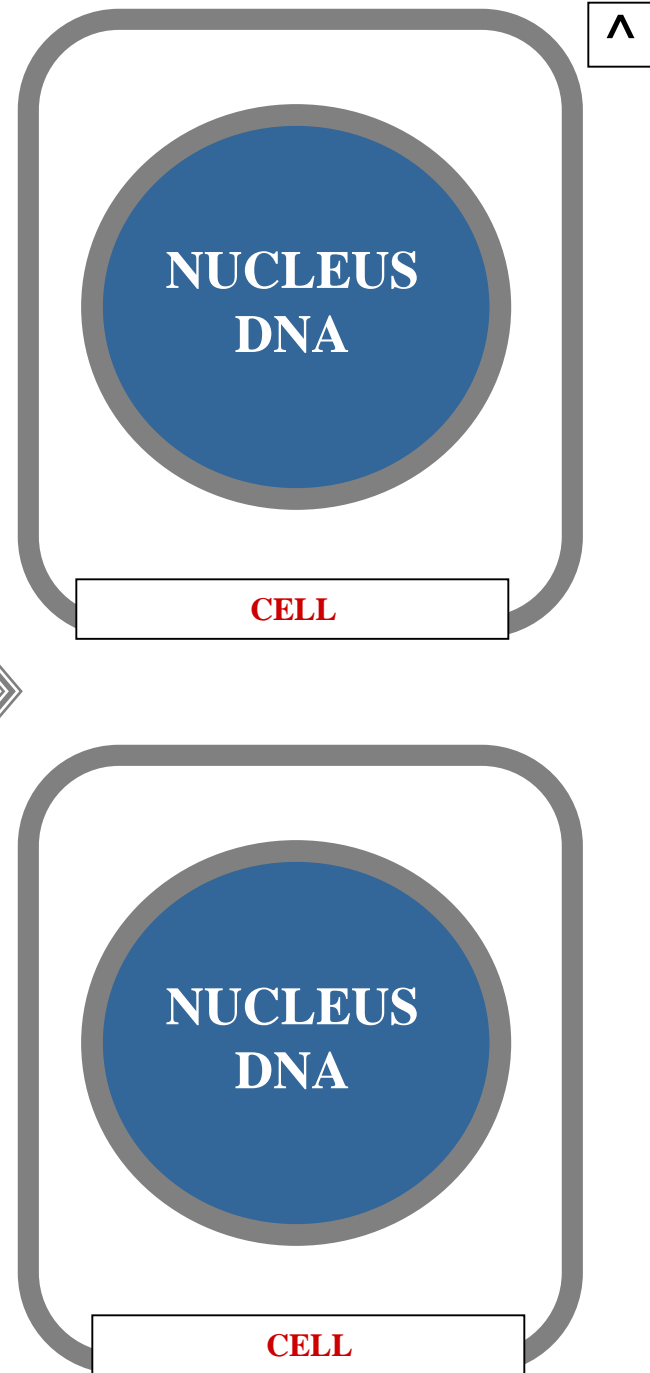
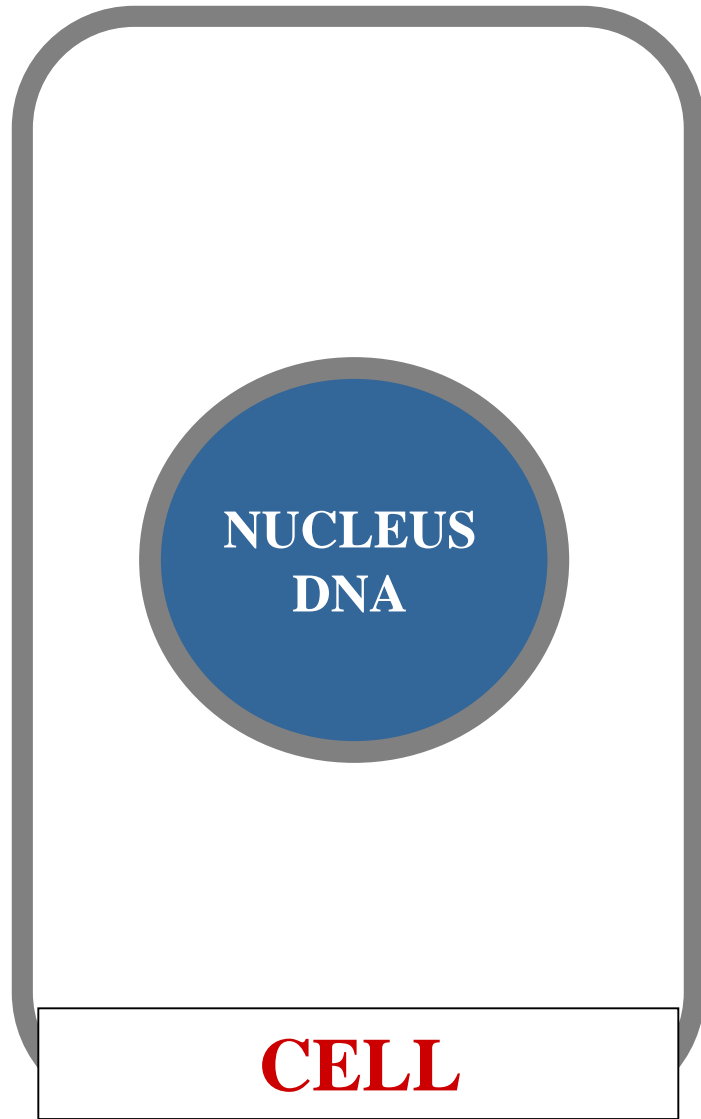
CELLS POSSESS DNA

CELL REPRODUCTION



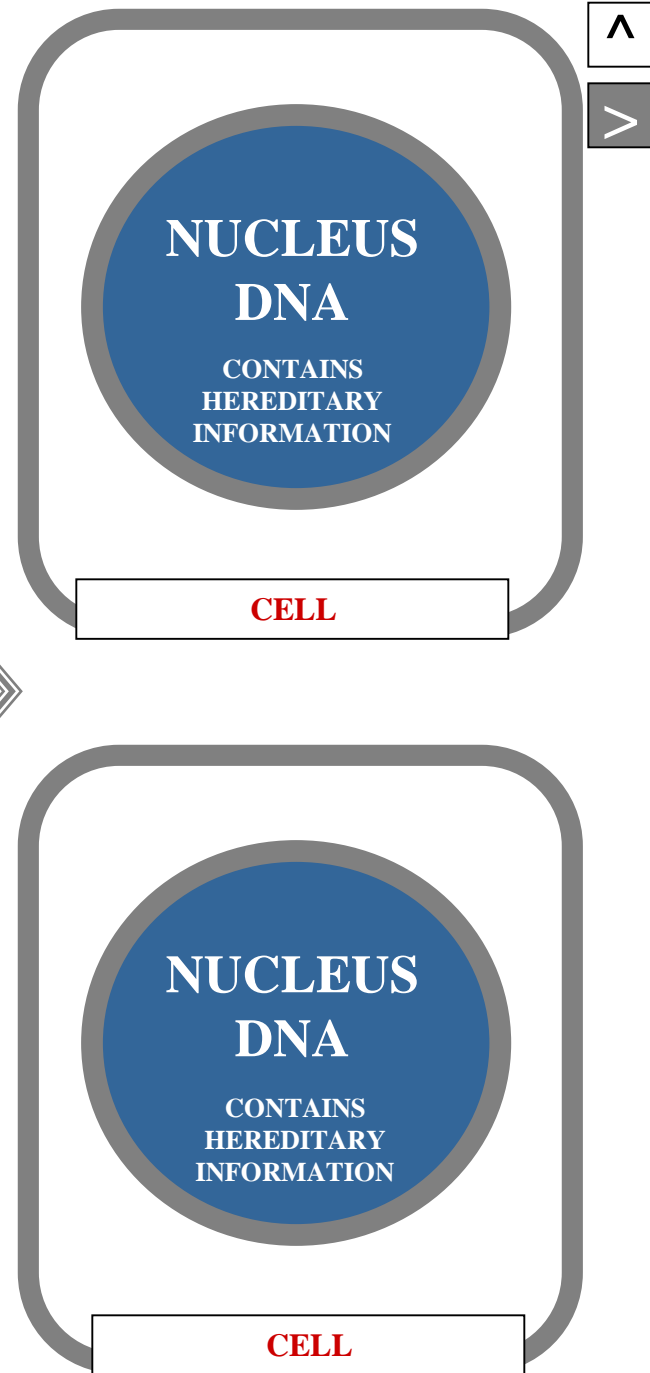
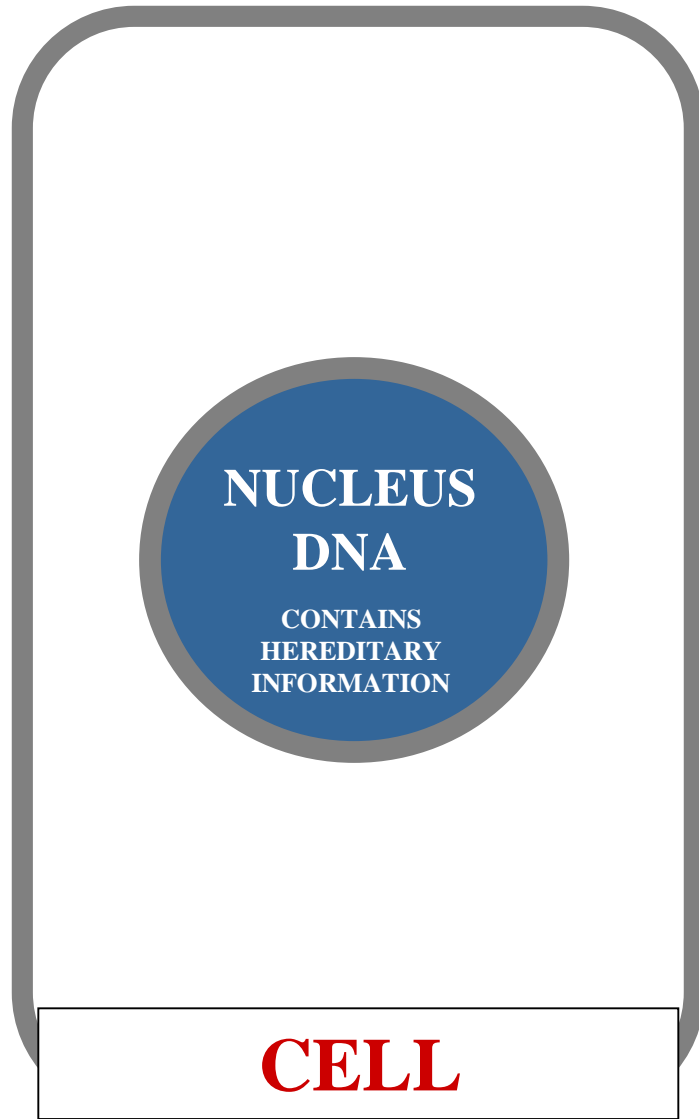
CELLS POSSESS DNA

CELL REPRODUCTION



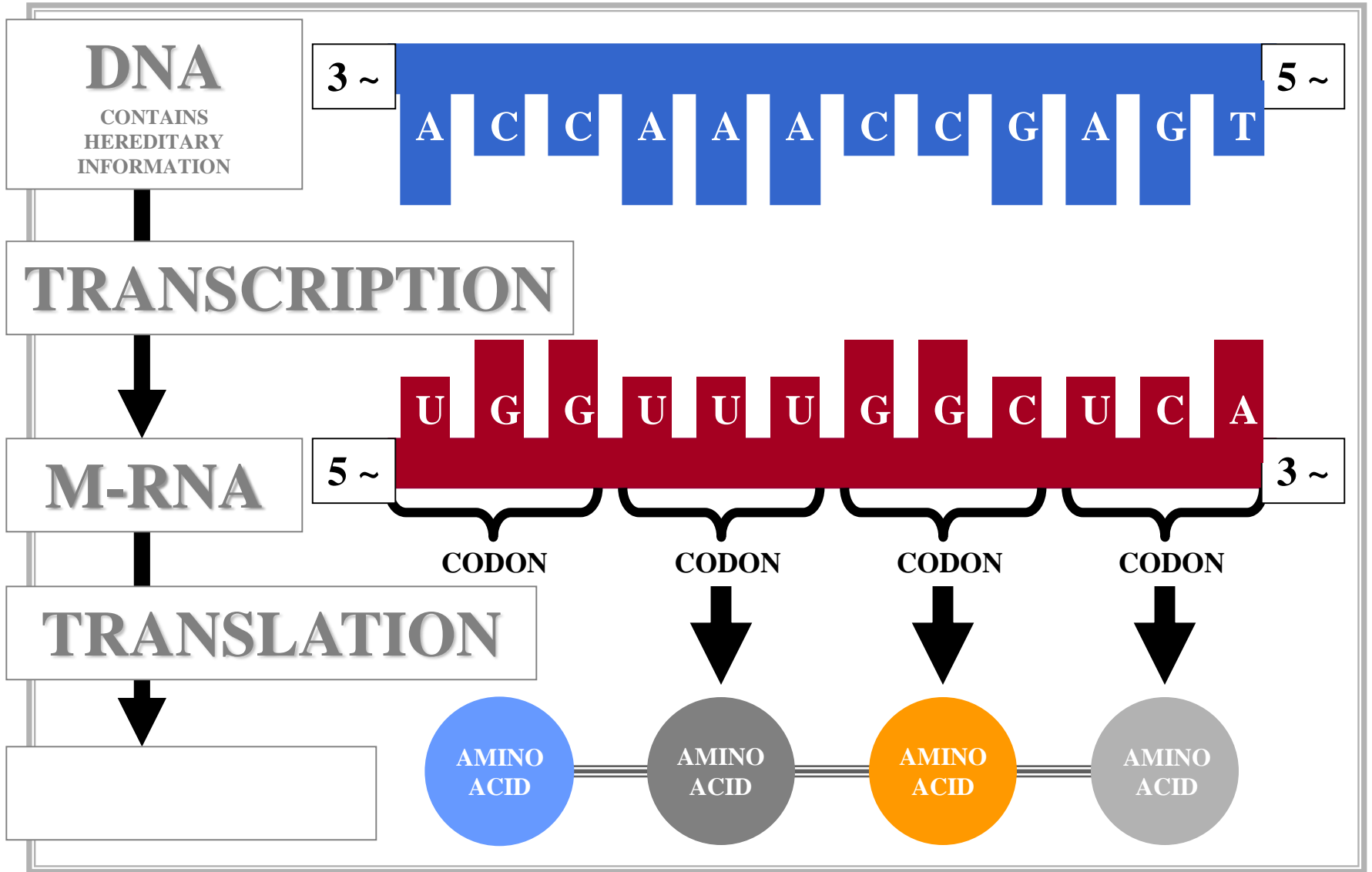
CELLS POSSESS DNA

CELL REPRODUCTION

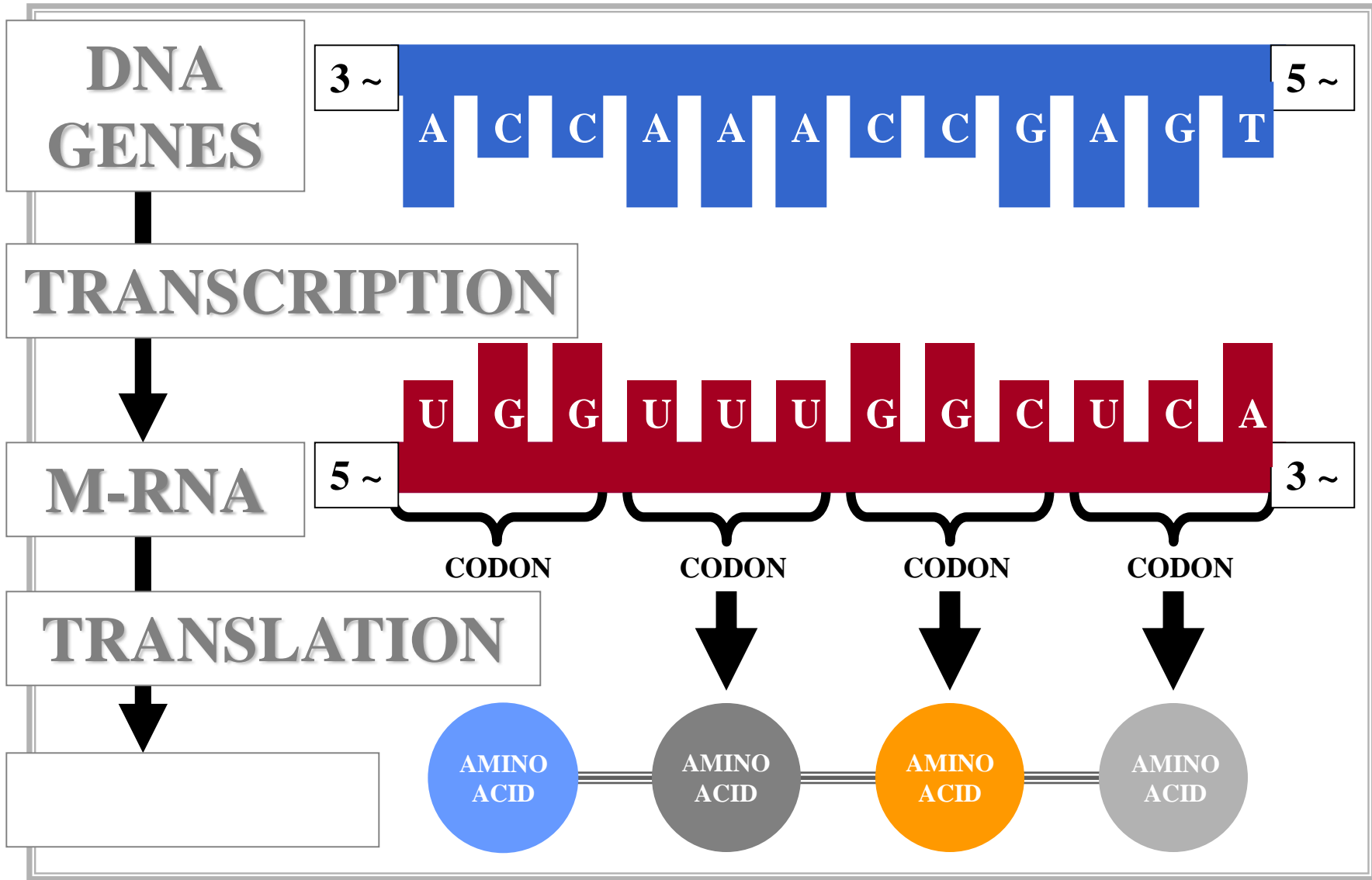


CELLS POSSESS DNA

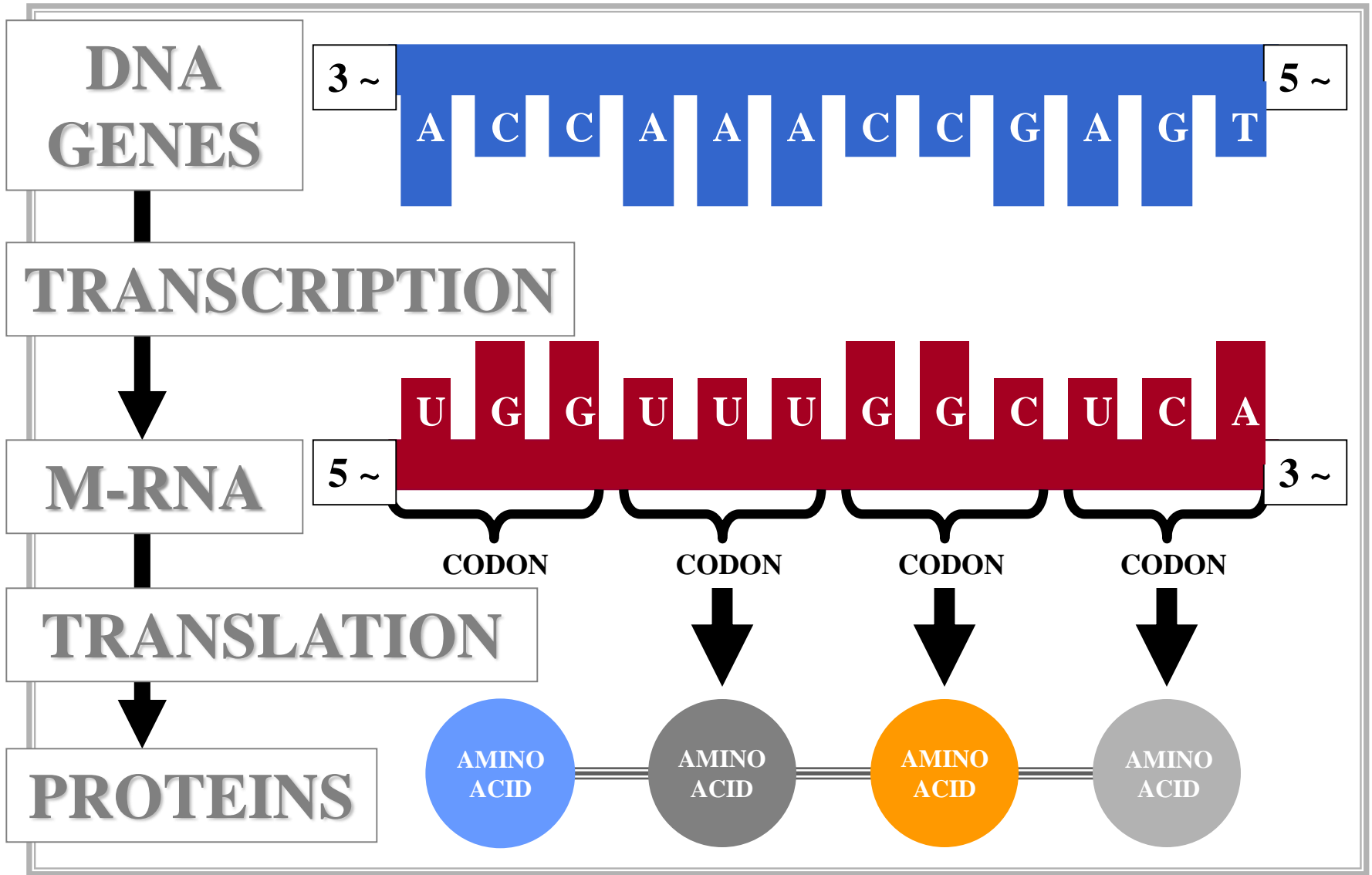
CELL REPRODUCTION



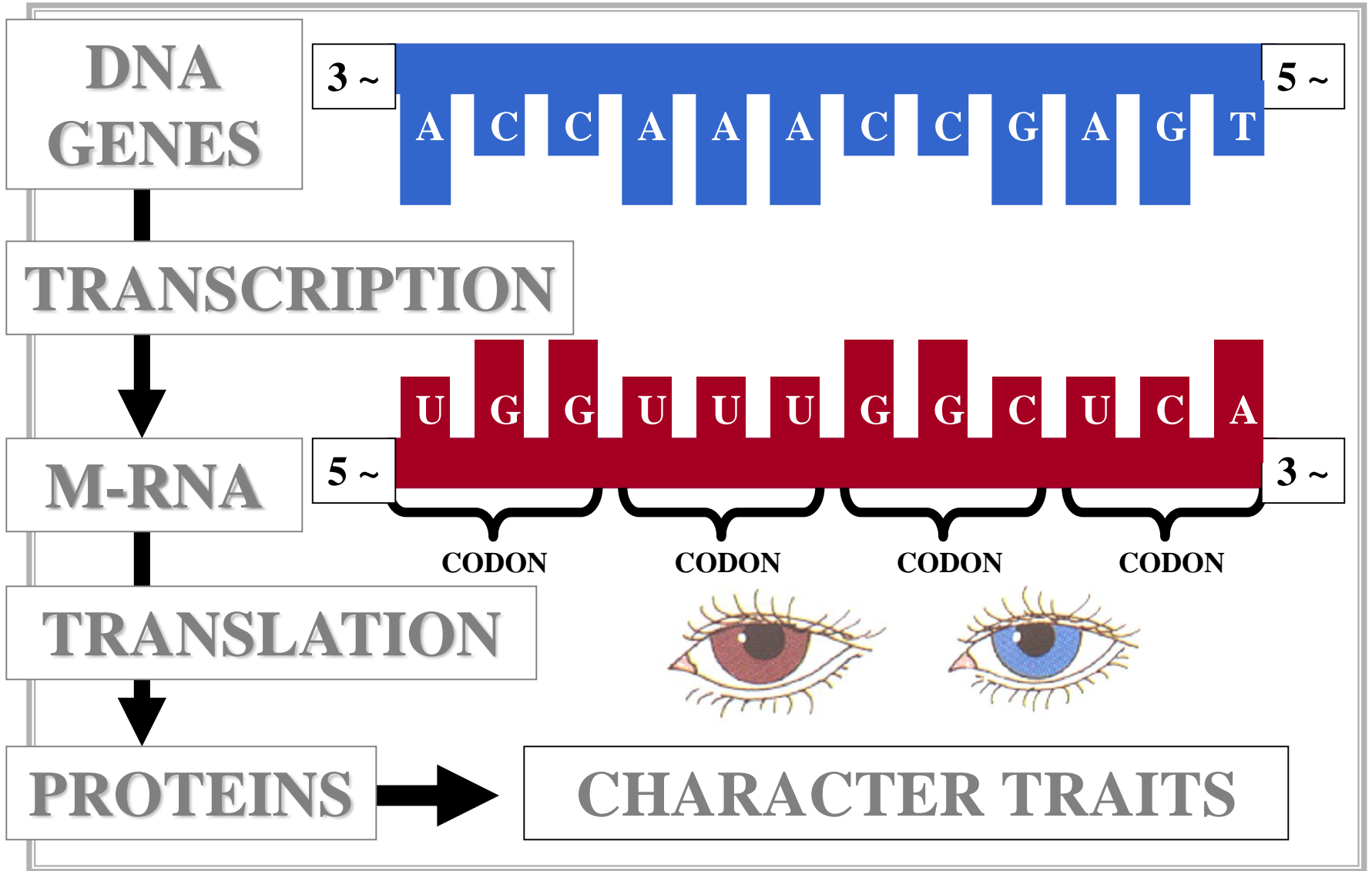
CELL REPRODUCTION



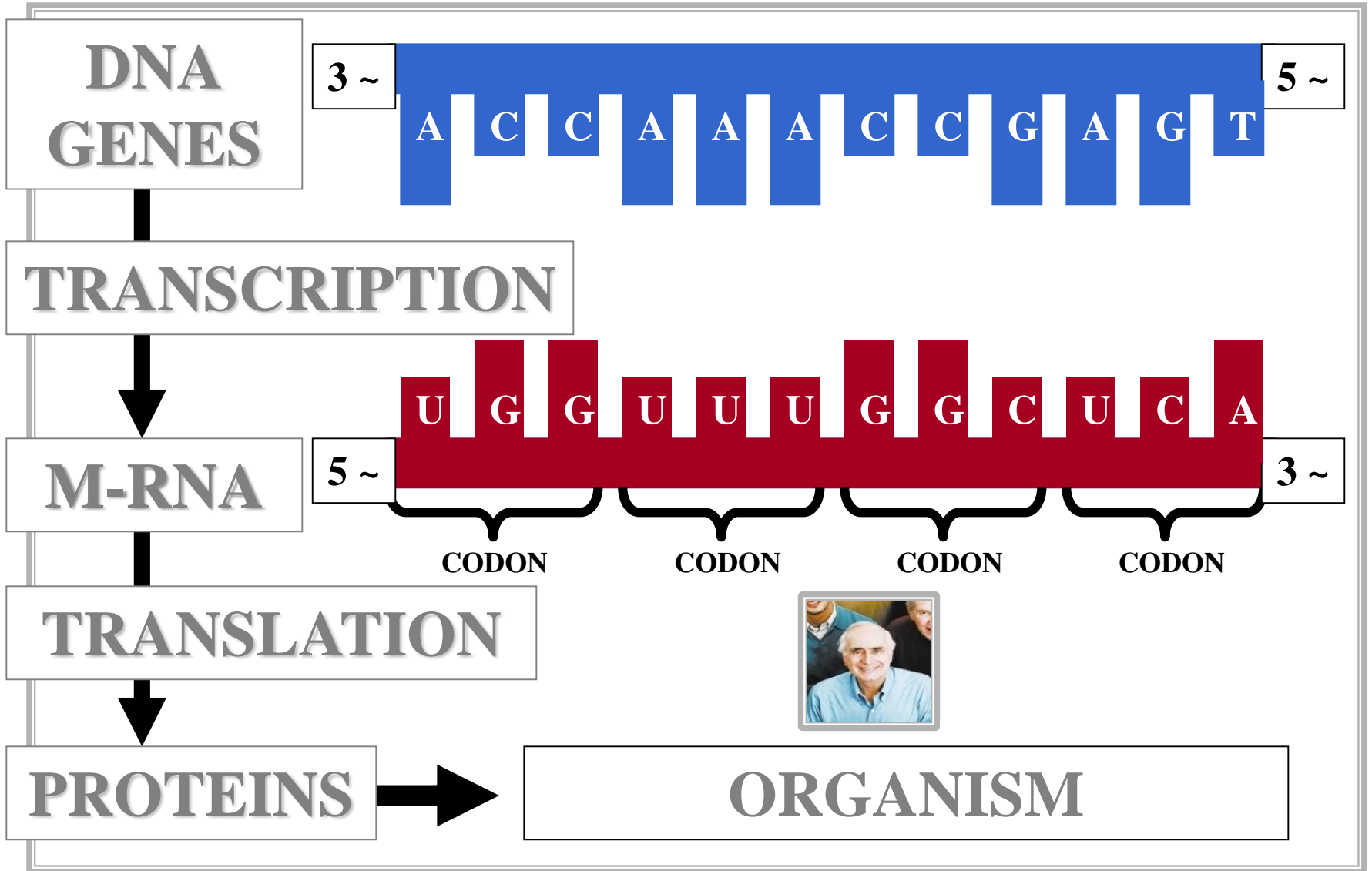
CELL REPRODUCTION



CELL REPRODUCTION



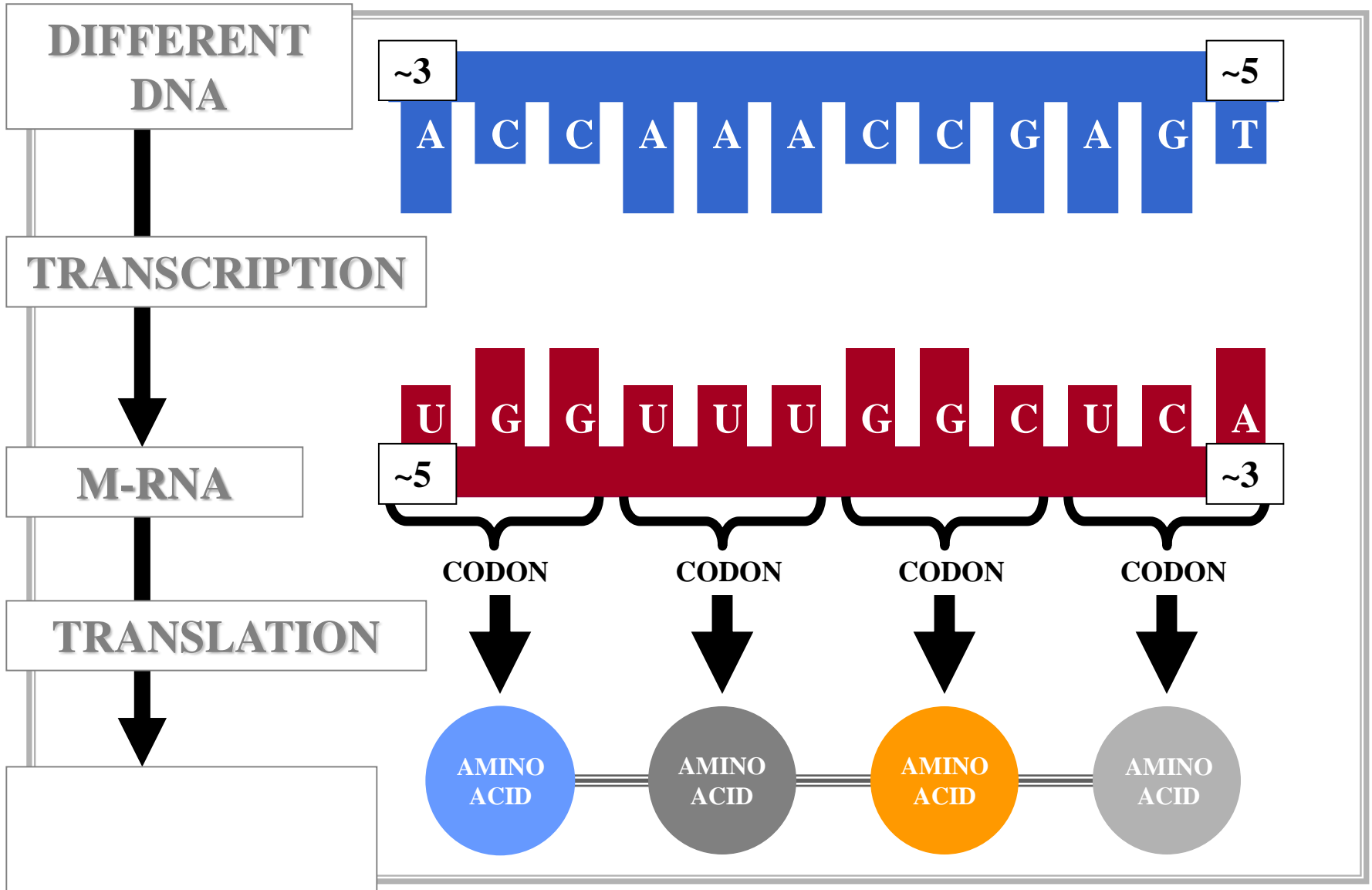
CELL REPRODUCTION



CELL REPRODUCTION

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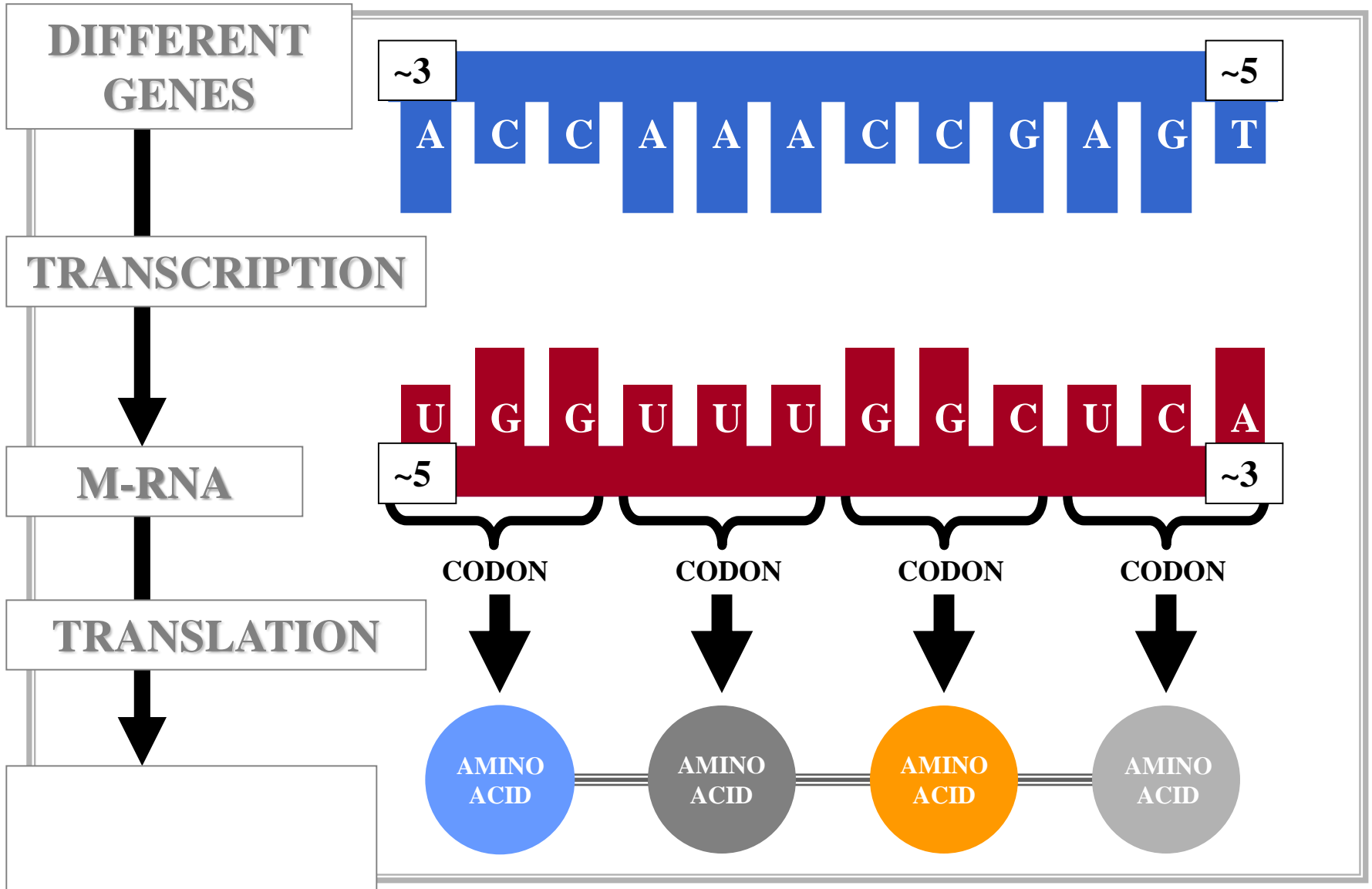
G



CELL REPRODUCTION

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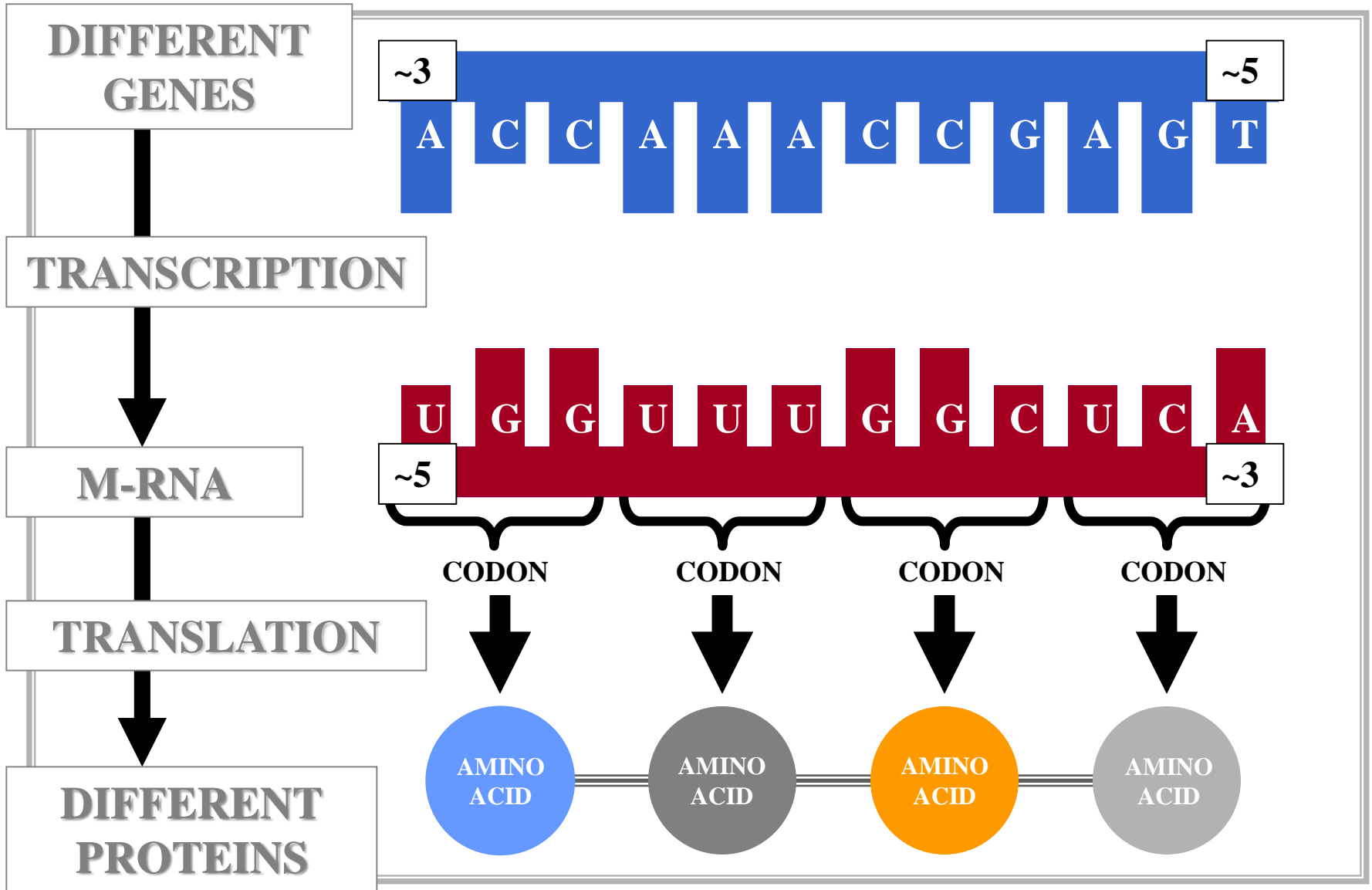
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CELL REPRODUCTION

DF

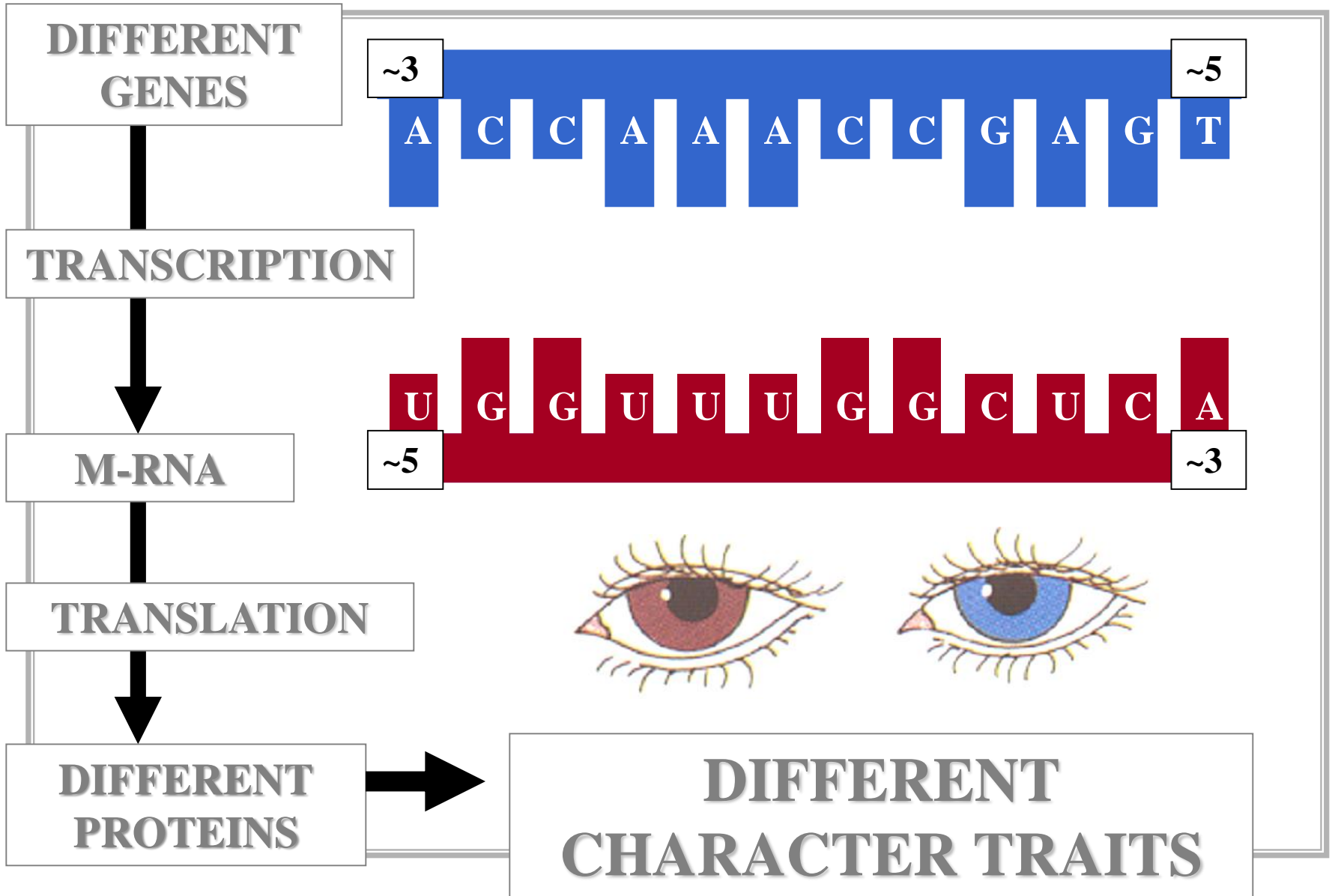
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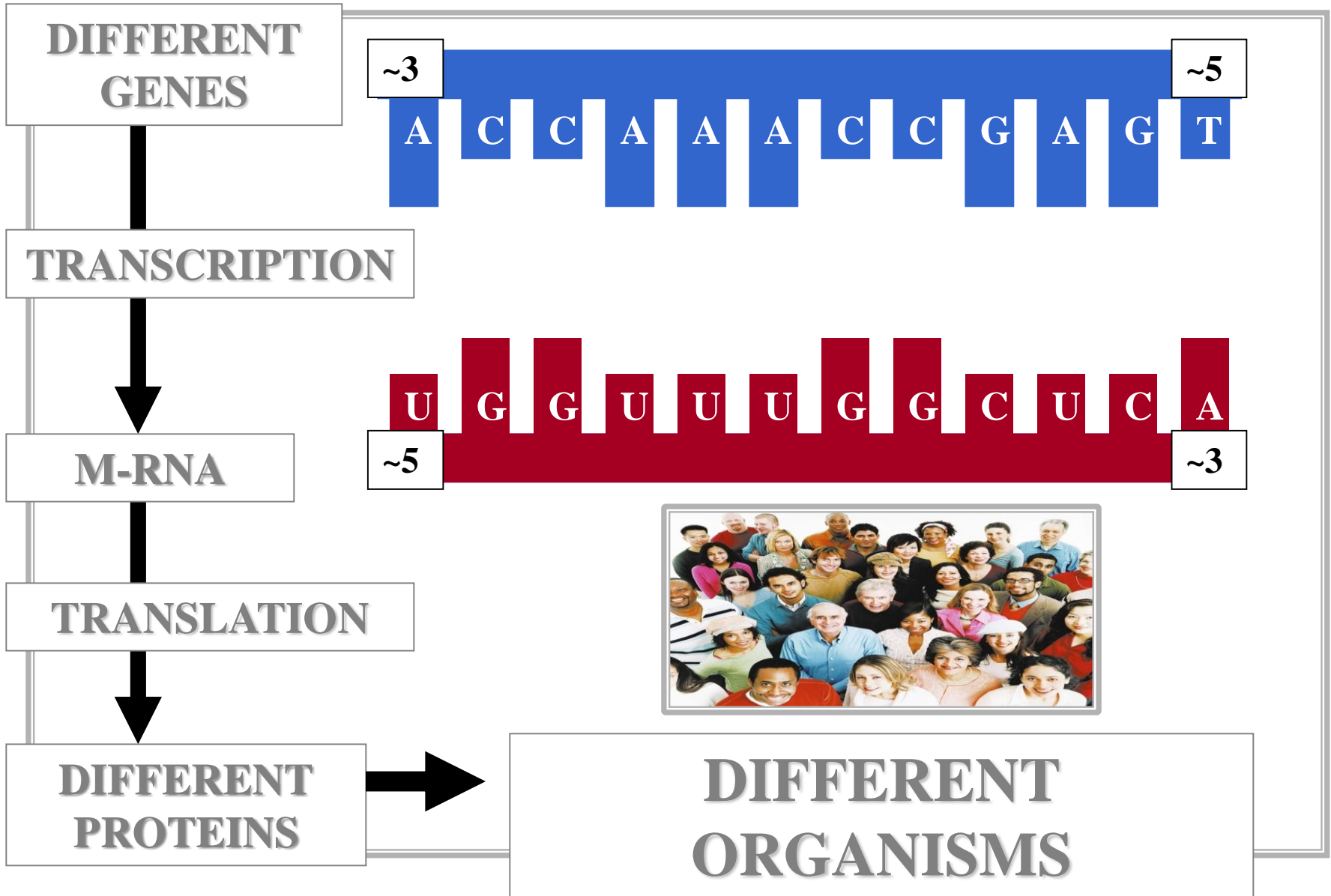
CELL REPRODUCTION

DF

O



CELL REPRODUCTION



HUMAN DIVERSITY



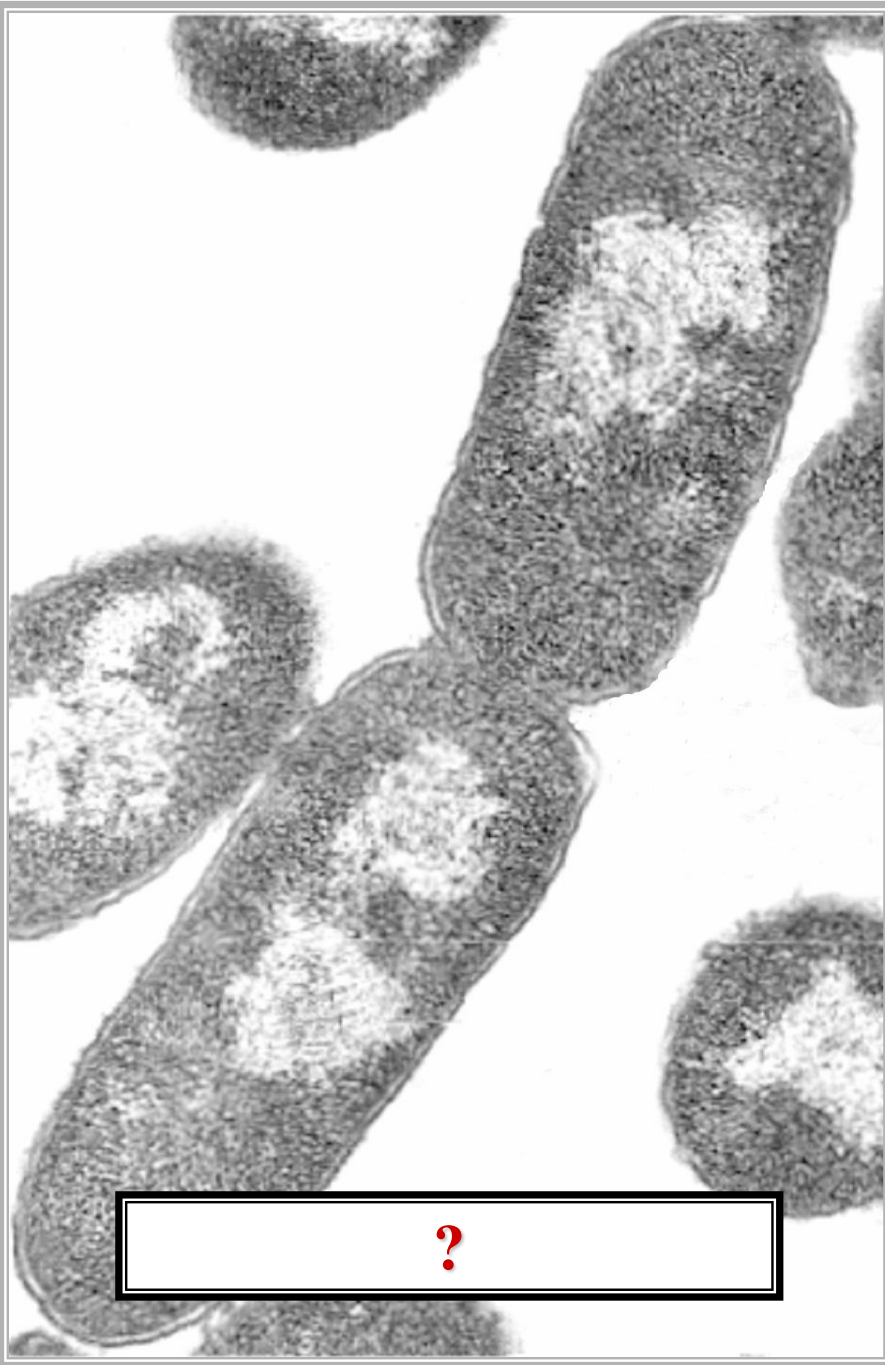
HUMAN DIVERSITY

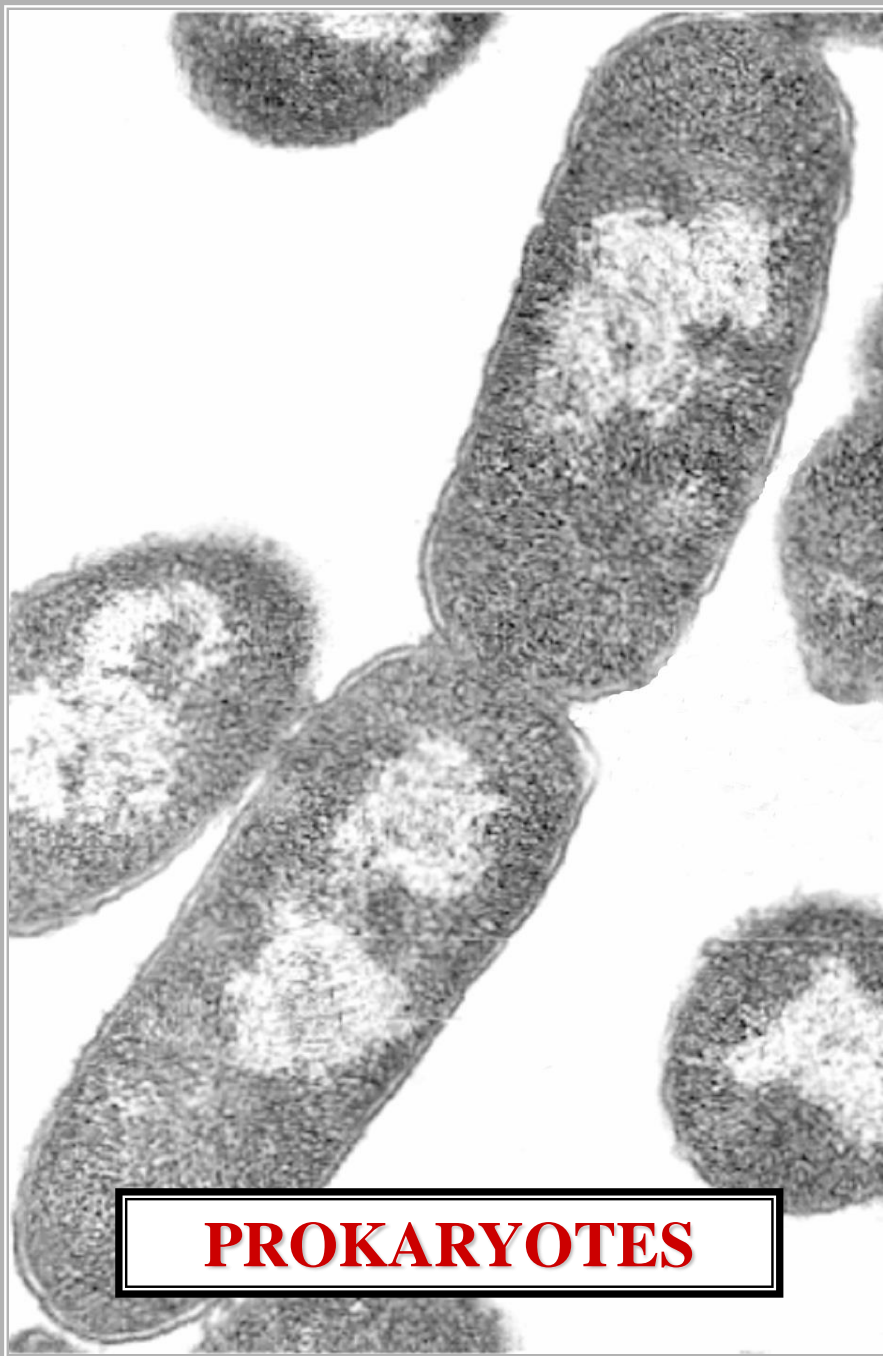


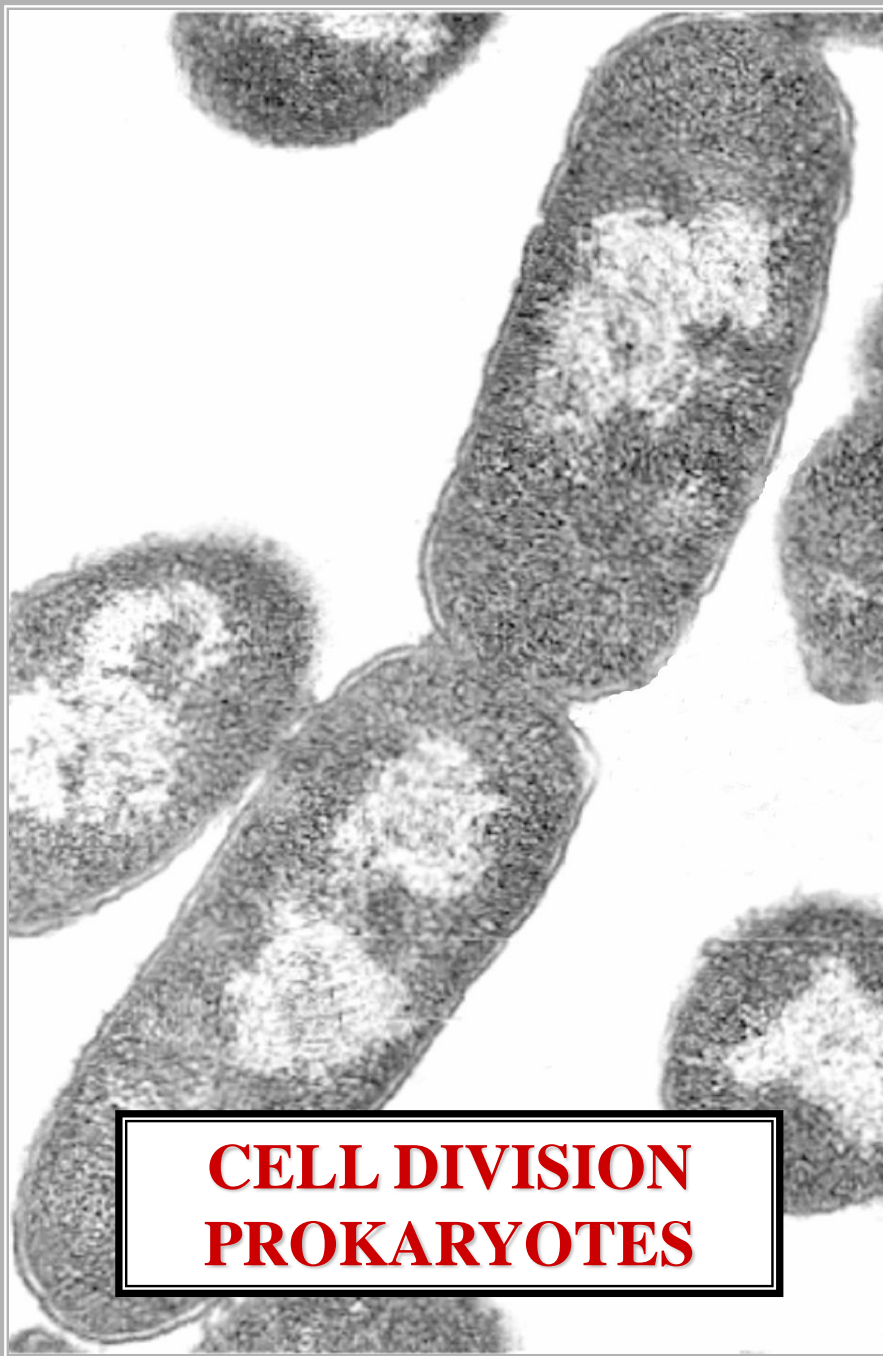
QUESTION

HOW IS DNA PASSED
FROM CELL TO CELL?

QUESTION







**CELL DIVISION
PROKARYOTES**



**CELL DIVISION
EUKARYOTES**

PROKARYOTE CELL DIVISION

PROKARYOTE

PROKARYOTE

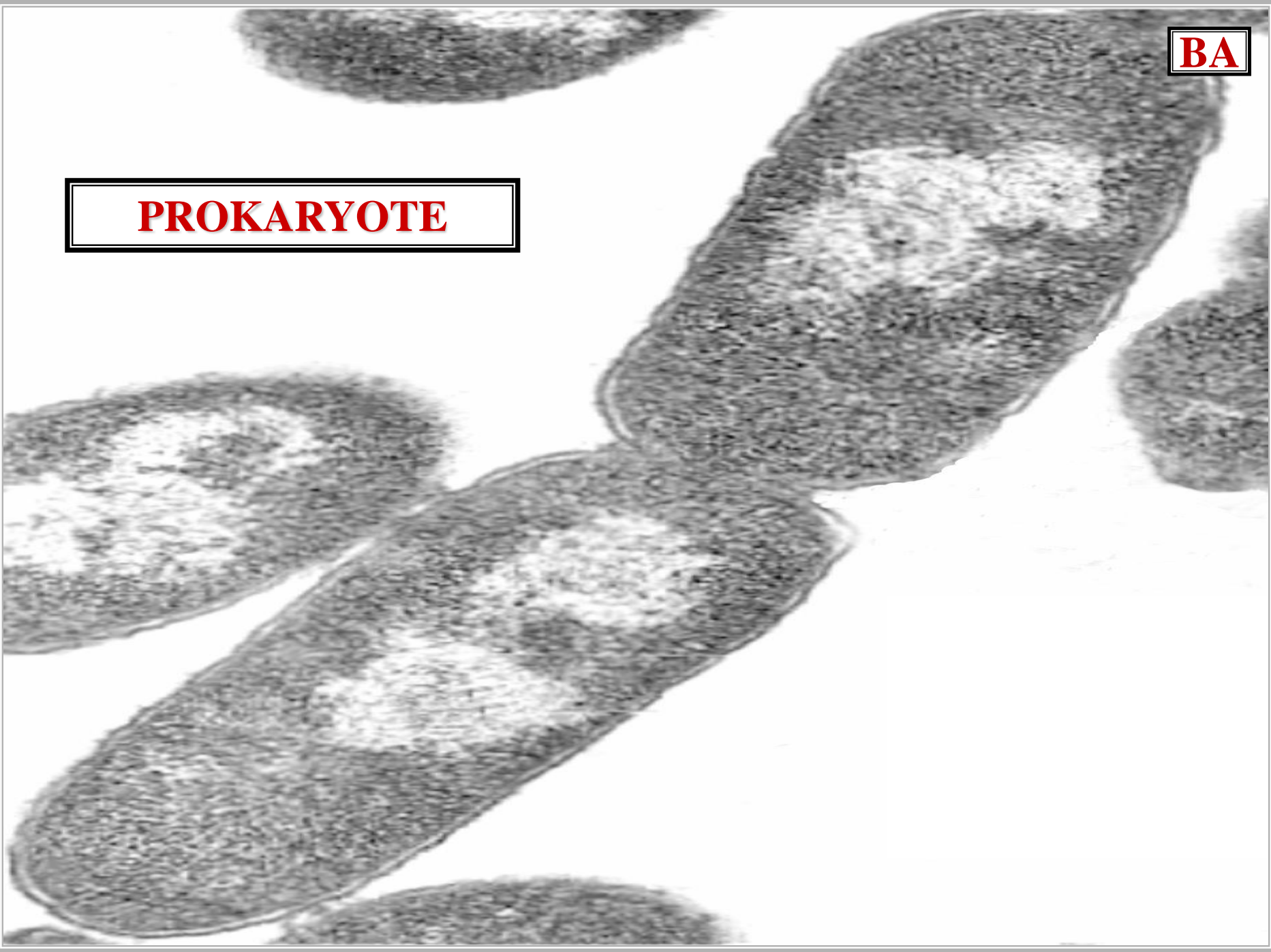


BACTERIUM

PROKARYOTE

BA

PROKARYOTE



?

CD

**PROKARYOTE
BACTERIUM**



A transmission electron micrograph (TEM) showing several rod-shaped prokaryotic cells. The cells are arranged in a chain, with one cell in the center showing a clear constriction, indicating binary fission. The internal structure is granular, and the cell walls are visible. The image is in grayscale.

BF

**PROKARYOTE
BACTERIUM**

**?
CELL DIVISION**

An electron micrograph showing several rod-shaped prokaryotic cells. The cells are arranged in a chain, with one cell in the center showing a clear constriction, indicating it is in the process of binary fission. The cells have a thick, textured outer boundary and a granular internal structure. The background is light and mostly featureless.

**PROKARYOTE
BACTERIUM**

**CELL DIVISION
BINARY FISSION**



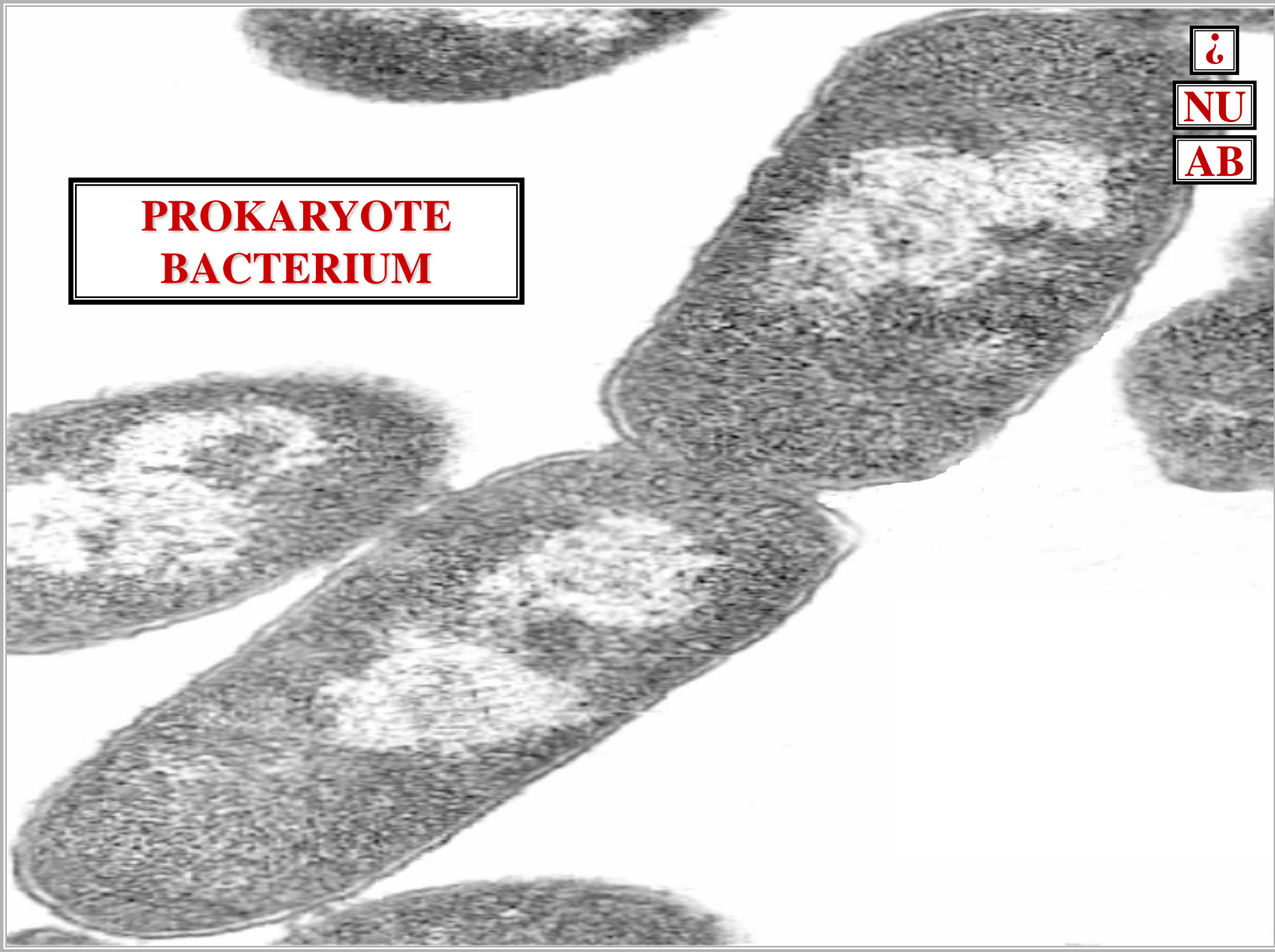
BINARY FISSION



NU

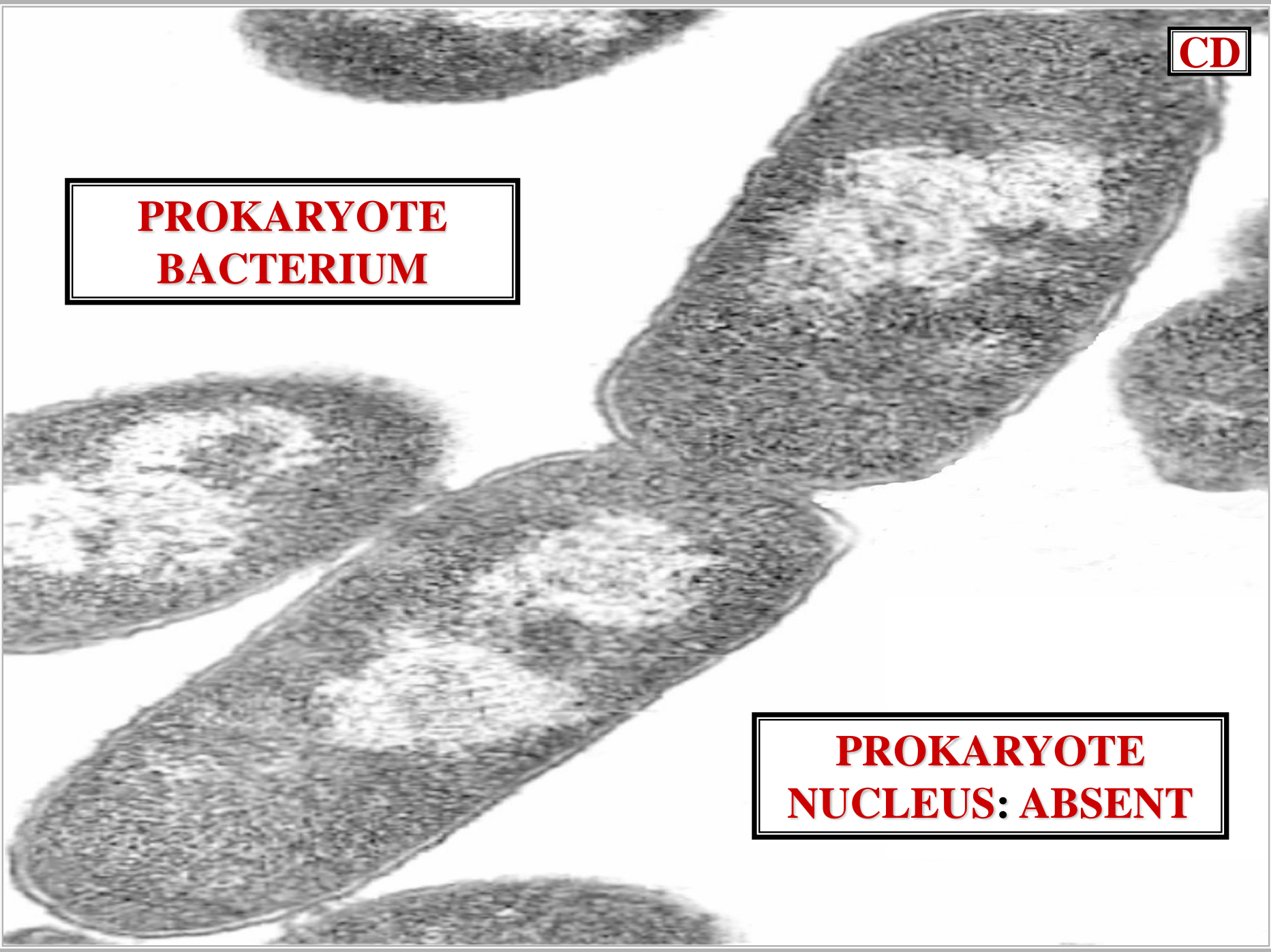
AB

**PROKARYOTE
BACTERIUM**



**PROKARYOTE
BACTERIUM**

**PROKARYOTE
NUCLEUS: ABSENT**



An electron micrograph showing several rod-shaped prokaryotic cells. The central cell is in the process of binary fission, with a clear constriction at its center where the cell wall and membrane are pinching together. The interior of the cells is filled with a dense, granular cytoplasm. The cells are arranged in a somewhat diagonal line across the frame.

CY

**PROKARYOTE
BACTERIUM**

**PROKARYOTE
CELL DIVIDES**



BF

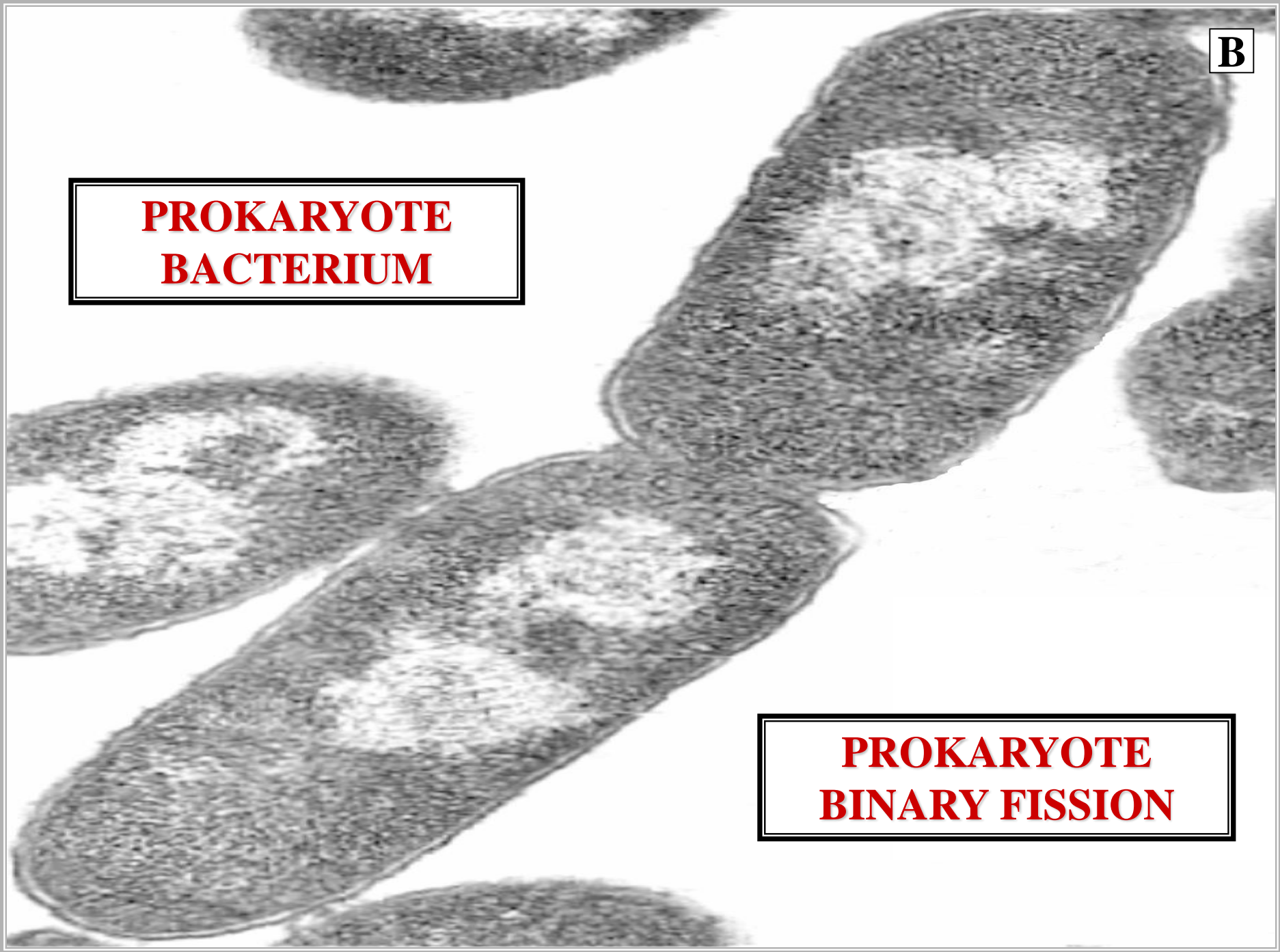
**PROKARYOTE
BACTERIUM**

**PROKARYOTE
CYTOSOL: DIVIDES**

B

**PROKARYOTE
BACTERIUM**

**PROKARYOTE
BINARY FISSION**



BINARY FISSION



BINARY FISSION

**CYTOSOL DIVISION
WITHOUT
NUCLEAR DIVISION**

BINARY FISSION

MOTHER CELL

MOTHER CELL

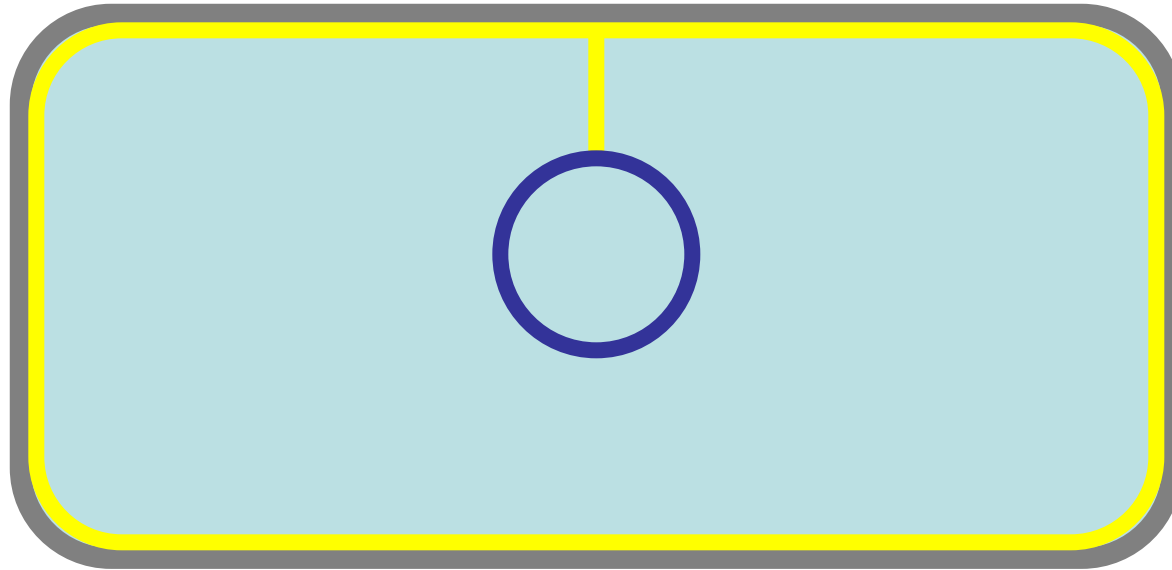
MOTHER CELL



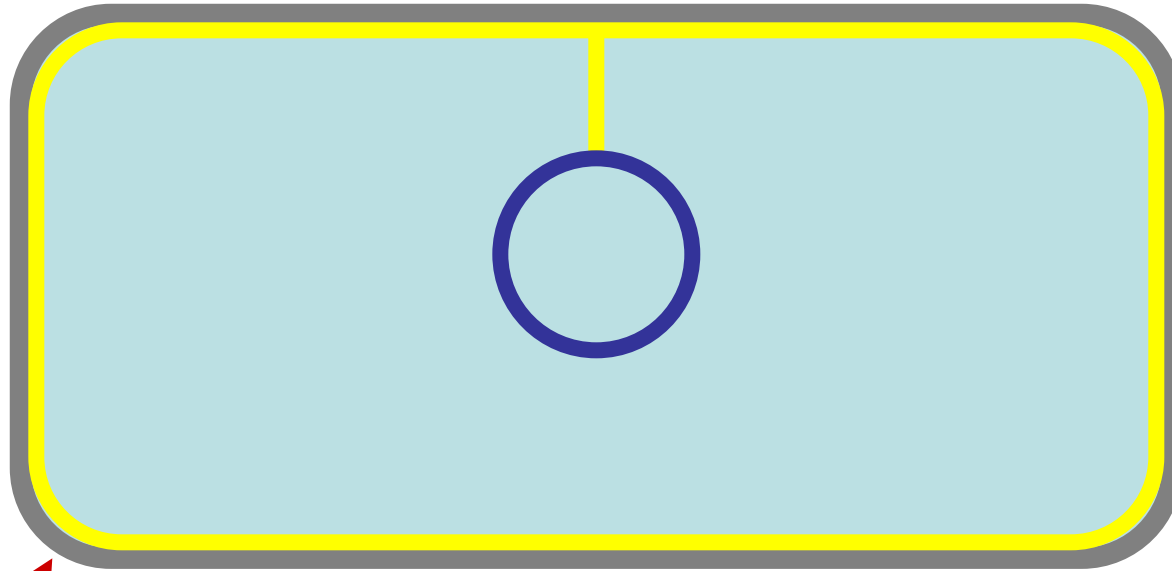
**UNDERGOES
BINARY FISSION**

MOTHER CELL

BINARY FISSION MOTHER CELL

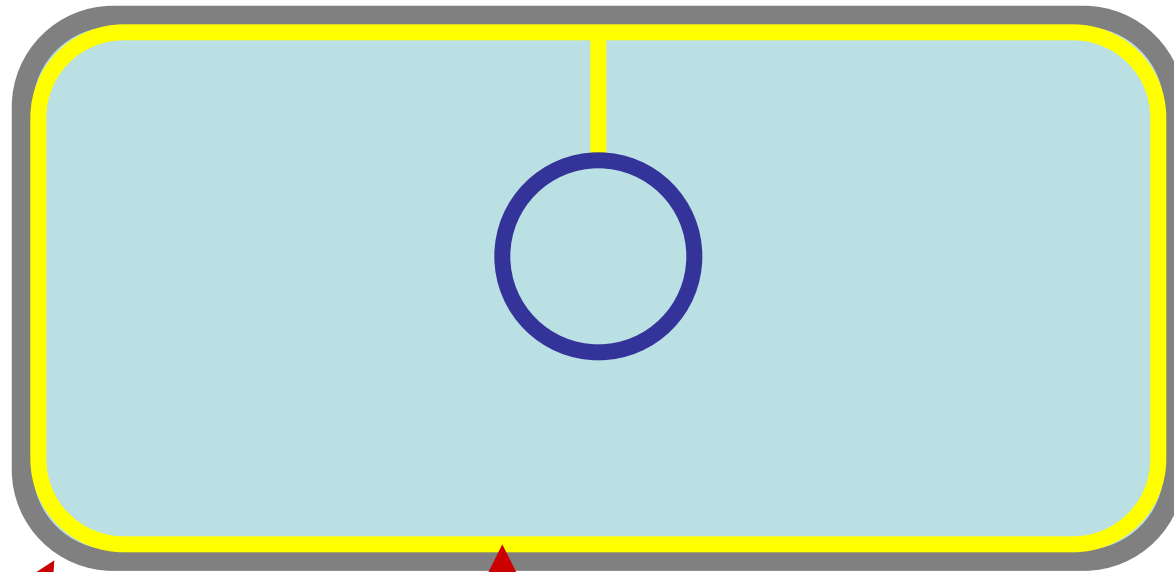


BINARY FISSION MOTHER CELL



CELL WALL

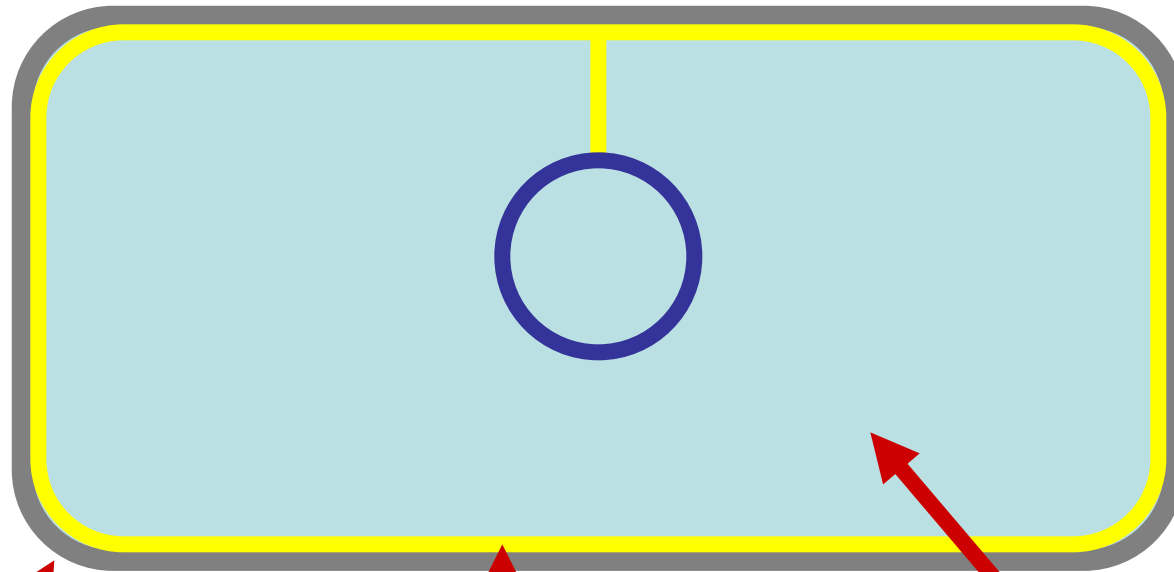
BINARY FISSION MOTHER CELL



CELL WALL

CELL MEMBRANE

BINARY FISSION MOTHER CELL



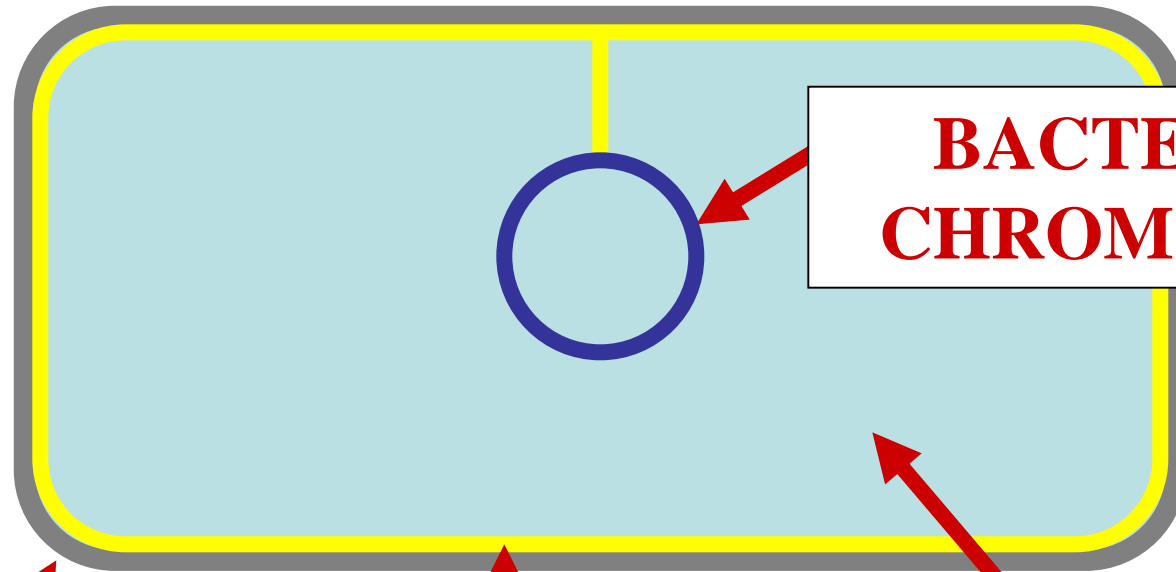
CELL WALL

CELL MEMBRANE

CYTOSOL



BINARY FISSION MOTHER CELL



**BACTERIUM
CHROMOSOME**

CELL WALL

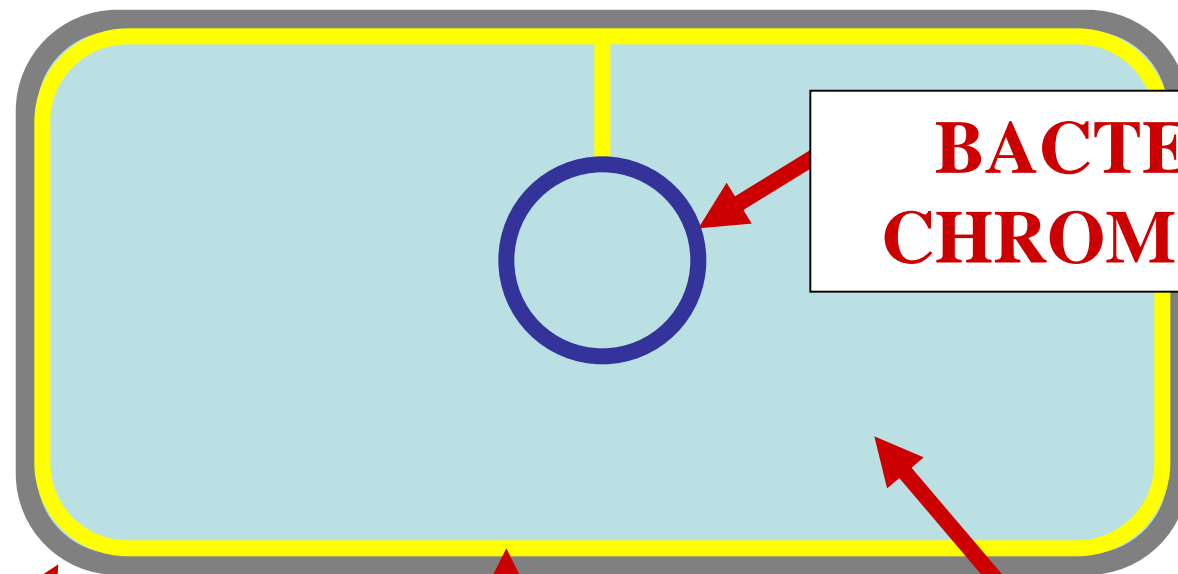
CELL MEMBRANE

CYTOSOL



BACTERIUM CHROMOSOME

BINARY FISSION MOTHER CELL



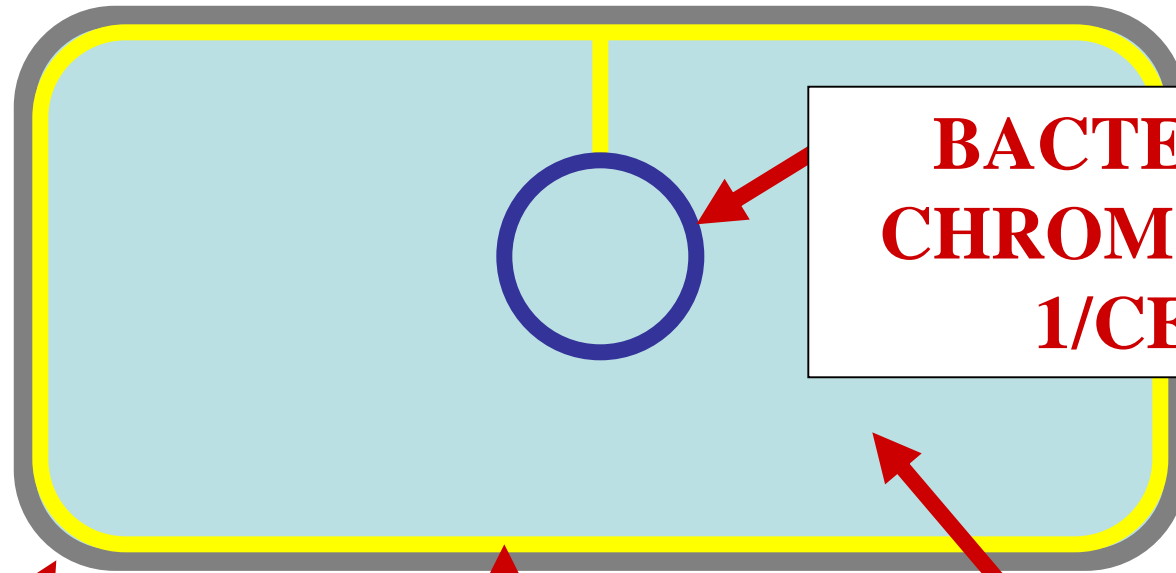
**BACTERIUM
CHROMOSOME**

CELL WALL

CELL MEMBRANE

CYTOSOL

BINARY FISSION MOTHER CELL



**BACTERIUM
CHROMOSOME
1/CELL**

CELL WALL

CELL MEMBRANE

CYTOSOL