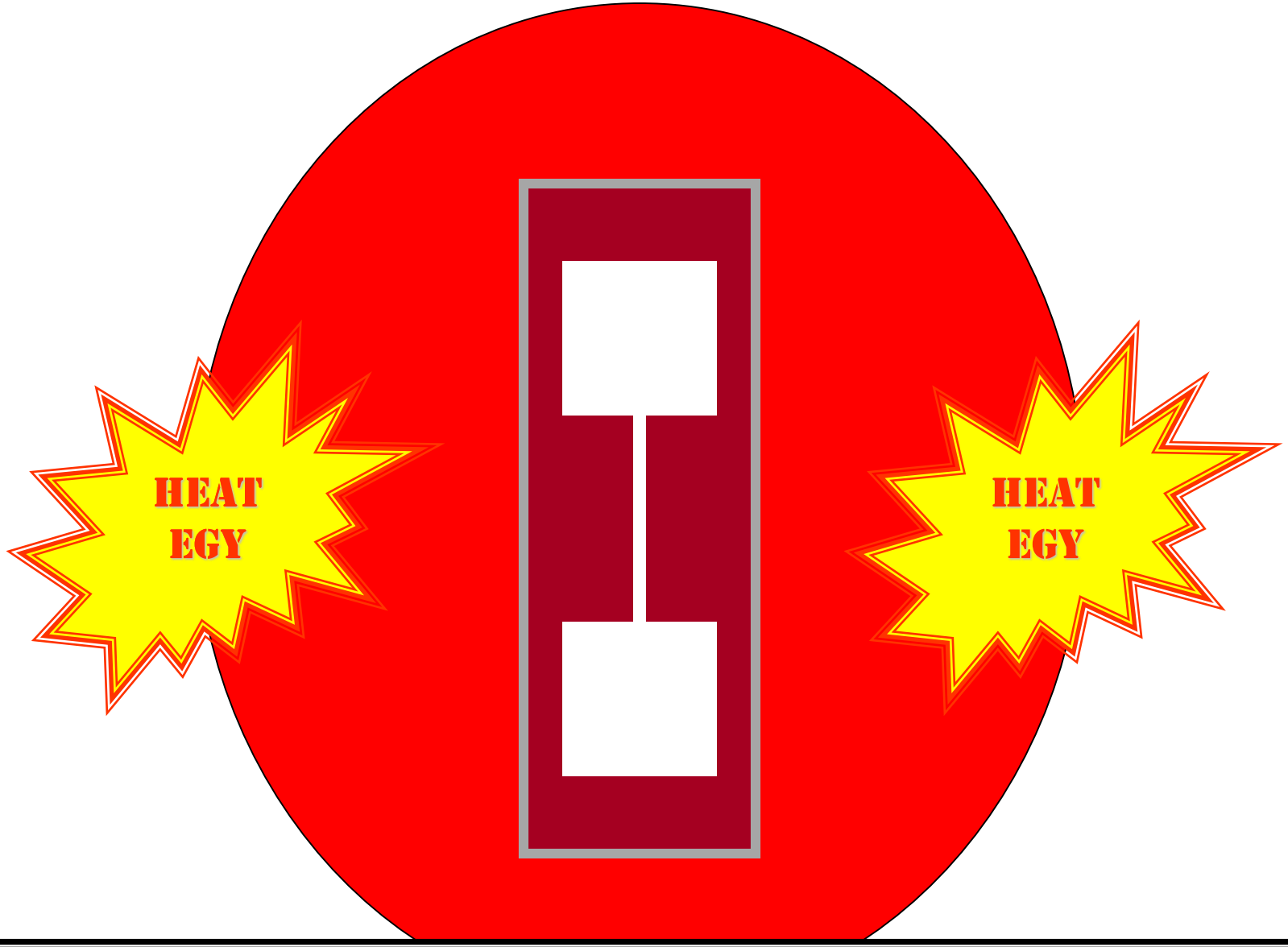
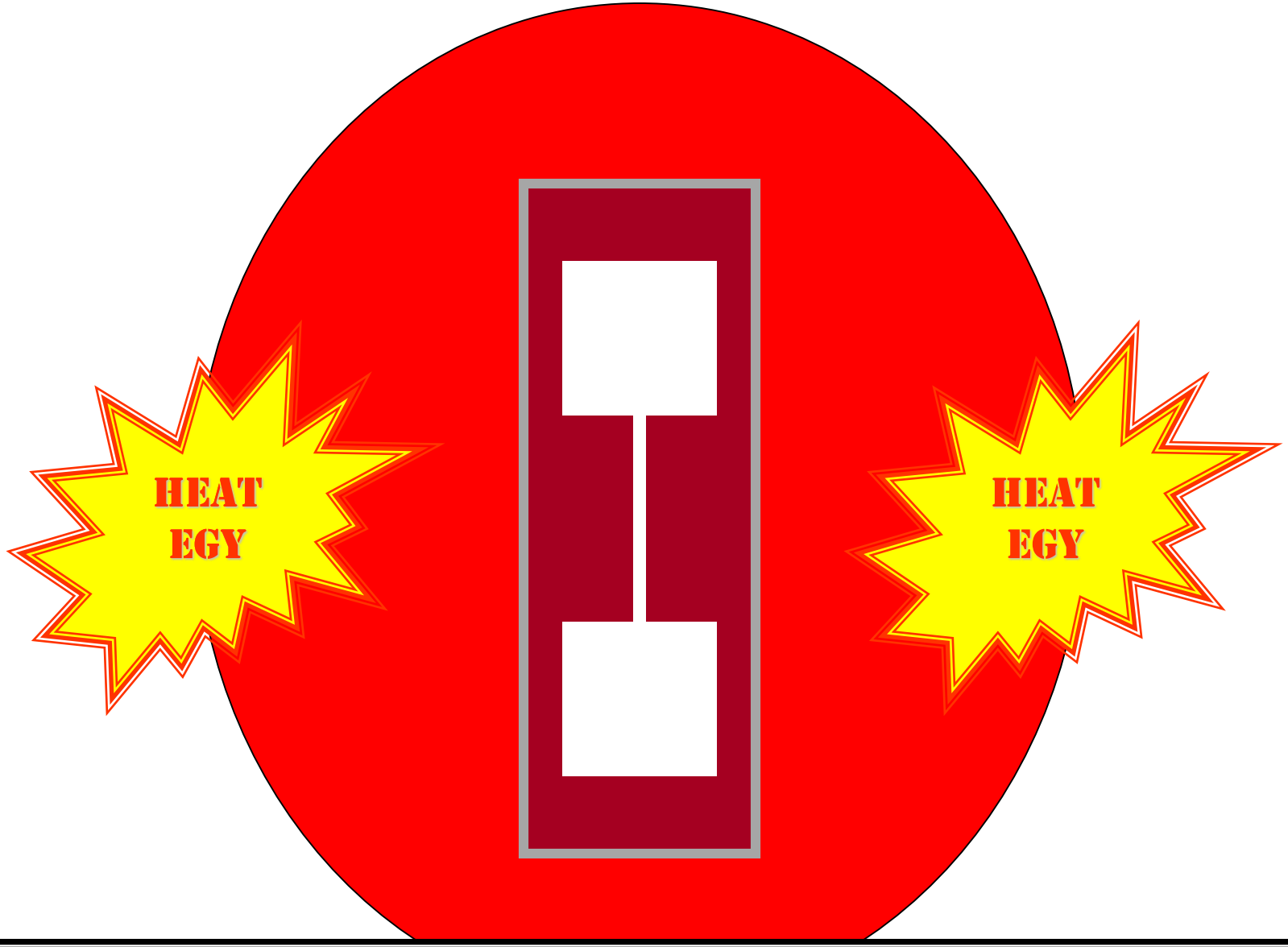
AD

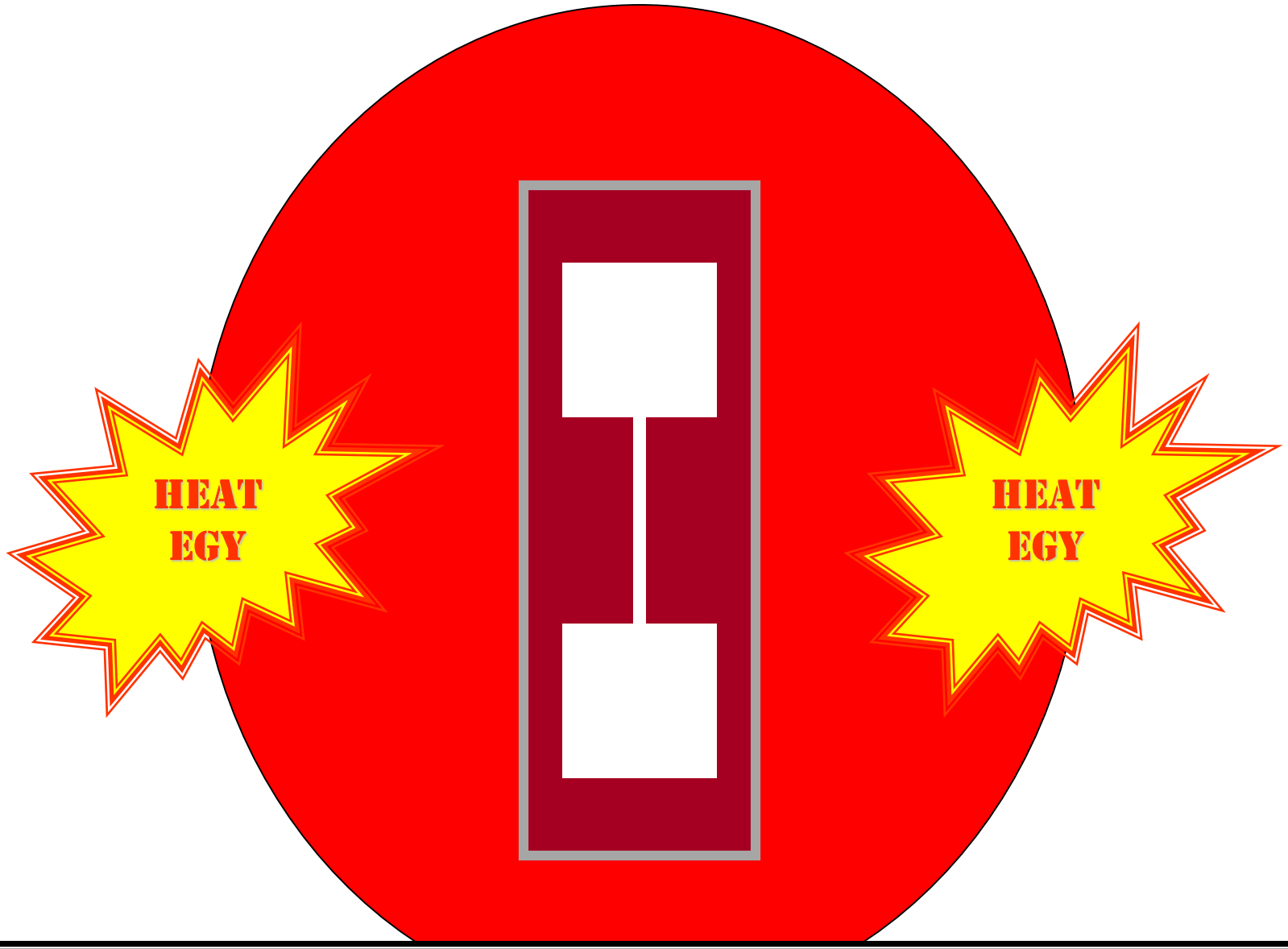


A.S. CHANGES CONFORMATION

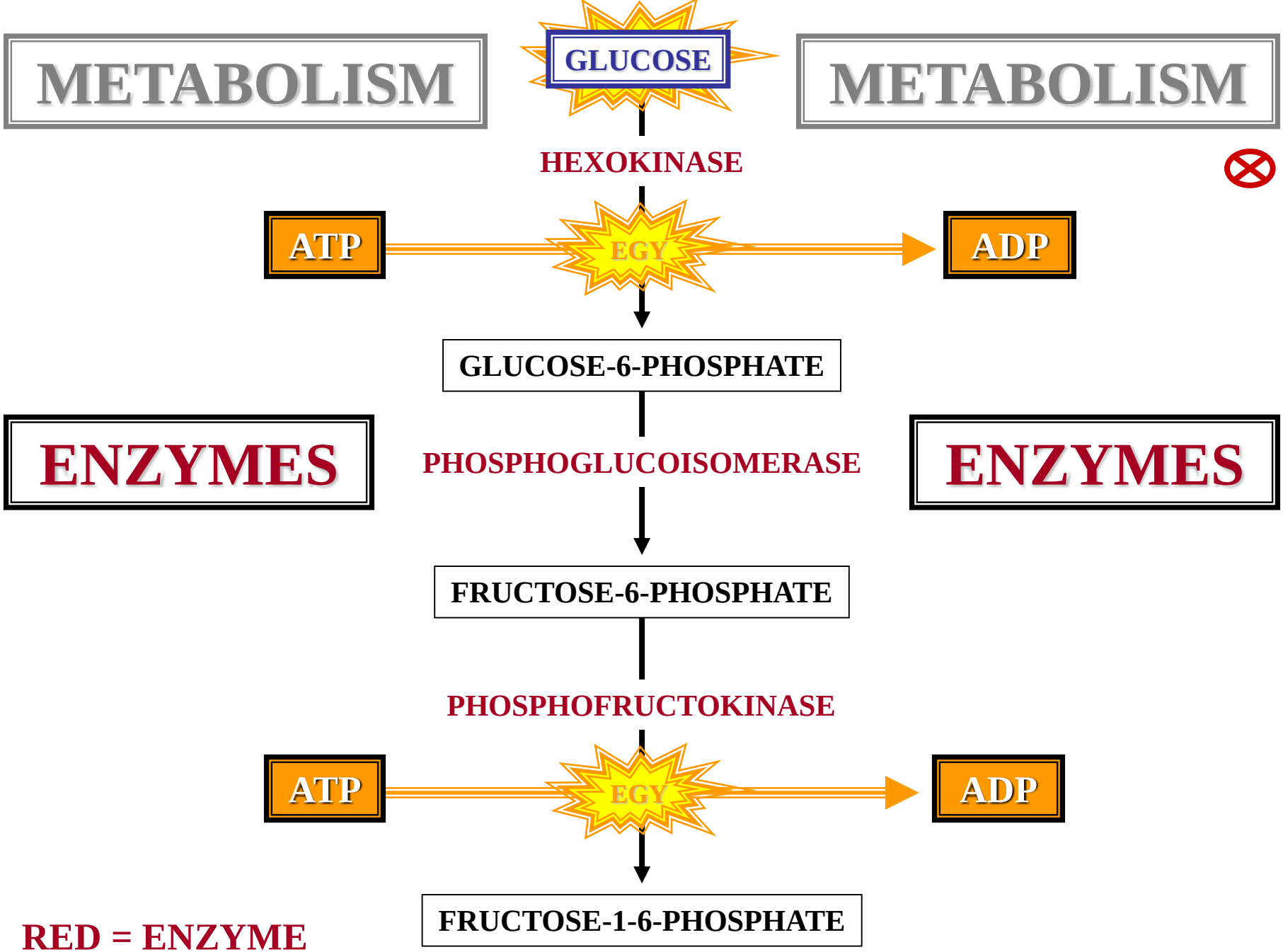
L

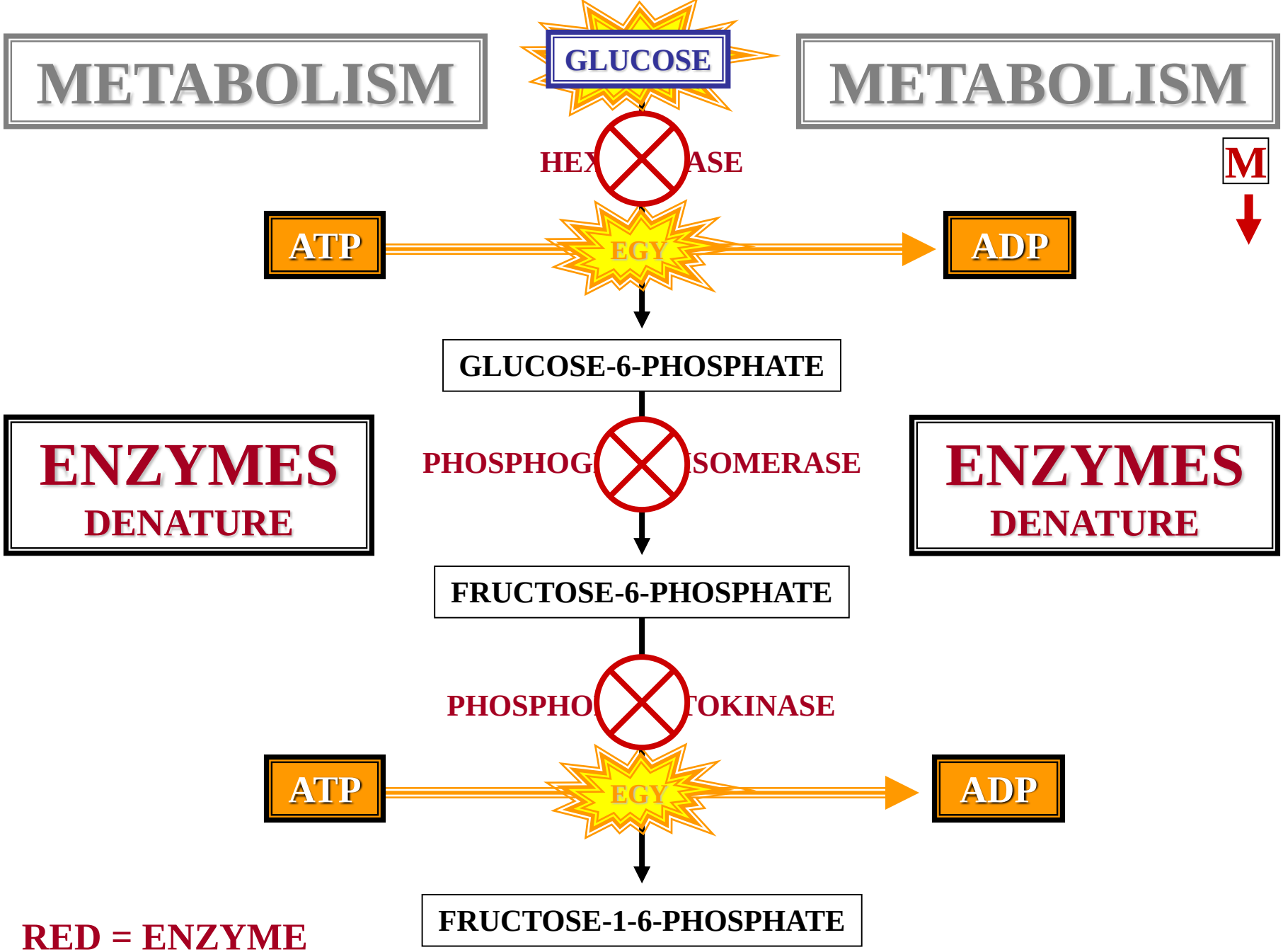


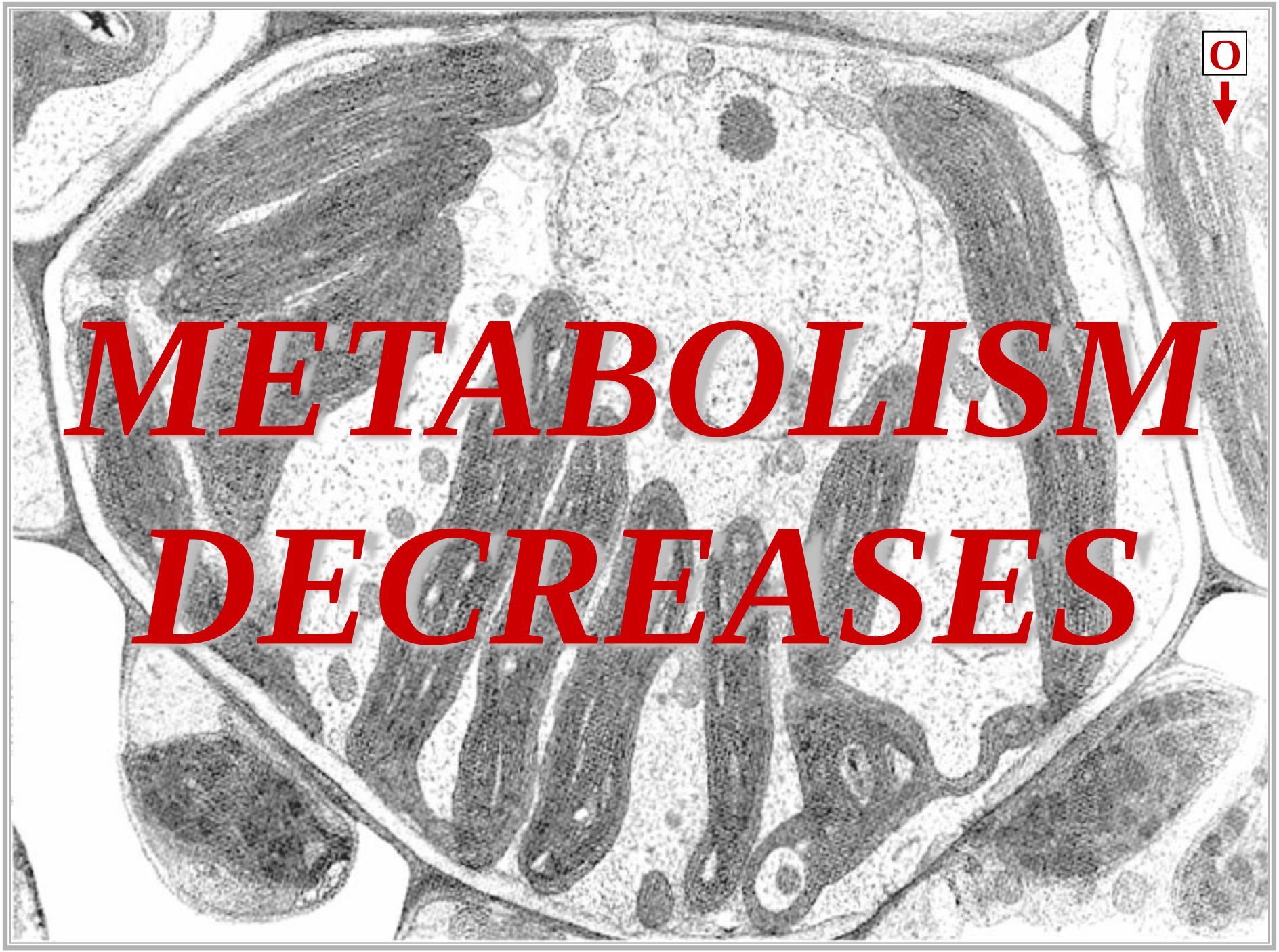
ACTIVE SITE DENATURES



LOST ENZYME FUNCTION


METABOLISM
GLUCOSE
METABOLISM
HEXOKINASE
ATP
EGY
ADP
GLUCOSE-6-PHOSPHATE
ENZYMES
PHOSPHOGLUCOISOMERASE
ENZYMES
FRUCTOSE-6-PHOSPHATE
PHOSPHOFRUCTOKINASE
ATP
EGY
ADP
FRUCTOSE-1-6-PHOSPHATE
RED = ENZYME


METABOLISM
GLUCOSE
METABOLISM
HEX ASE
M
ATP
EGY
ADP
GLUCOSE-6-PHOSPHATE
ENZYMES
DENATURE
PHOSPHOG SOMERASE
ENZYMES
DENATURE
FRUCTOSE-6-PHOSPHATE
PHOSPHO TOKINASE
ATP
EGY
ADP
FRUCTOSE-1-6-PHOSPHATE
RED = ENZYME

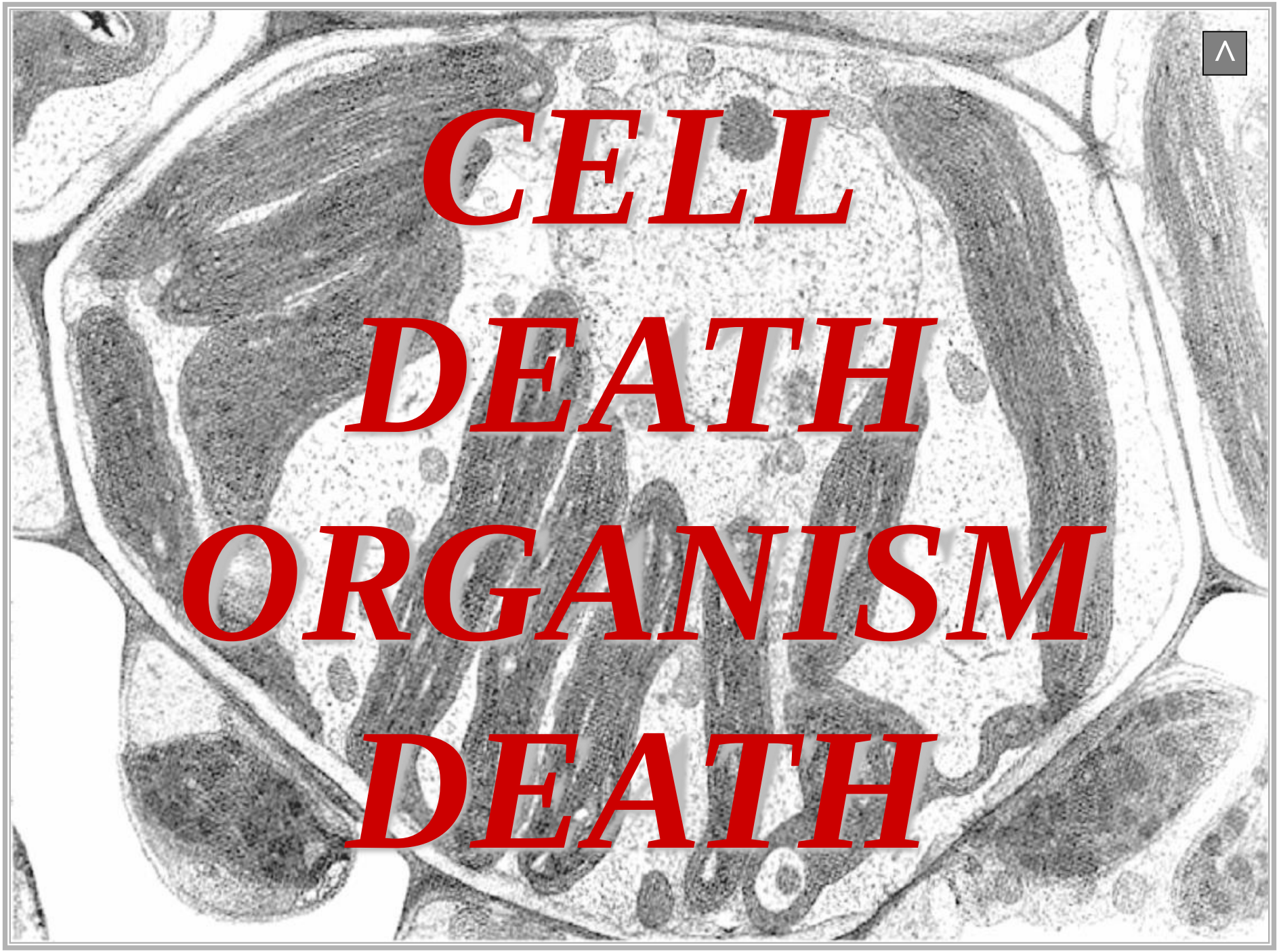


METABOLISM DECREASES


E
ORANIZATION
DECREASES

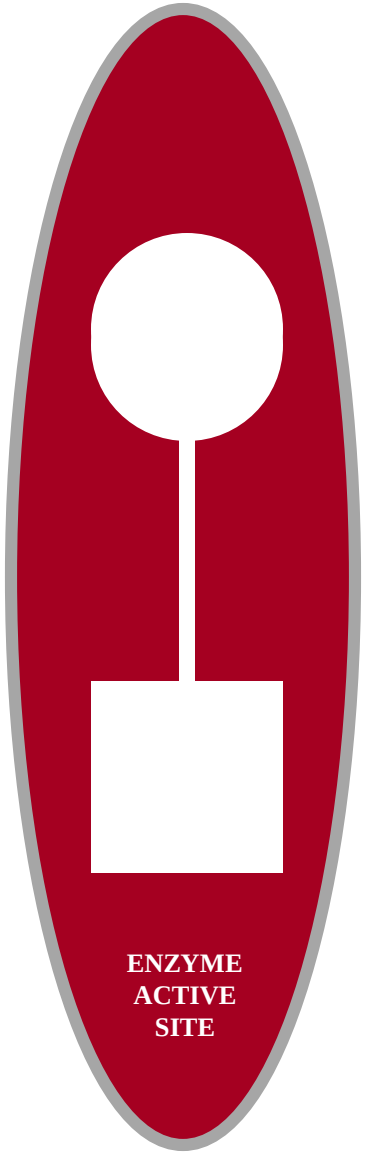

H
ENTROPY
INCREASES


CD
HOMEOSTASIS
DISRUPTED

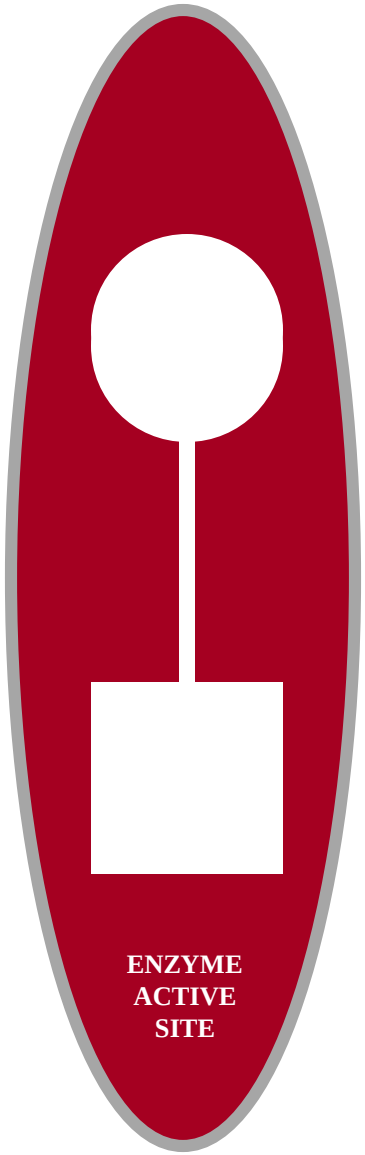

CELL
DEATH
ORGANISM
DEATH

ENZYME DENATURES

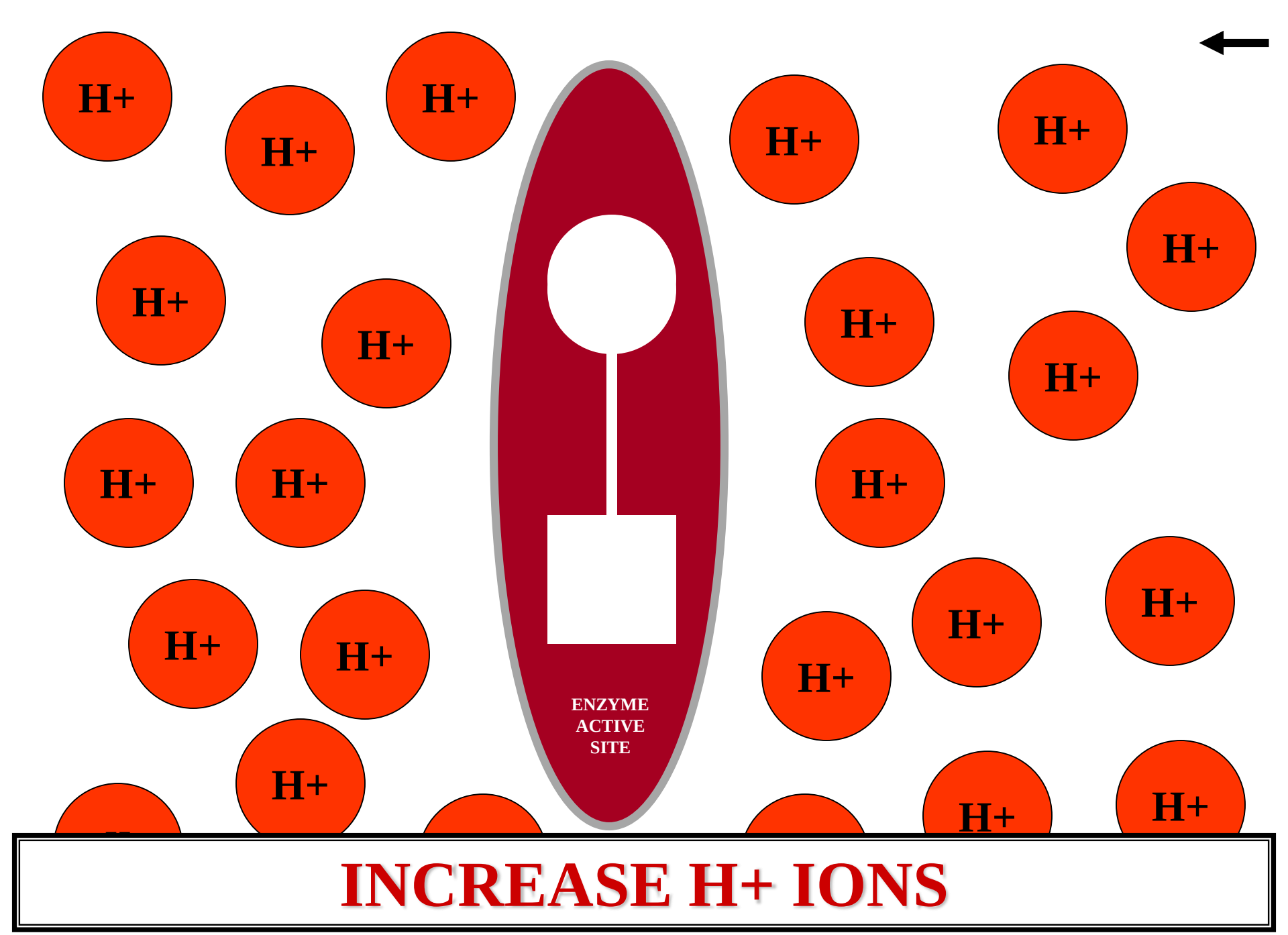
pH CHANGE



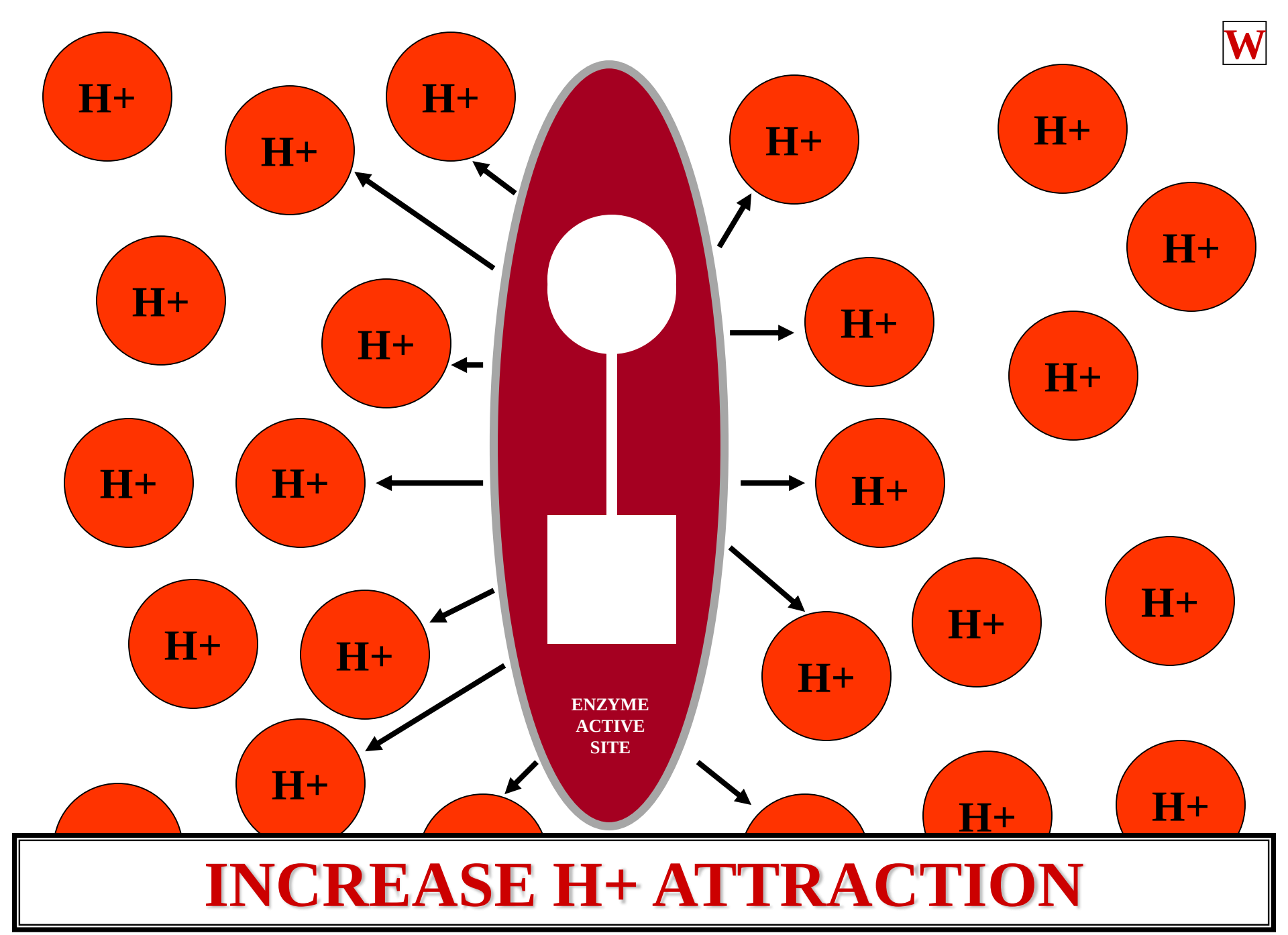
ENZYME



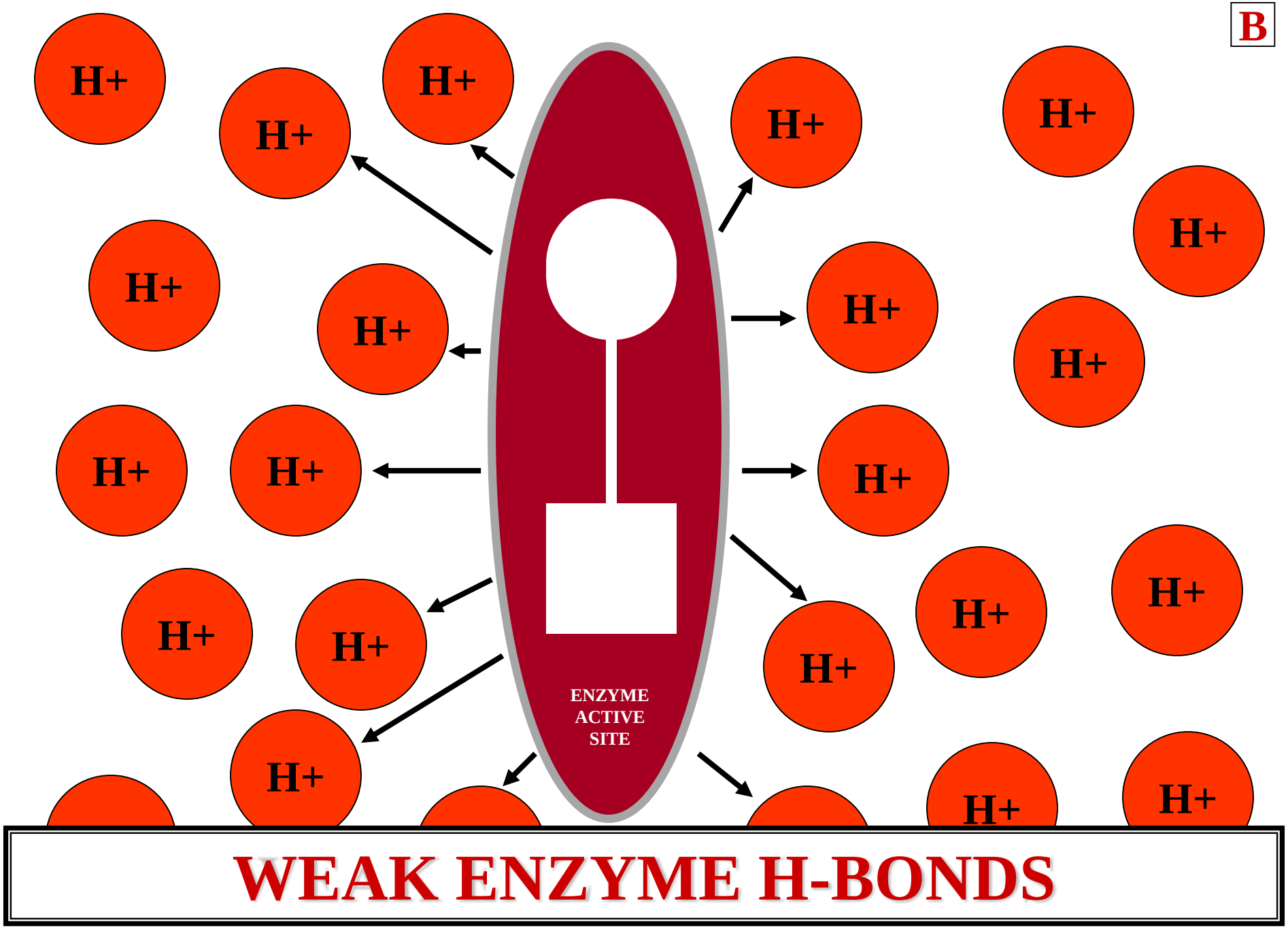
pH DECREASE

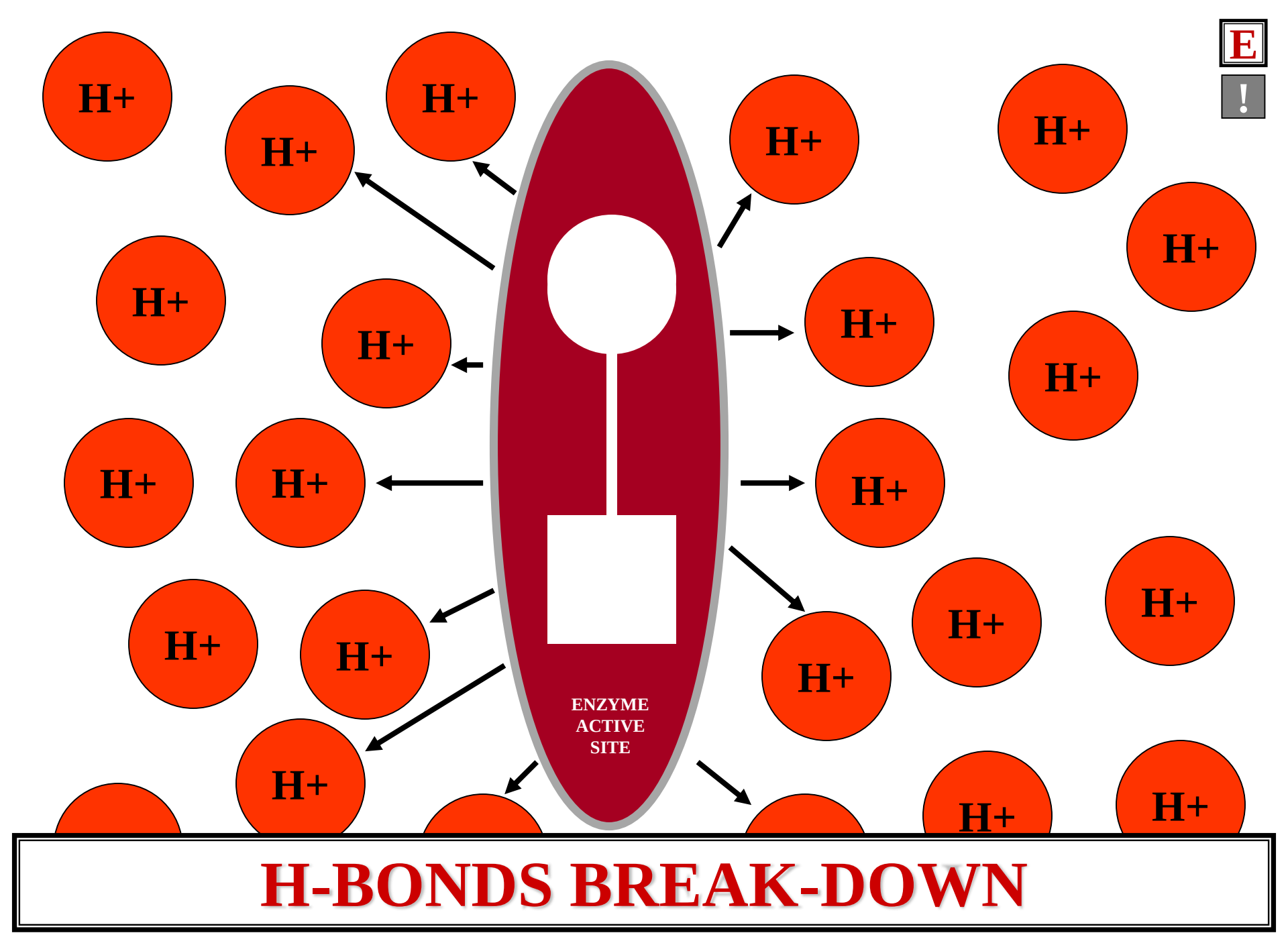


INCREASE H+ IONS

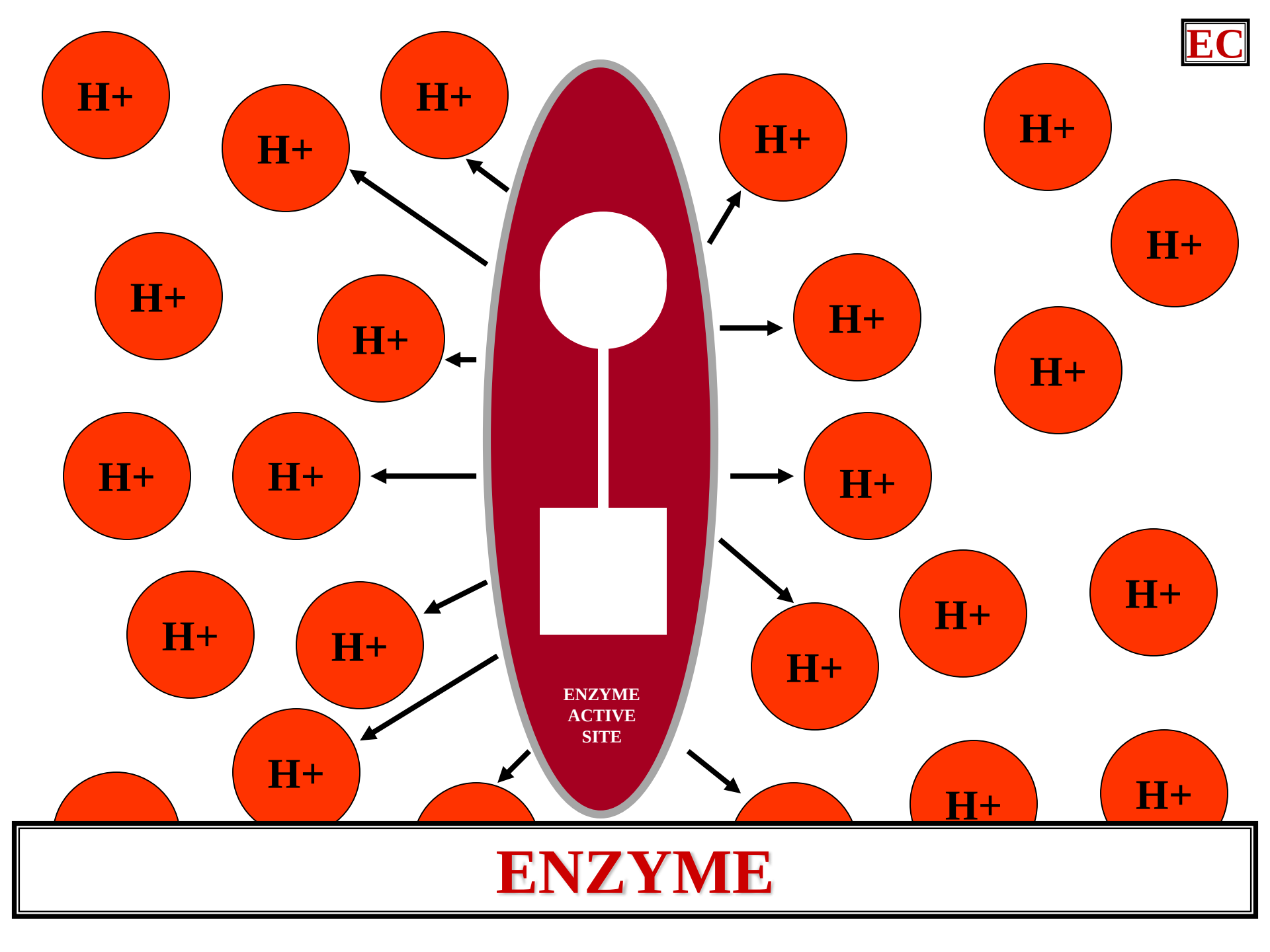


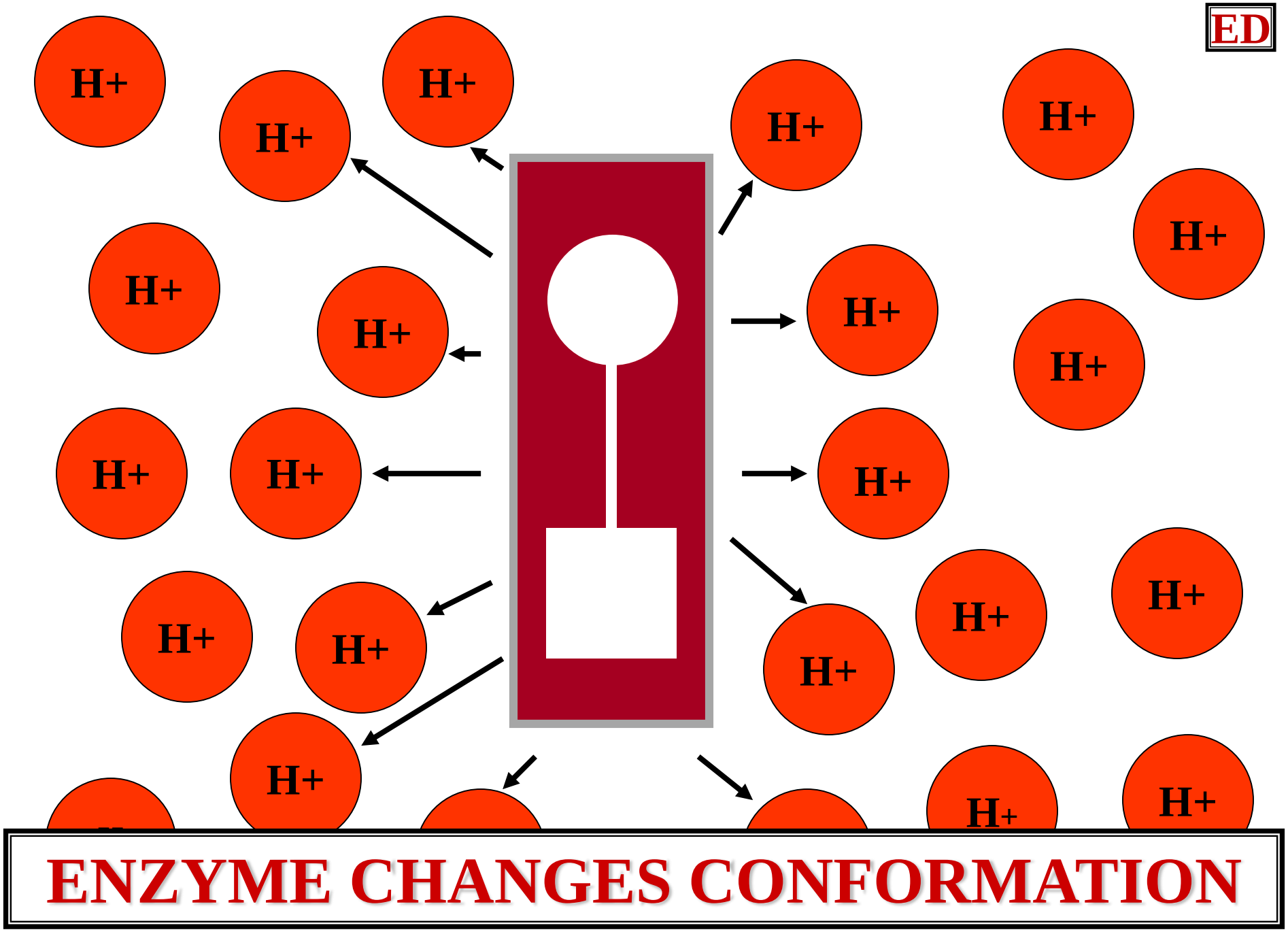
INCREASE H+ ATTRACTION

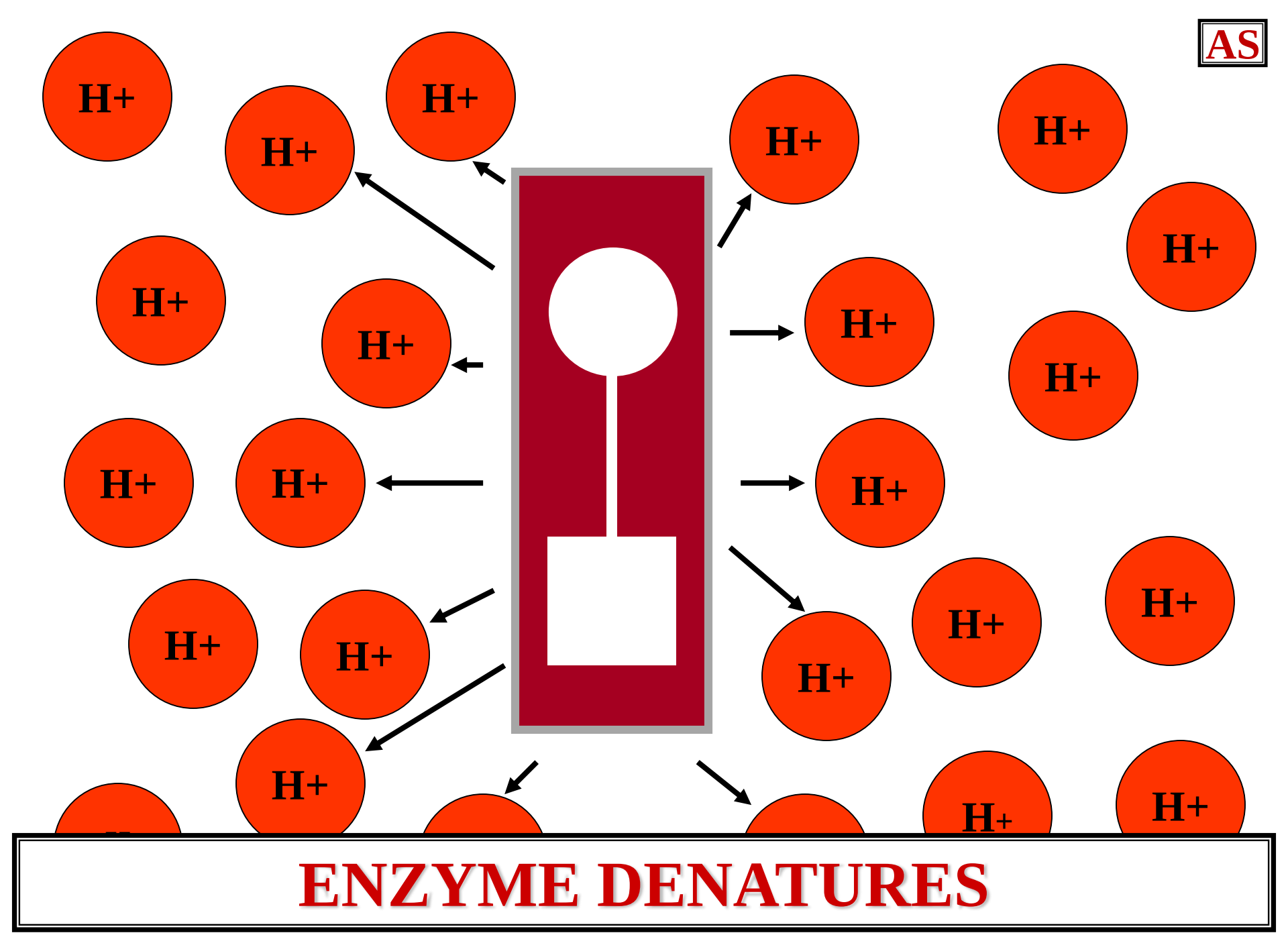

B
H+
ENZYME
ACTIVE
SITE
WEAK ENZYME H-BONDS

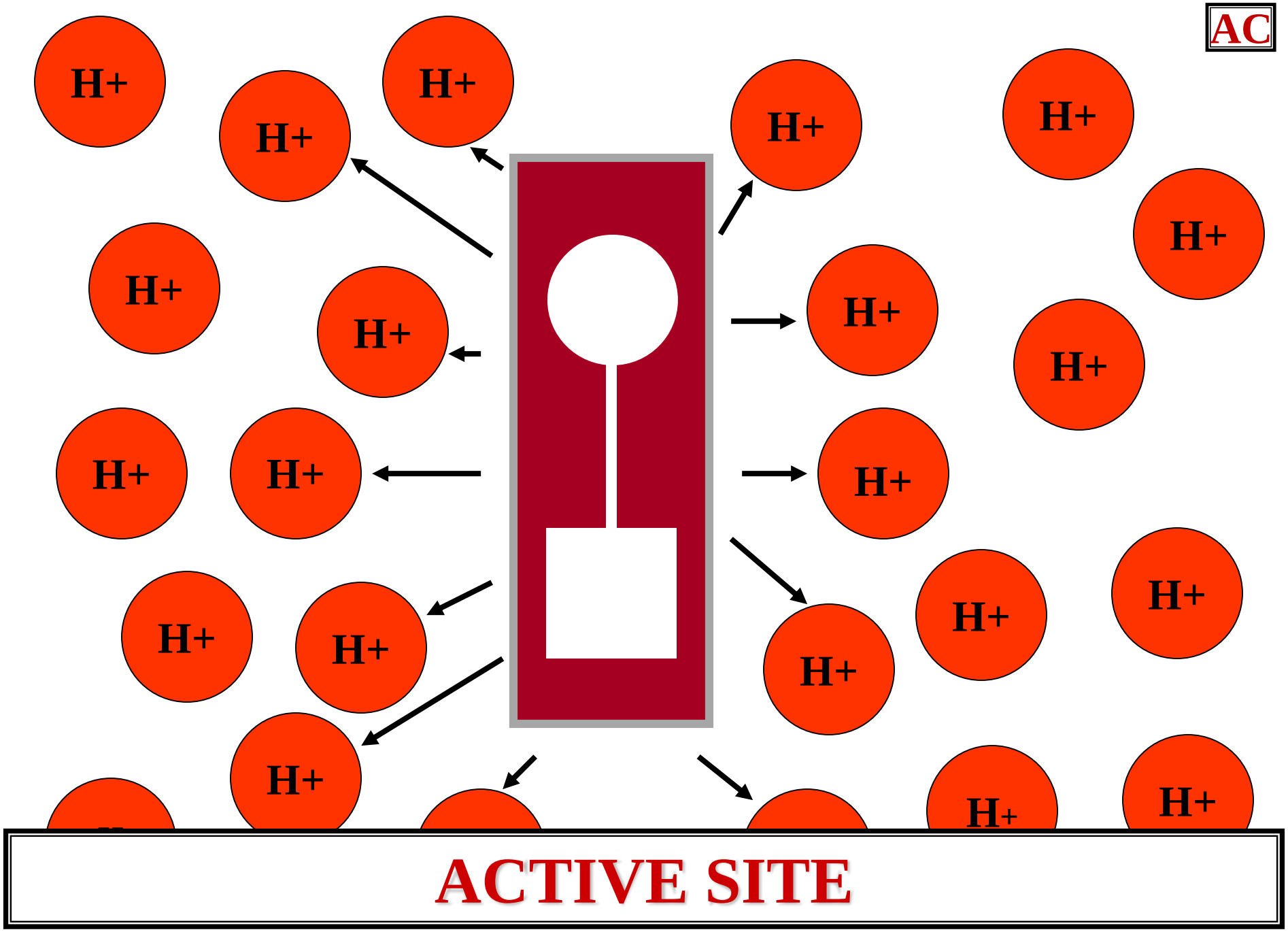


H-BONDS BREAK-DOWN


EC
H+
ENZYME
ACTIVE
SITE
ENZYME


ED
H+
ENZYME CHANGES CONFORMATION


AS
H+
ENZYME DENATURES


AC
H+
H+
H+
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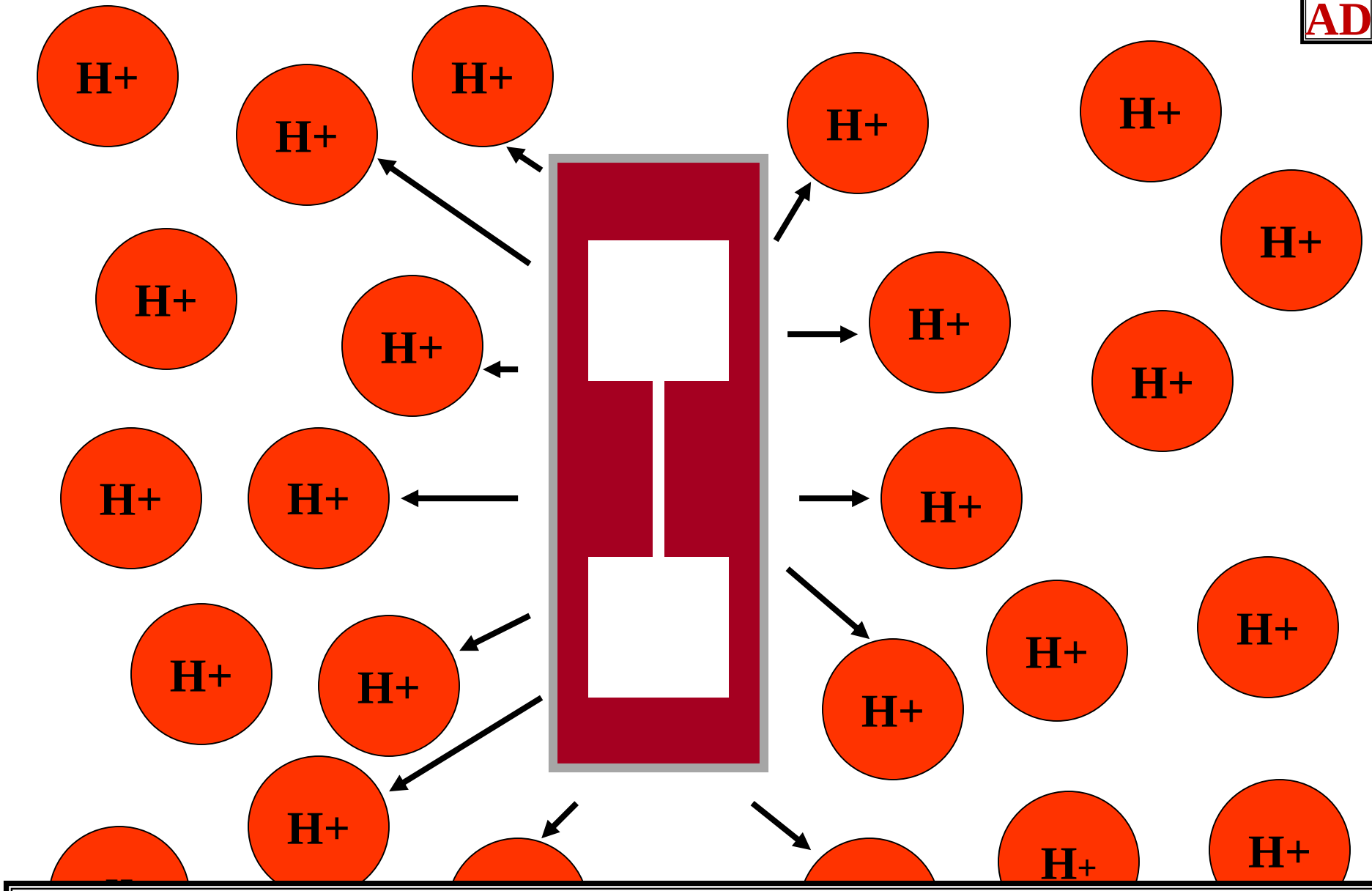
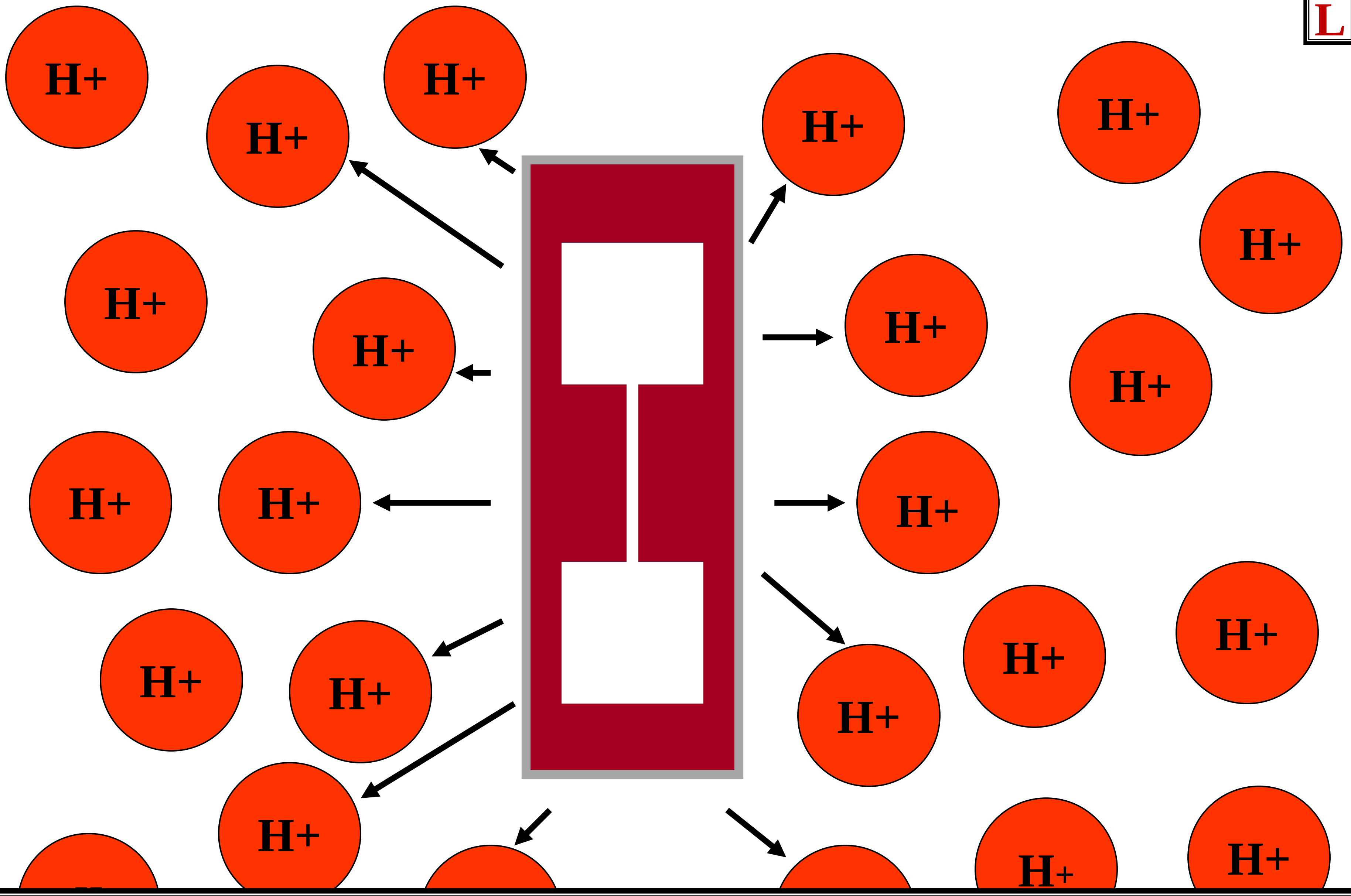
H+
H+
ACTIVE SITE

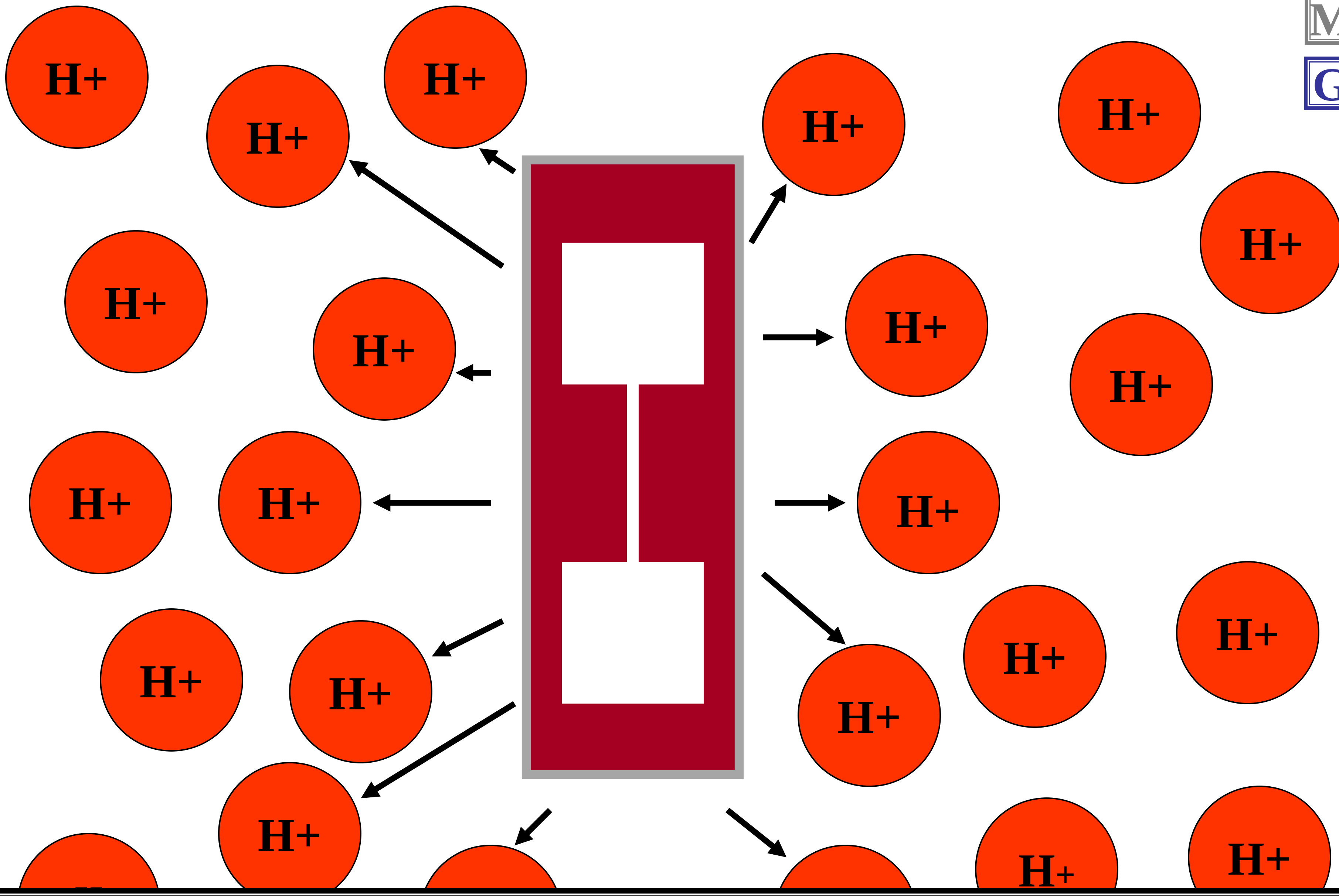
AD



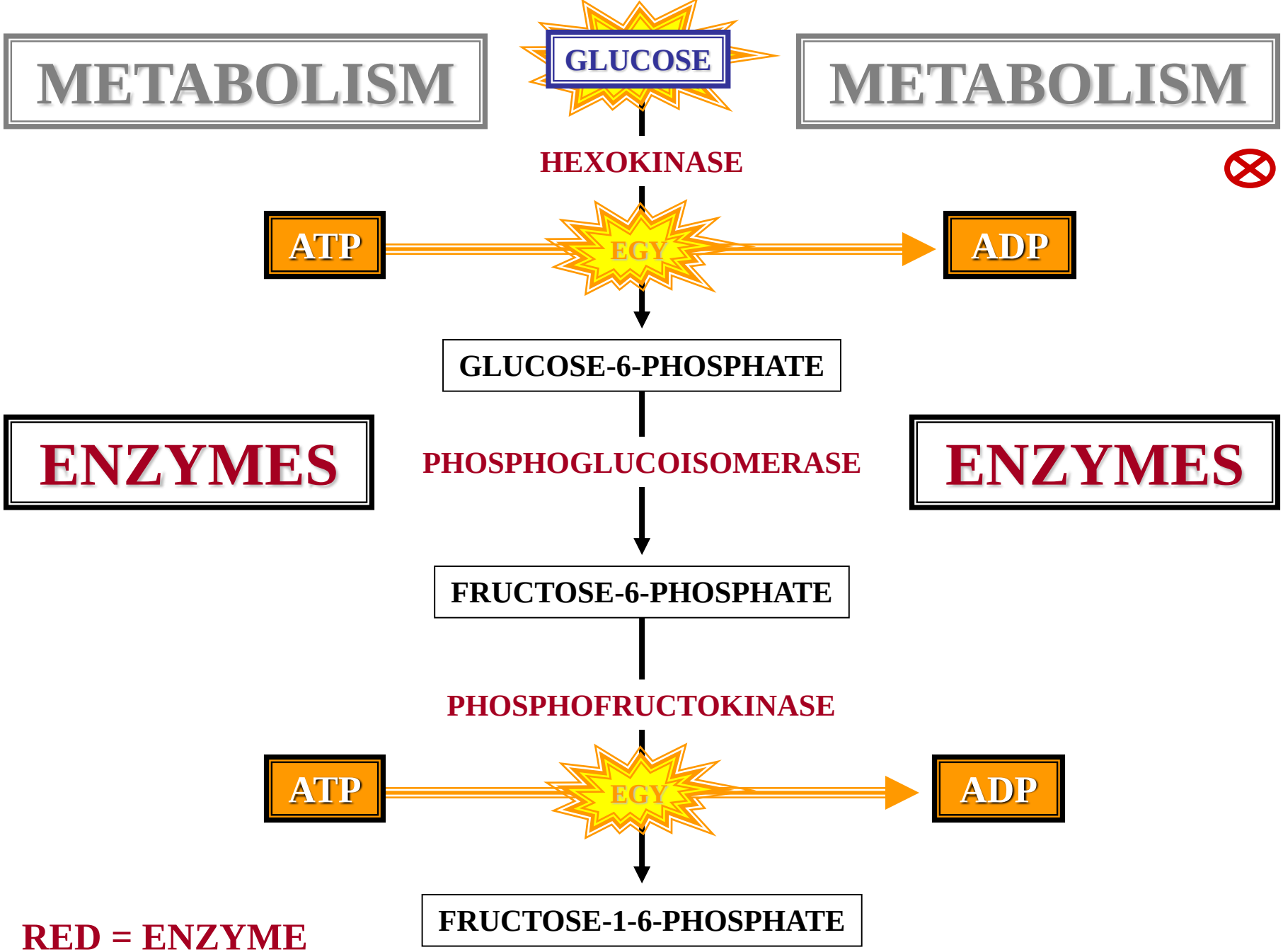
A.S. CHANGES CONFORMATION

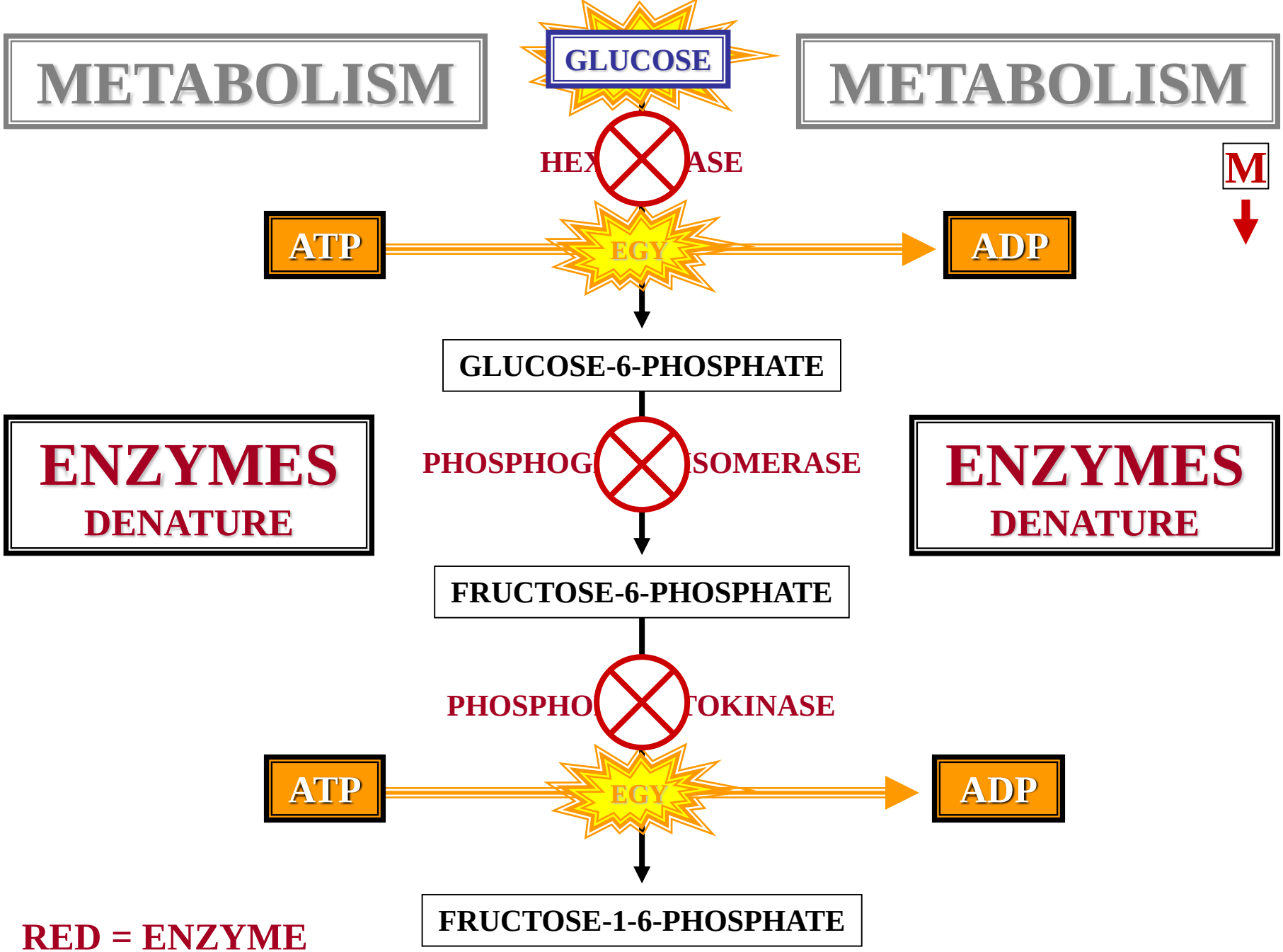


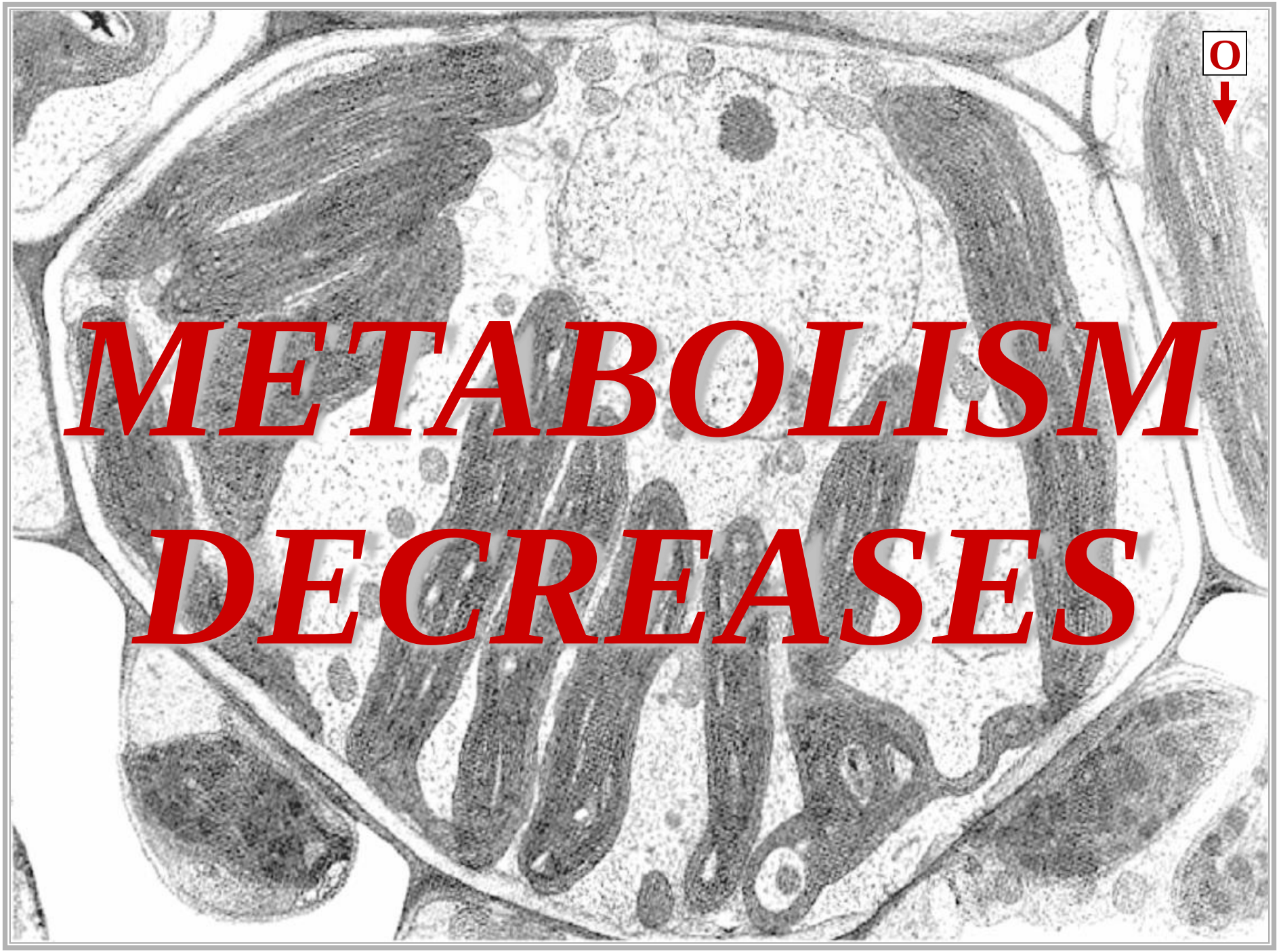
ACTIVE SITE DENATURES



LOST ENZYME FUNCTION


METABOLISM
GLUCOSE
METABOLISM
HEXOKINASE
ATP
EGY
ADP
GLUCOSE-6-PHOSPHATE
ENZYMES
PHOSPHOGLUCOISOMERASE
ENZYMES
FRUCTOSE-6-PHOSPHATE
PHOSPHOFRUCTOKINASE
ATP
EGY
ADP
FRUCTOSE-1-6-PHOSPHATE
RED = ENZYME


METABOLISM
GLUCOSE
METABOLISM
HEX ASE
M
ATP
EGY
ADP
GLUCOSE-6-PHOSPHATE
ENZYMES
DENATURE
PHOSPHOG SOMERASE
ENZYMES
DENATURE
FRUCTOSE-6-PHOSPHATE
PHOSPHO TOKINASE
ATP
EGY
ADP
FRUCTOSE-1-6-PHOSPHATE
RED = ENZYME

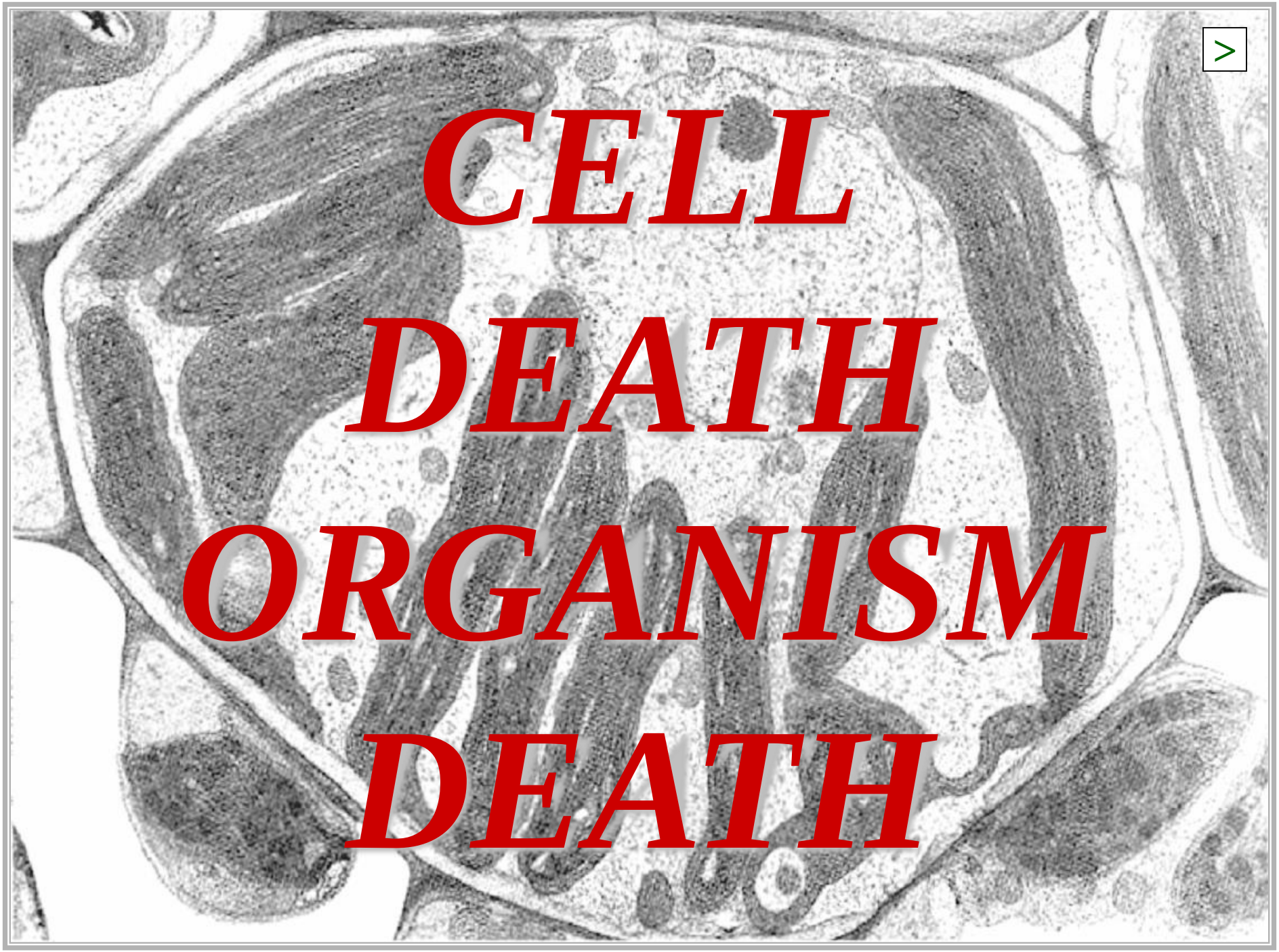


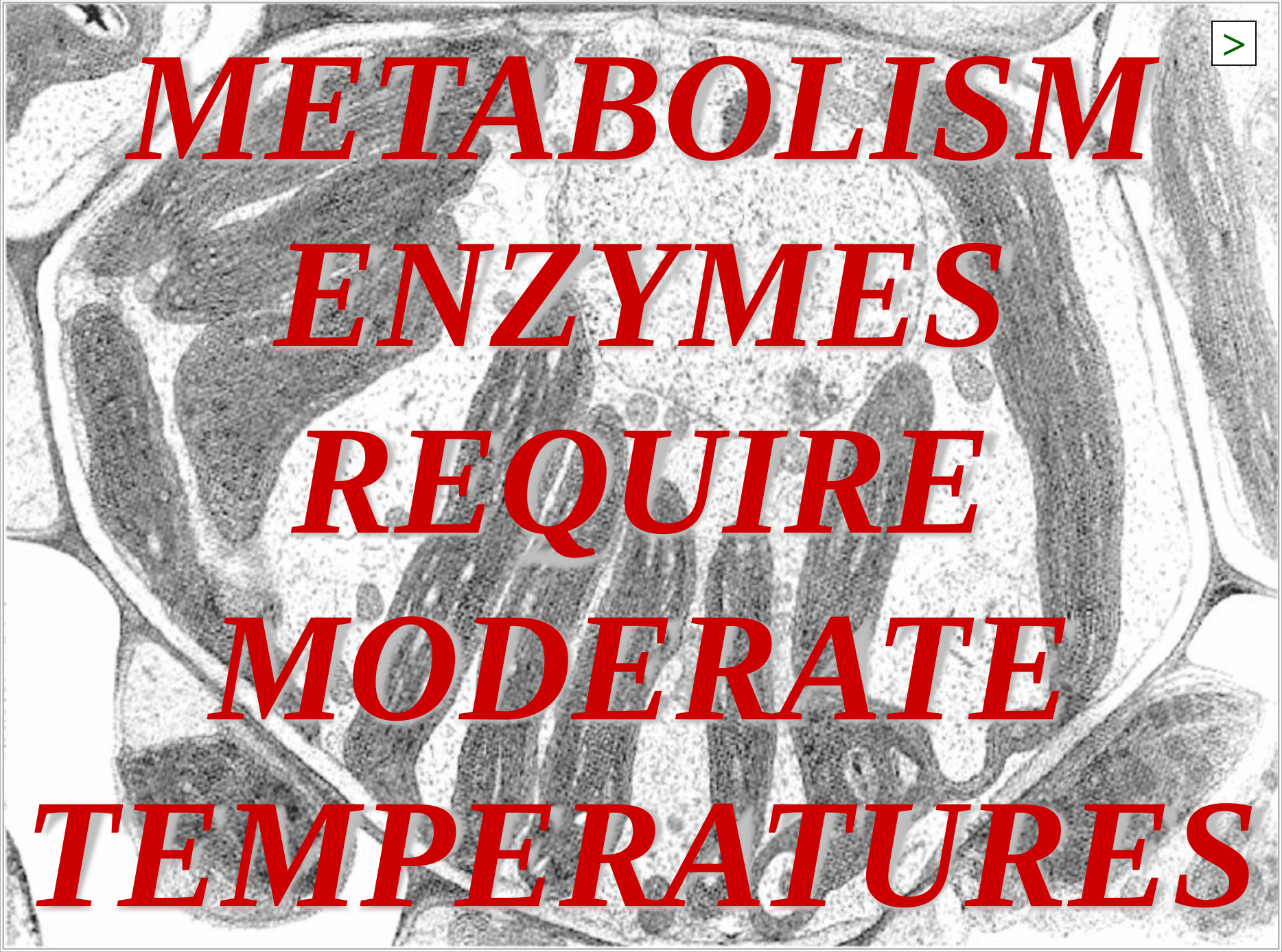
METABOLISM DECREASES

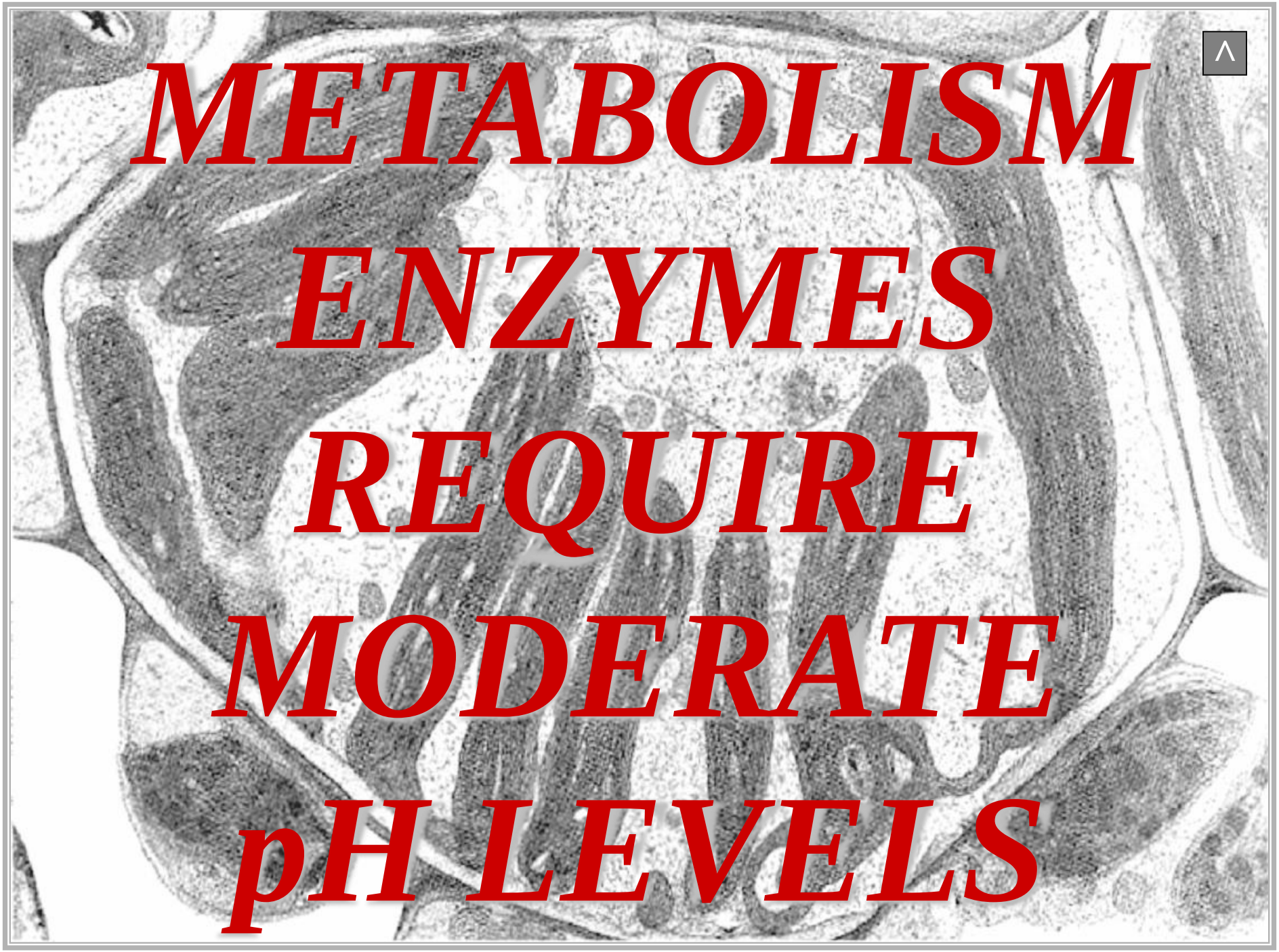

E
ORANIZATION
DECREASES


H
ENTROPY
INCREASES


CD
HOMEOSTASIS
DISRUPTED


CELL
DEATH
ORGANISM
DEATH


METABOLISM
ENZYMES
REQUIRE
MODERATE
TEMPERATURES


METABOLISM
ENZYMES
REQUIRE
MODERATE
pH LEVELS

REDUCTION
OXIDATION
REACTIONS

REDUCTION
OXIDATION
REACTIONS

SYNONYMOUS

REDOX
REACTIONS

REDOX REACTION

REDOX REACTION

BIO-CHEMICAL
E- TRANSFER OCCURS
→

REDOX REACTION

REDOX REACTION

BIO-CHEMICAL
E- TRANSFER OCCURS
→
REDUCTION RXT

REDOX REACTION

R

REDOX REACTION

BIO-CHEMICAL
E- TRANSFER OCCURS
→
REDUCTION RXT
&
OXIDATION RXT

REDOX REACTION

REDUCTION REACTION

O

REDUCTION REACTION

BIO-CHEMICAL COMPOUND GAINS E- & GAINS ENERGY

REDUCTION REACTION

OXIDATION REACTION

AP

OXIDATION REACTION

BIO-CHEMICAL COMPOUND LOSES E-

&

LOSES ENERGY

OXIDATION REACTION

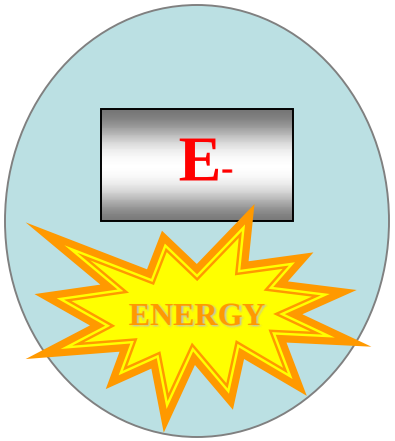
REDOX REACTION APPLIED

REDOX REACTION

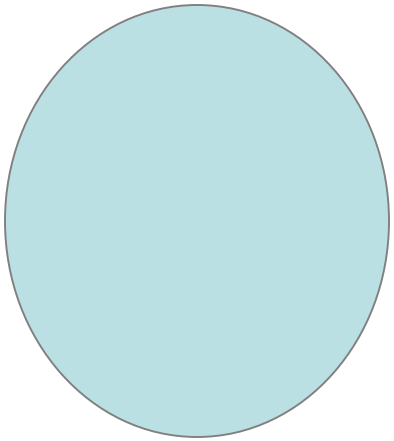
RX

REDUCTION RXT – OXIDATION RXT

CMP-A



CMP-B

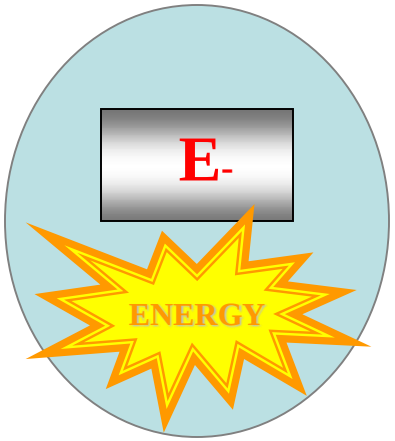


 = **CHEMICAL ENERGY**

REDOX REACTION

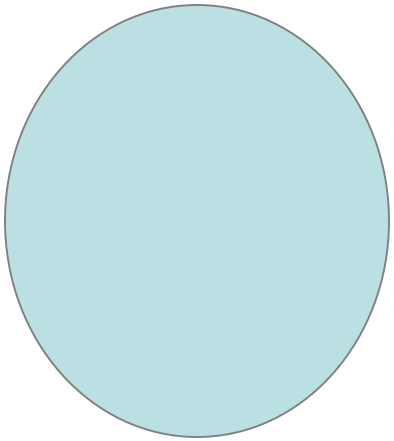
REDUCTION RXT – OXIDATION RXT

CMP-A



REDOX REACTION

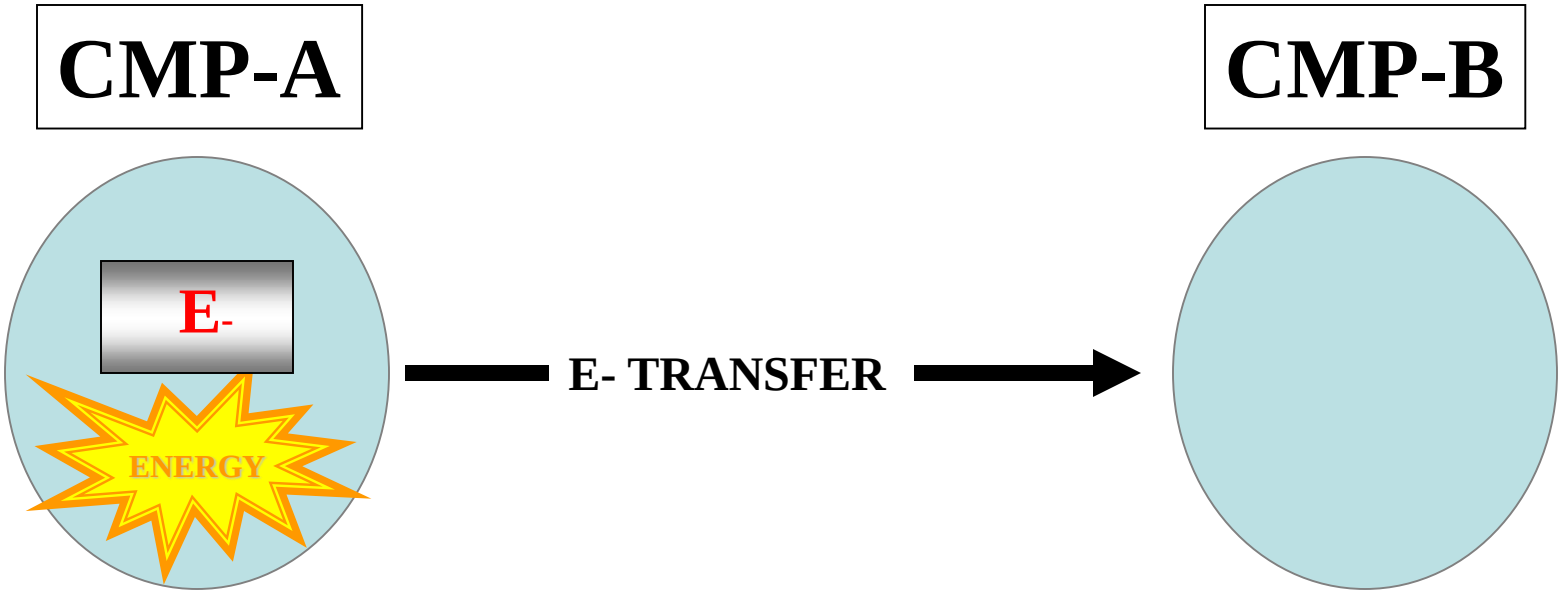
CMP-B



 = **CHEMICAL ENERGY**

REDOX REACTION

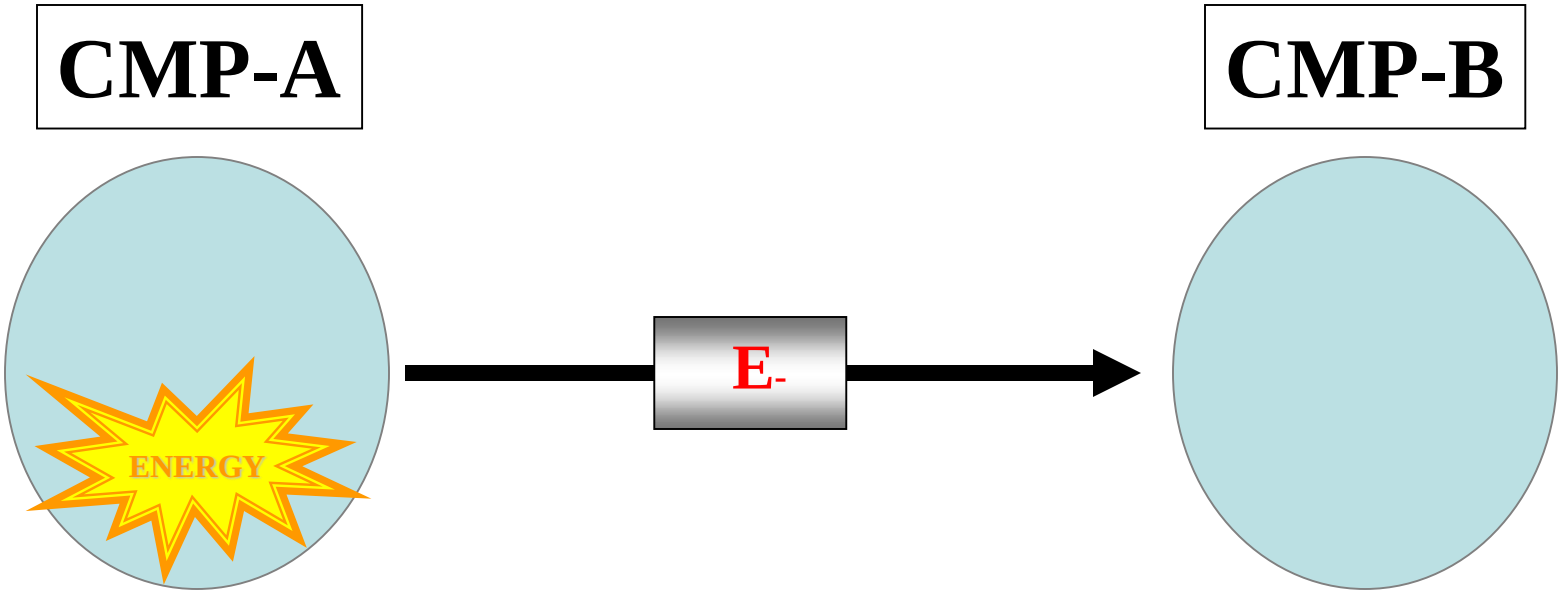
REDUCTION RXT – OXIDATION RXT



= CHEMICAL ENERGY

REDOX REACTION

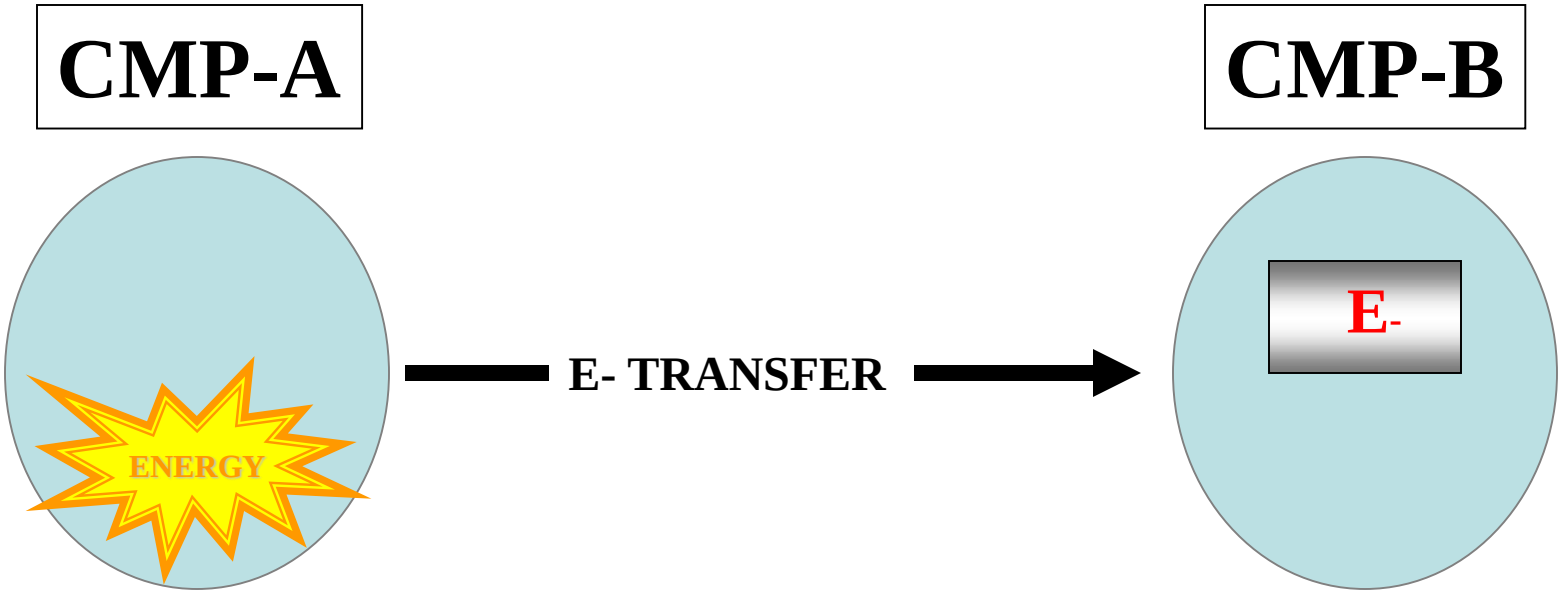
REDUCTION RXT – OXIDATION RXT



= CHEMICAL ENERGY

REDOX REACTION

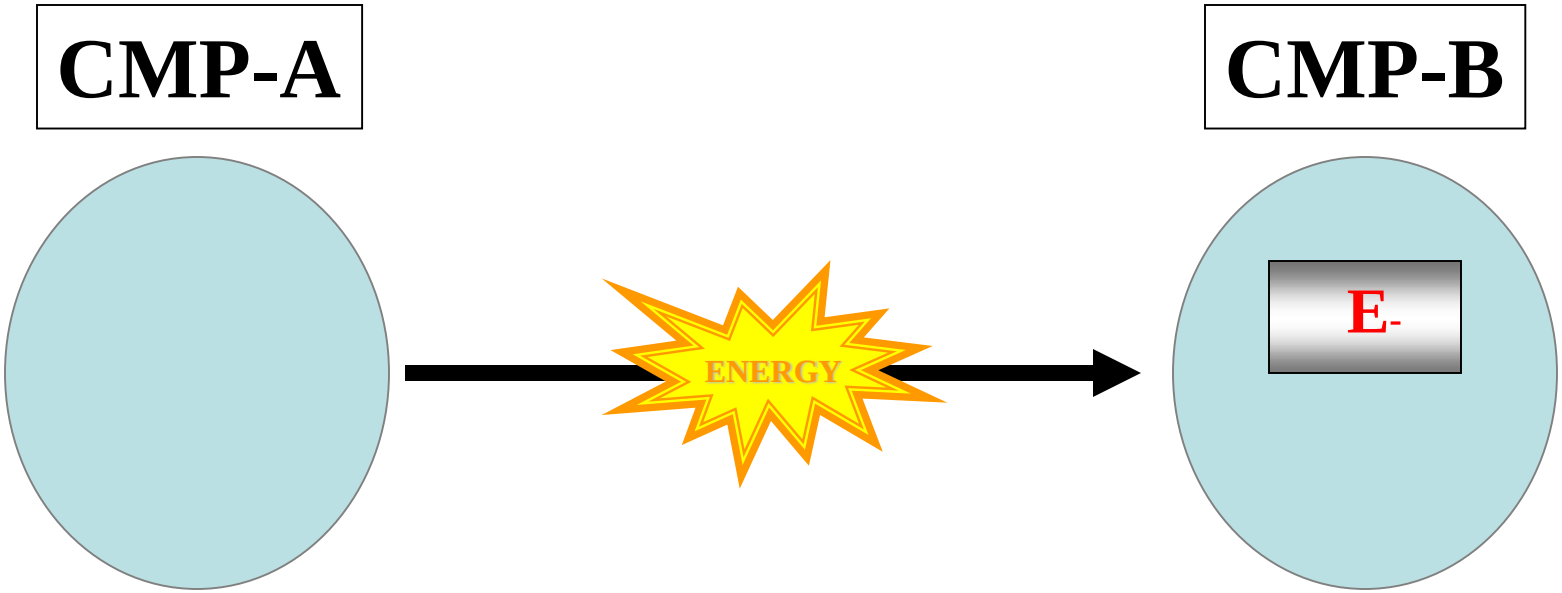
REDUCTION RXT – OXIDATION RXT



= CHEMICAL ENERGY

REDOX REACTION

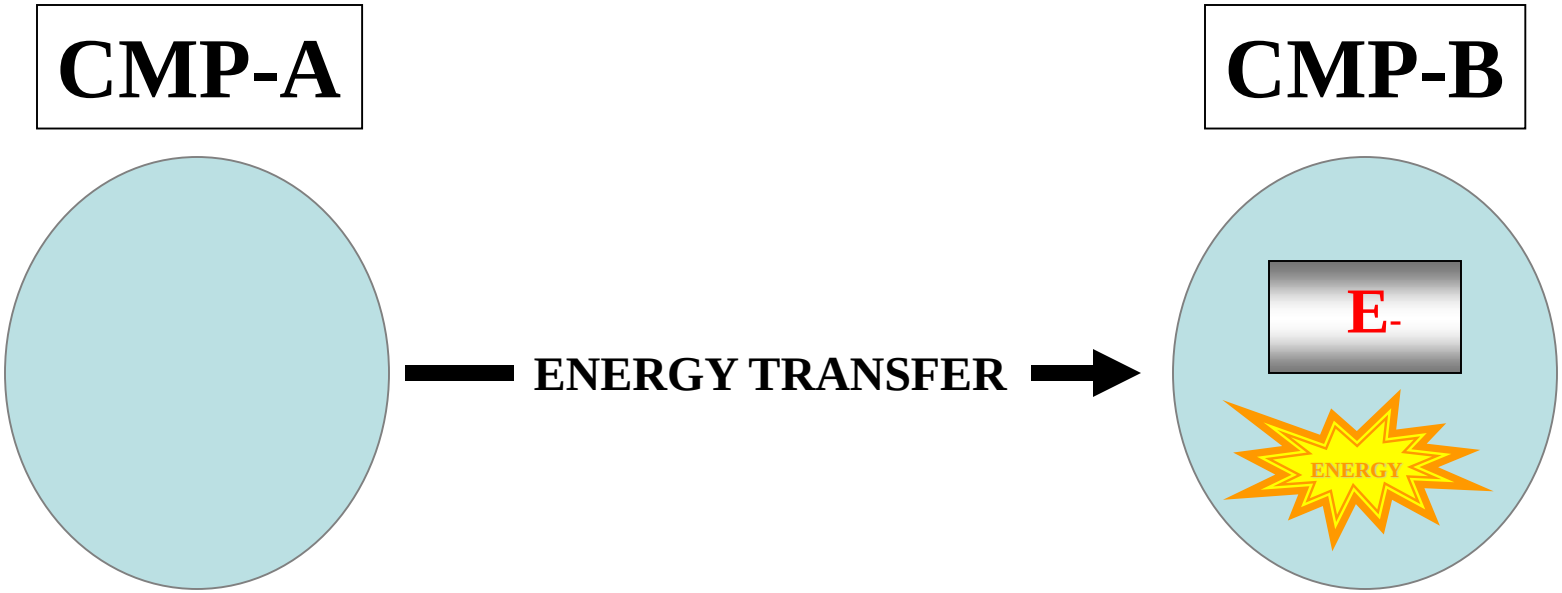
REDUCTION RXT – OXIDATION RXT



= CHEMICAL ENERGY

REDOX REACTION

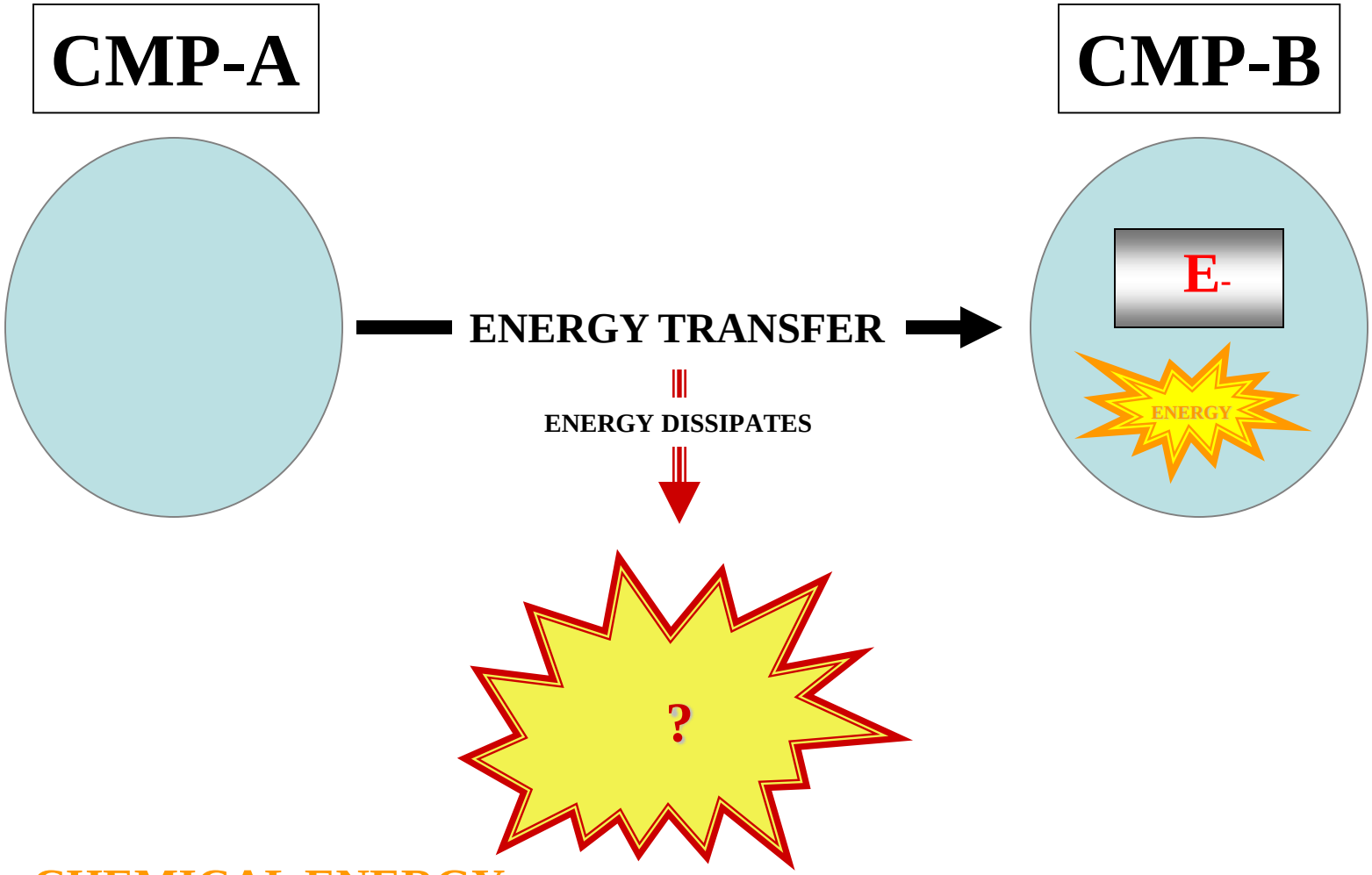
REDUCTION RXT – OXIDATION RXT



= CHEMICAL ENERGY

REDOX REACTION

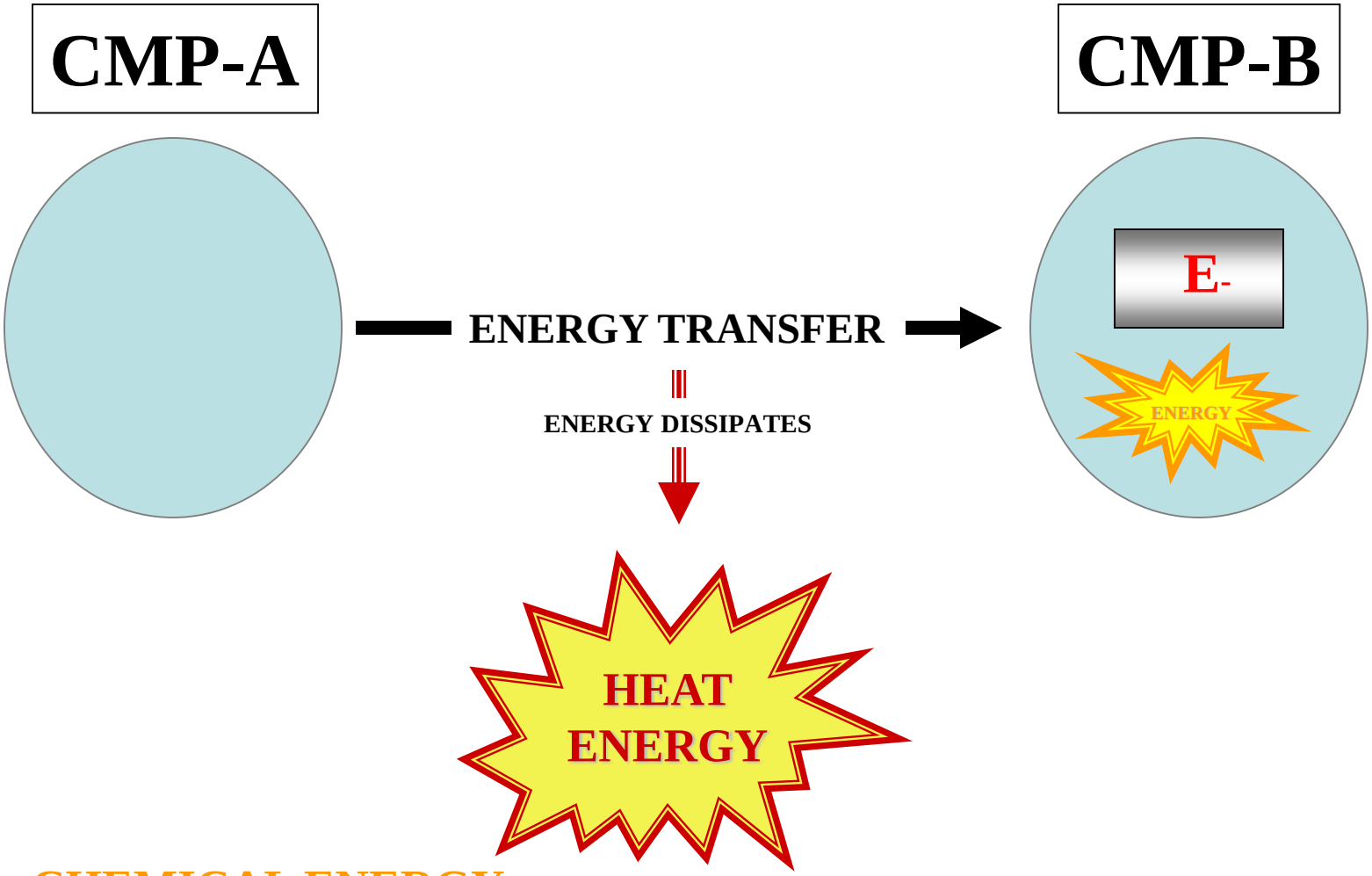
REDUCTION RXT – OXIDATION RXT



REDOX REACTION

OX

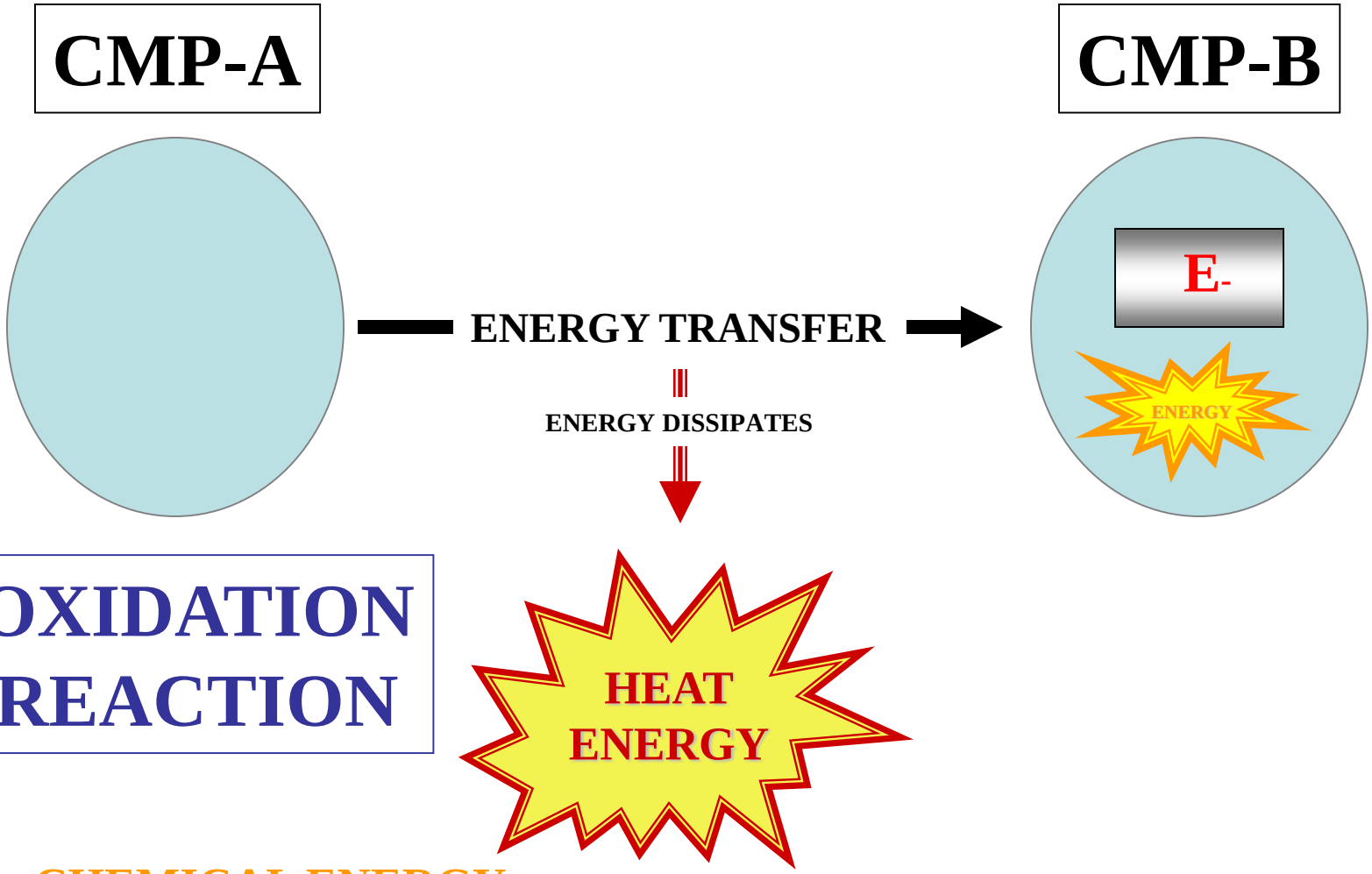
REDUCTION RXT – OXIDATION RXT



REDOX REACTION

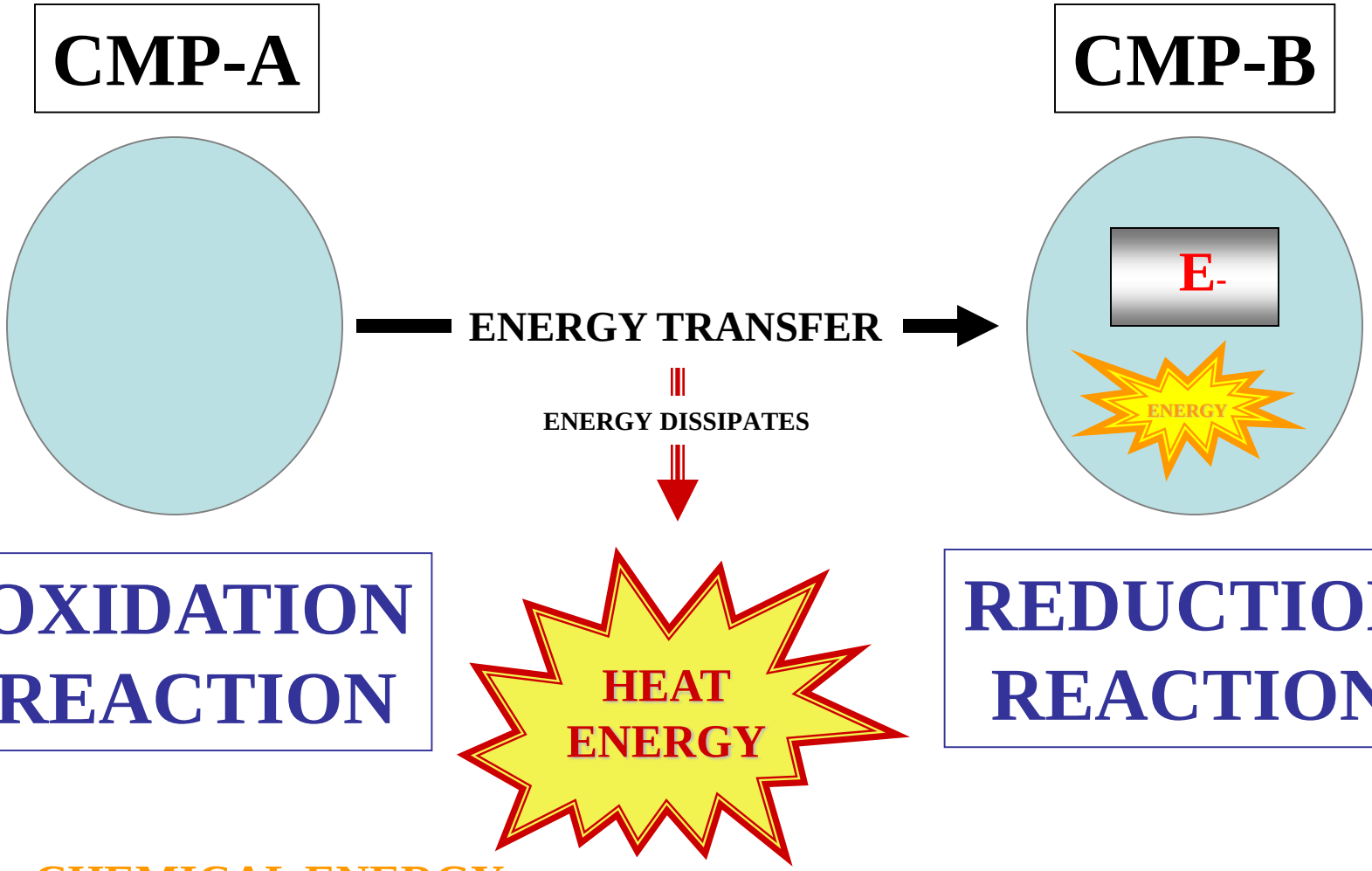
RE

REDUCTION RXT – OXIDATION RXT



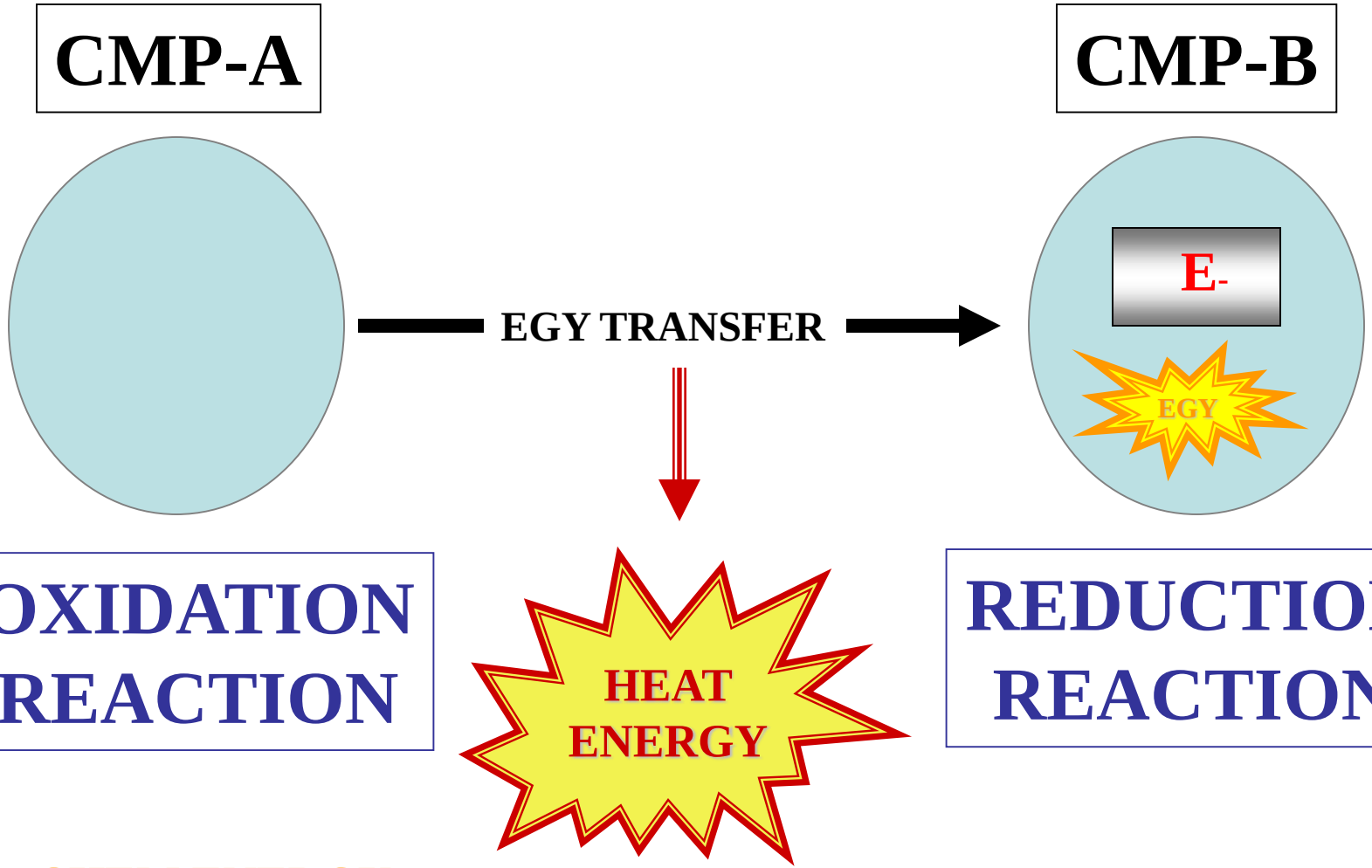
REDOX REACTION

REDUCTION RXT – OXIDATION RXT



REDUCTION REACTIONS & OXIDATION REACTIONS ?

REDOX REACTION
REDUCTION RXT – OXIDATION RXT



REDUCTION REACTIONS & OXIDATION REACTIONS

!!!COUPLED!!!

E

ENDERGONIC REACTIONS VS EXERGONIC REACTIONS

EXERGONIC REACTION

E

EXERGONIC REACTION

RELEASES ENERGY

EXERGONIC REACTION

ENDERGONIC REACTION

AP

ENDERGONIC REACTION

REQUIRES ENERGY INPUT

ENDERGONIC REACTION

ENDERGONIC REACTIONS VS EXERGONIC REACTIONS APPLIED

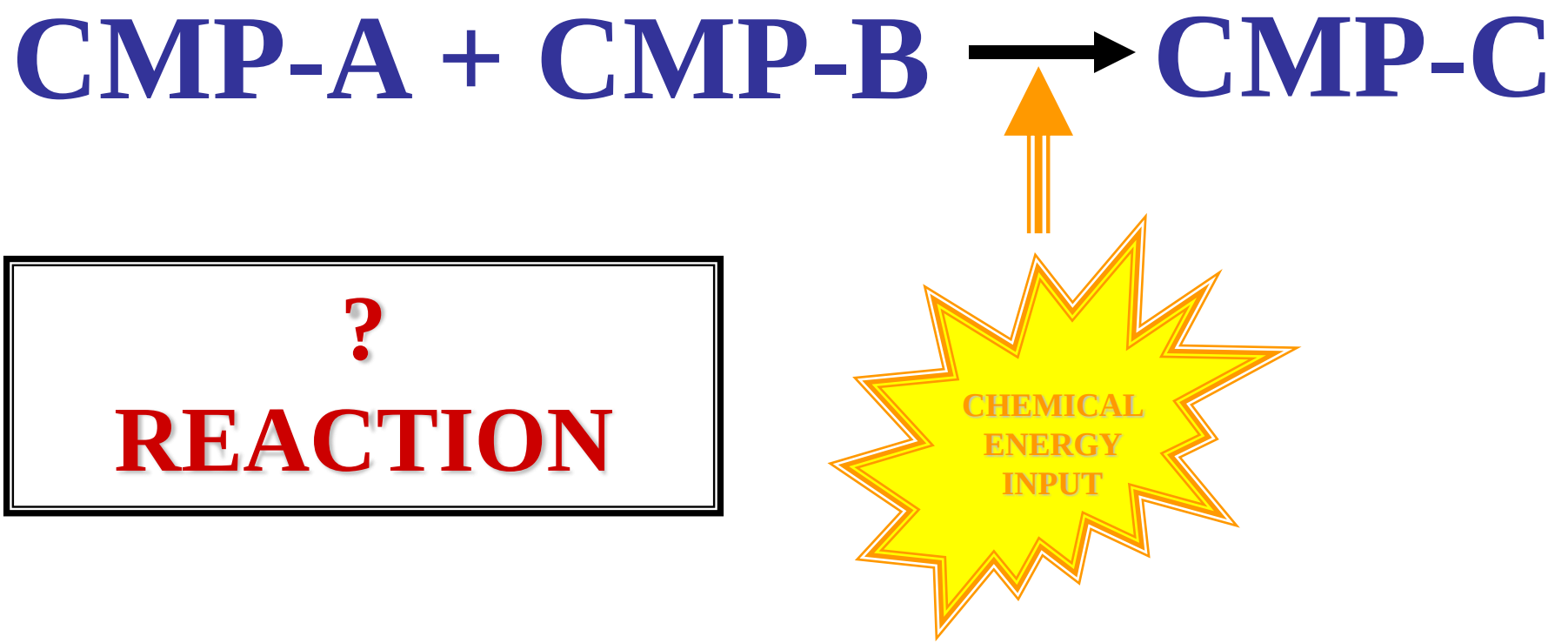
ENDERGONIC REACTIONS VS EXERGONIC REACTIONS

$$CMP\text{-}A + CMP\text{-}B \longrightarrow CMP\text{-}C$$

BIOCHEMICAL REACTION

EN

ENDERGONIC REACTIONS VS EXERGONIC REACTIONS



ENDERGONIC REACTIONS VS EXERGONIC REACTIONS

$$CMP\text{-}A + CMP\text{-}B \xrightarrow{\text{CHEMICAL ENERGY INPUT}} CMP\text{-}C$$

ENDERGONIC REACTION

ENDERGONIC REACTIONS VS EXERGONIC REACTIONS

CMP-D + CMP-E → CMP-F

BIOCHEMICAL REACTION

EX

ENDERGONIC REACTIONS VS EXERGONIC REACTIONS

CMP-D + CMP-E → CMP-F

?
REACTION

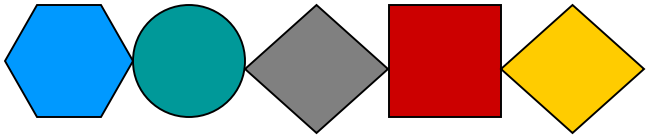
ENDERGONIC REACTIONS VS EXERGONIC REACTIONS

CMP-D + CMP-E → CMP-F

EXERGONIC REACTION

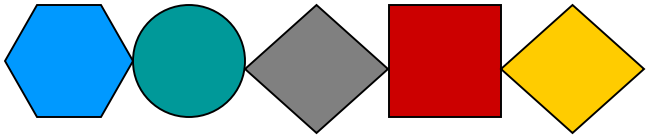
CATABOLIC METABOLISM & ANABOLIC METABOLISM SUMMARY

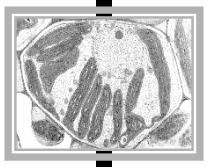
POLYMER



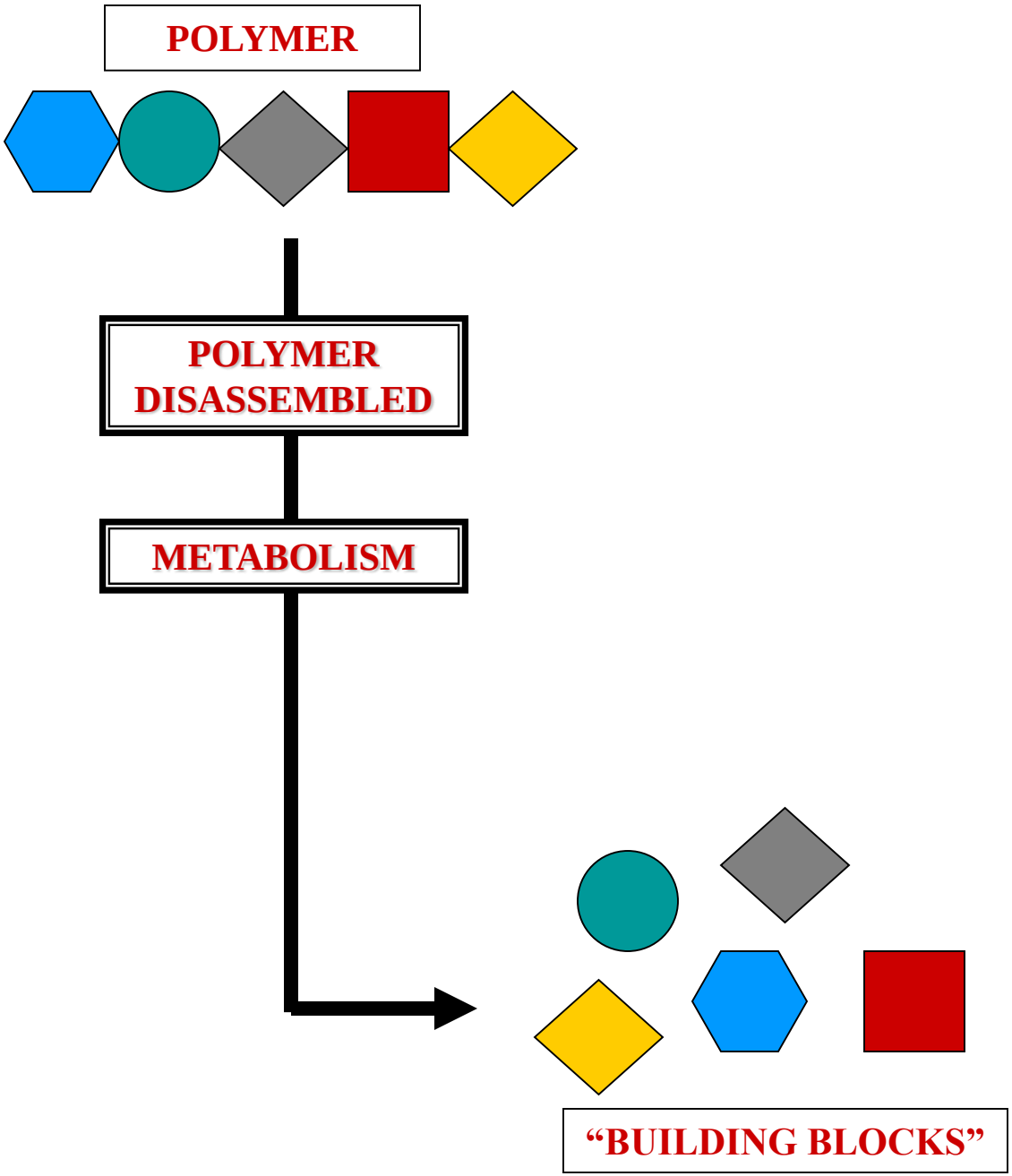
PD

POLYMER

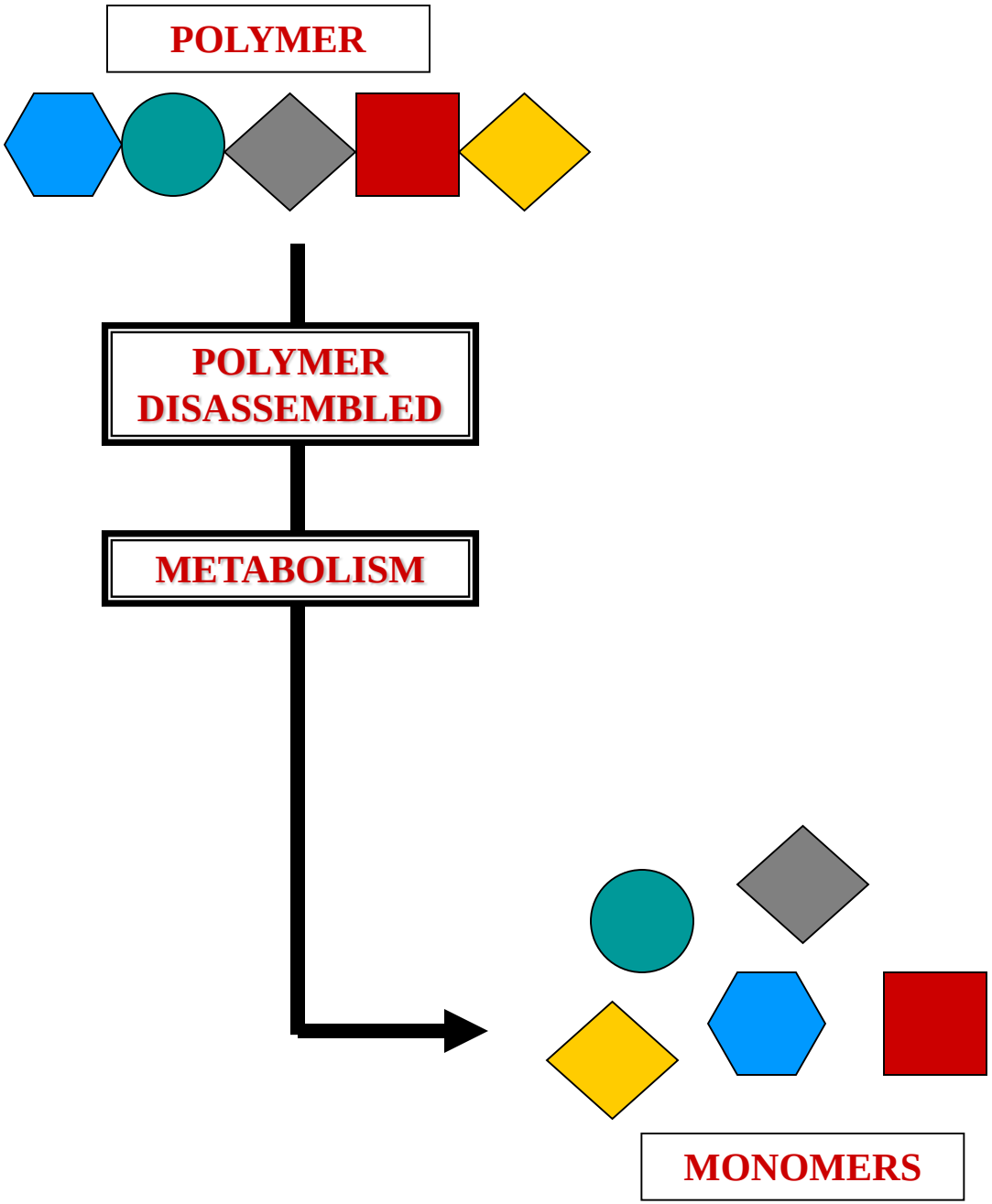




METABOLISM

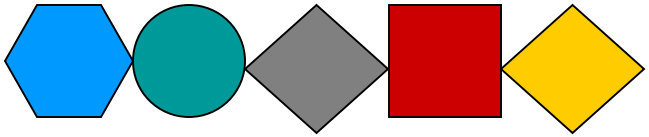

POLYMER
POLYMER DISASSEMBLED
METABOLISM
“BUILDING BLOCKS”

HR



BD

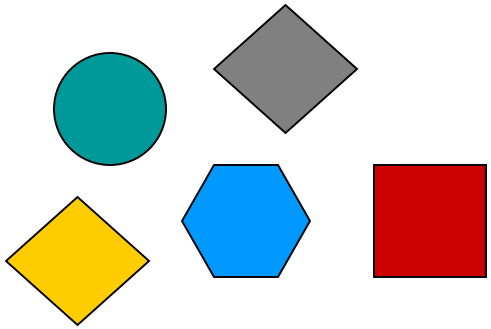
POLYMER



POLYMER DISASSEMBLED

METABOLISM

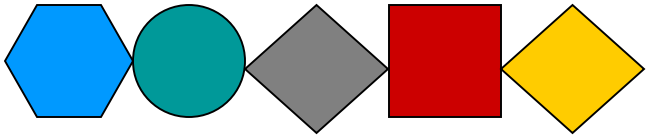
HYDROLYSIS REACTIONS



MONOMERS

CM

POLYMER



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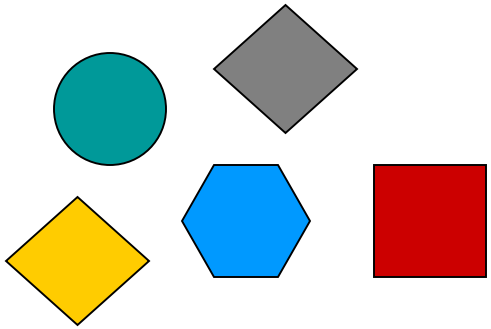
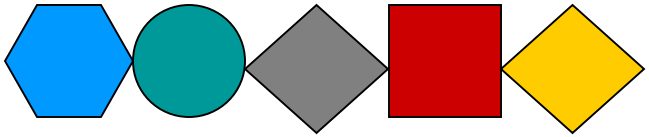
BREAK-DOWN METABOLISM

HYDROLYSIS REACTIONS



MONOMERS

POLYMER



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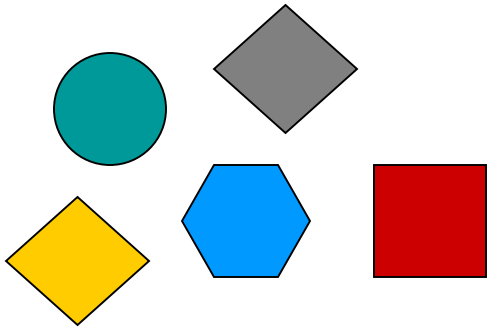
CATABOLIC METABOLISM

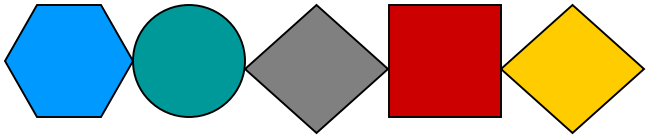
HYDROLYSIS REACTIONS



MONOMERS

EX

POLYMER



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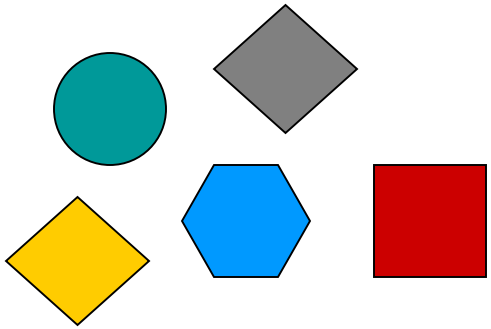
CATABOLIC METABOLISM

RELEASES ENERGY

HYDROLYSIS REACTIONS



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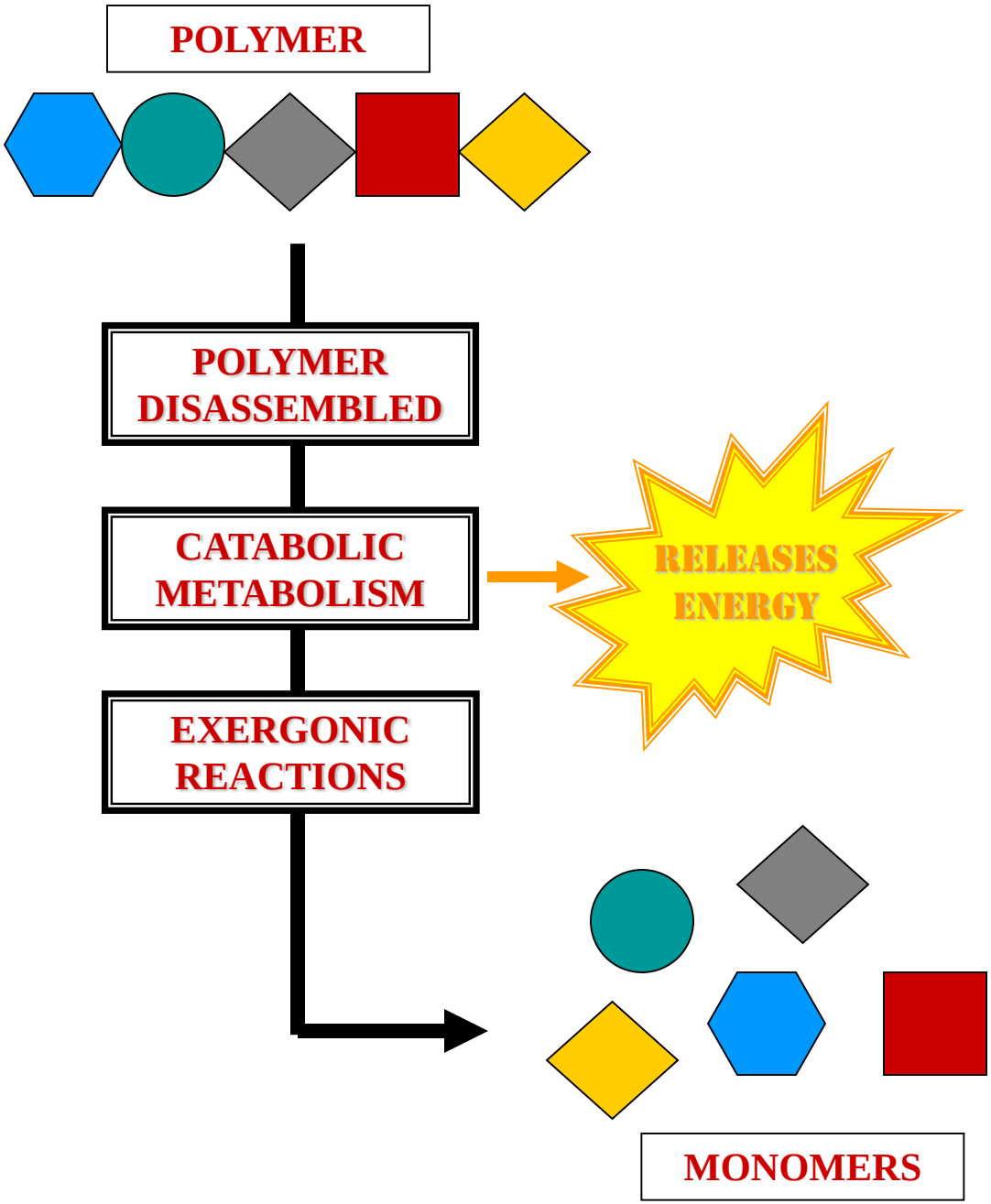
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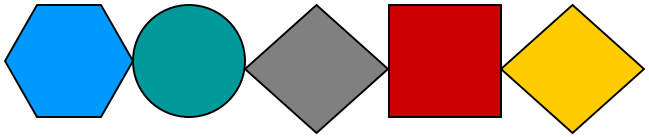
CATABOLIC METABOLISM
RELEASES ENERGY
EXERGONIC REACTIONS
MONOMERS

MA

POLYMER



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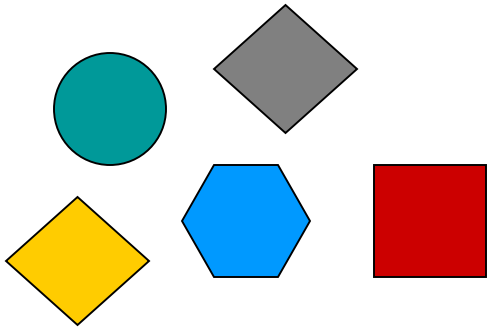
CATABOLIC METABOLISM

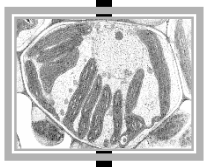
ENERGY

EXERGONIC REACTIONS



MONOMERS

METABOLISM



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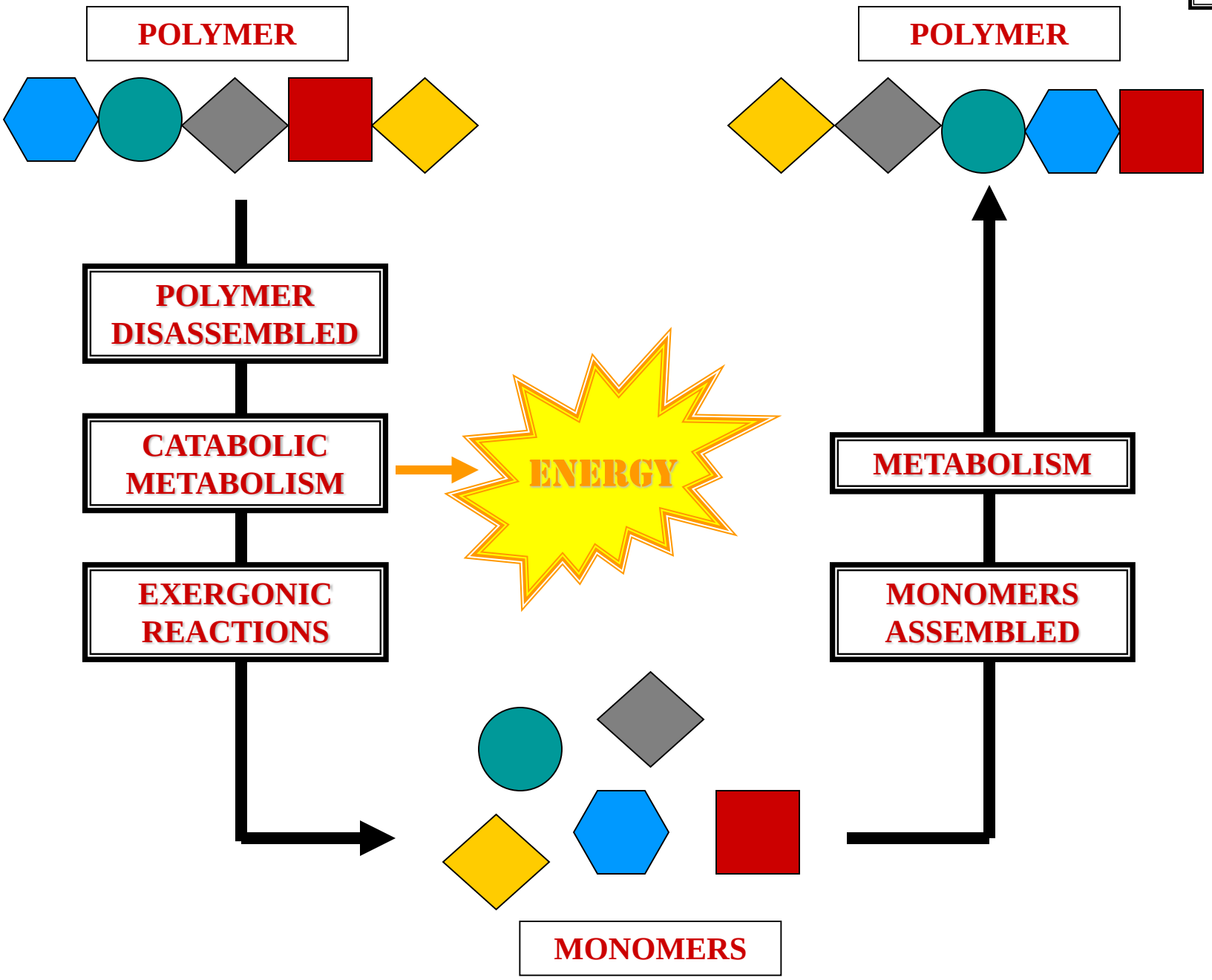
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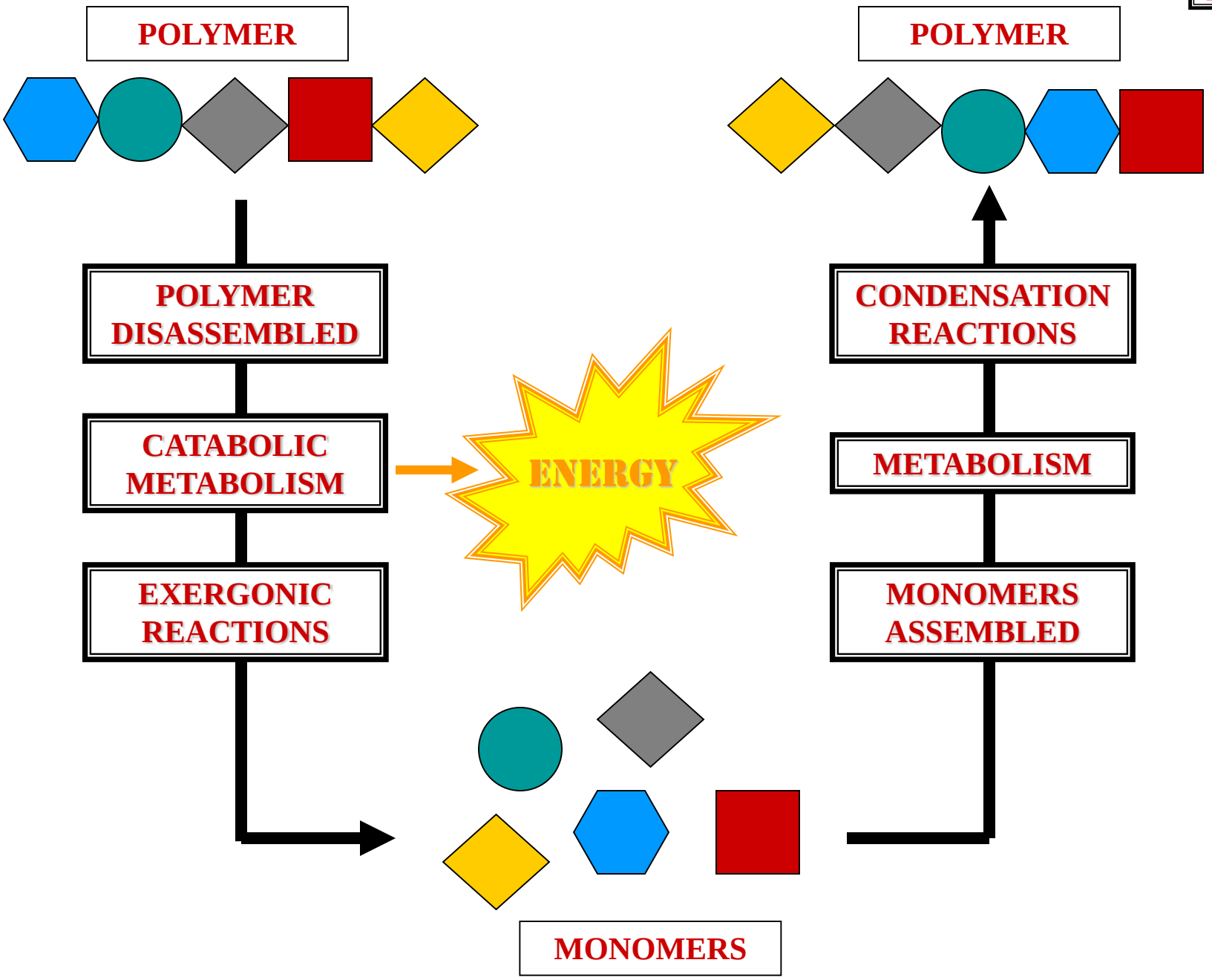
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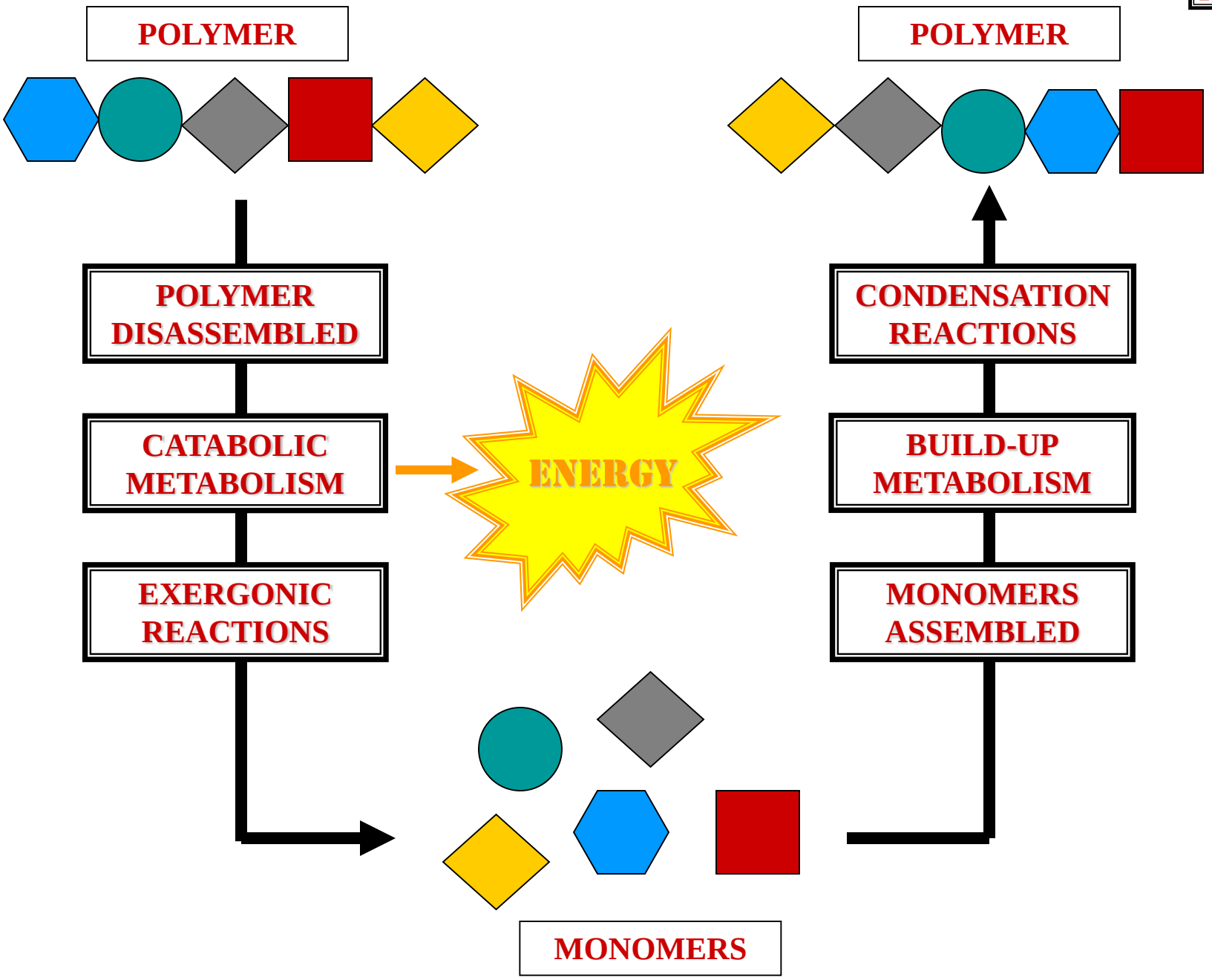
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ENERGY
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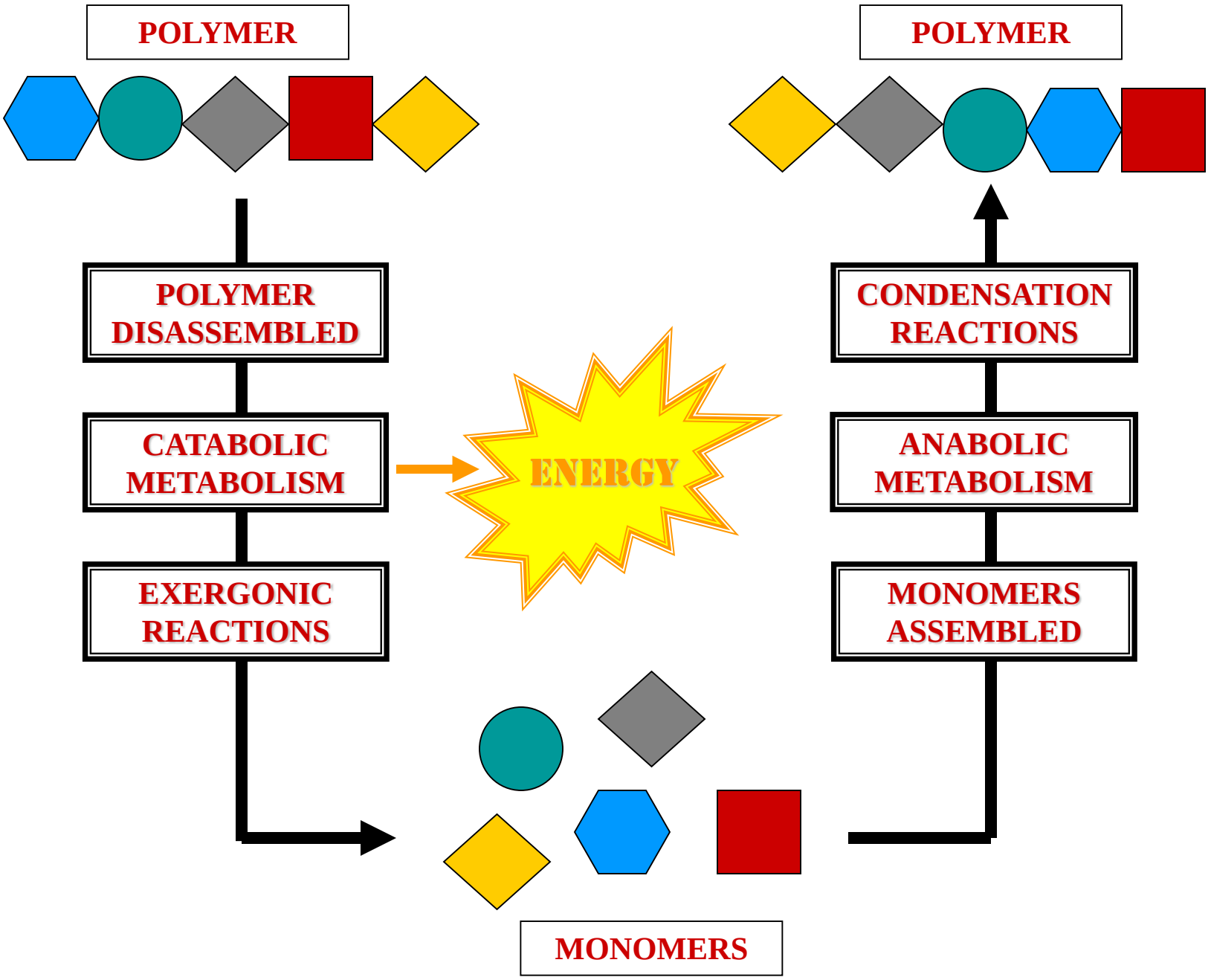
MONOMERS ASSEMBLED
MONOMERS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MONOMERS

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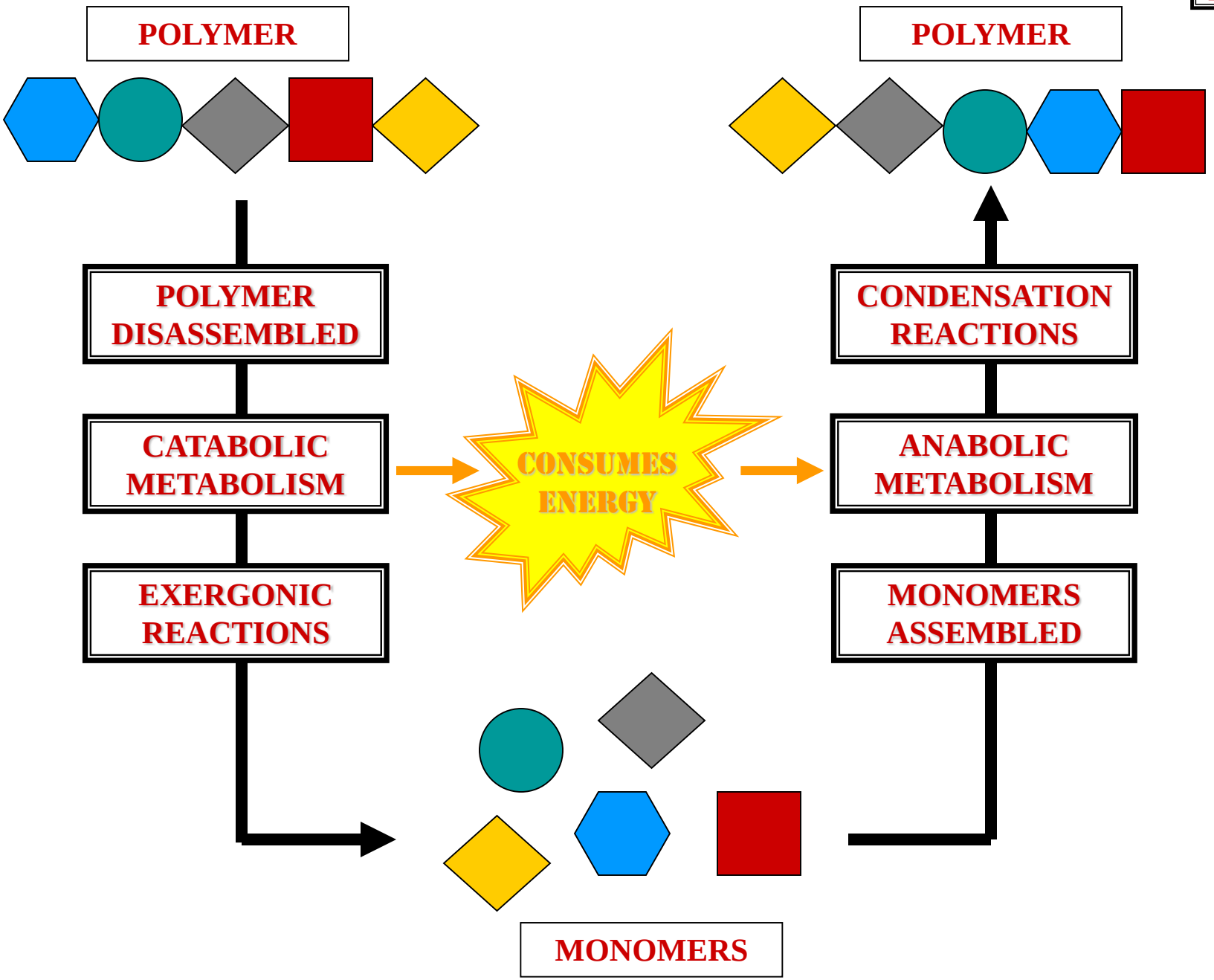
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CONSUMES ENERGY
ANABOLIC METABOLISM
EXERGONIC REACTIONS
MONOMERS ASSEMBLED
MONOMERS

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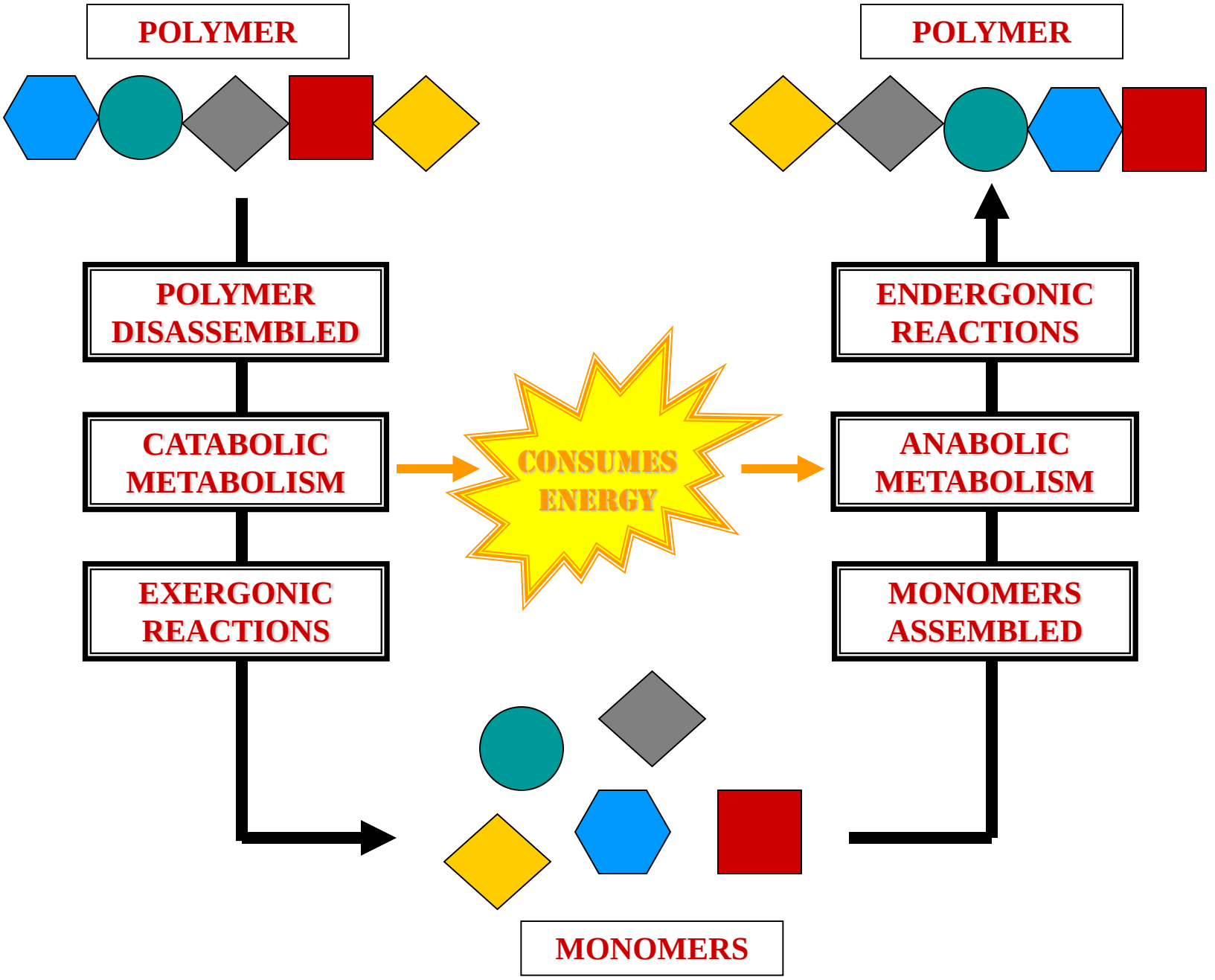
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EXERGONIC REACTIONS
CONSUMES ENERGY
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MONOMERS ASSEMBLED
MONOMERS

EXERGONIC REACTIONS & ENDERGONIC REACTIONS ?

CP

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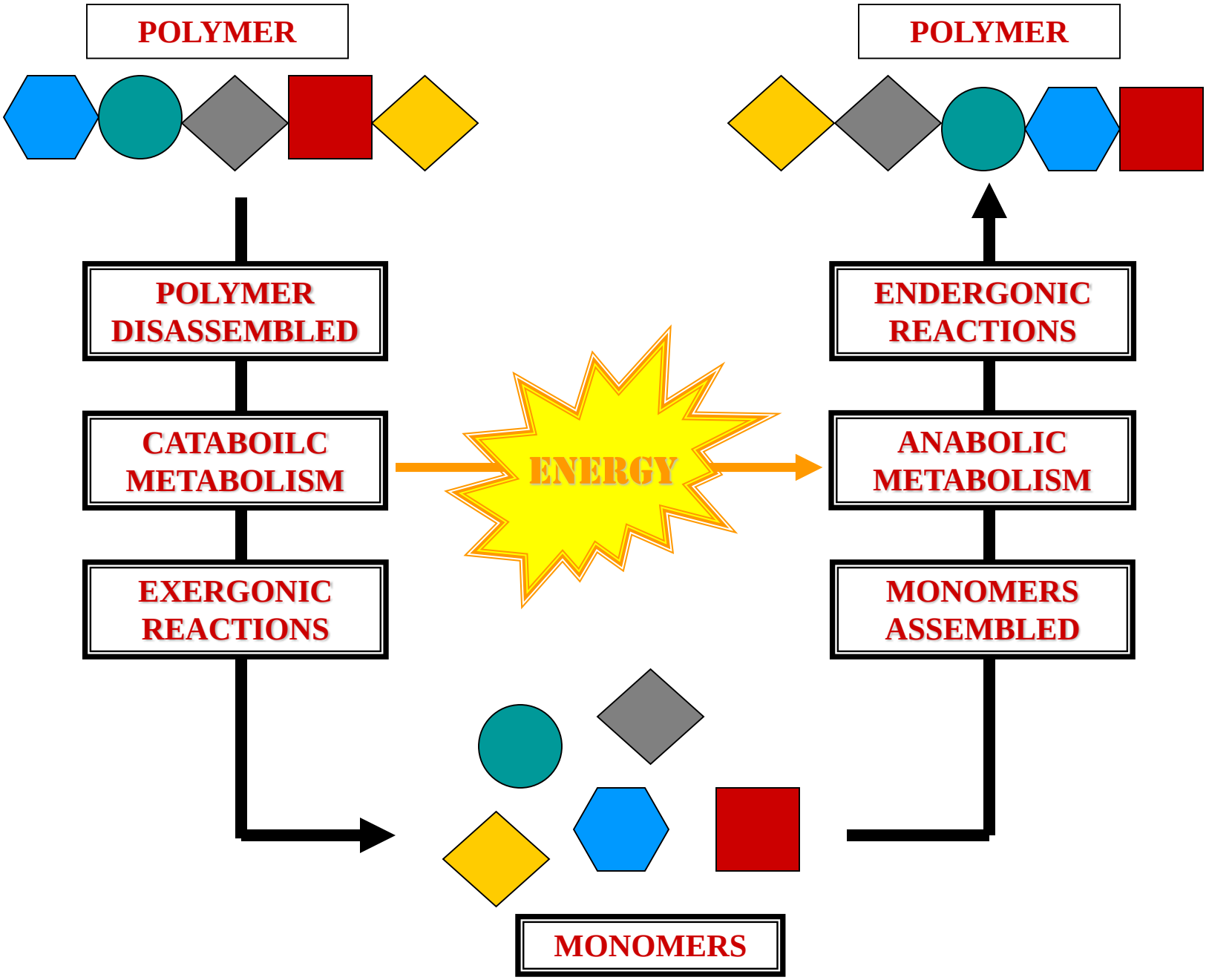
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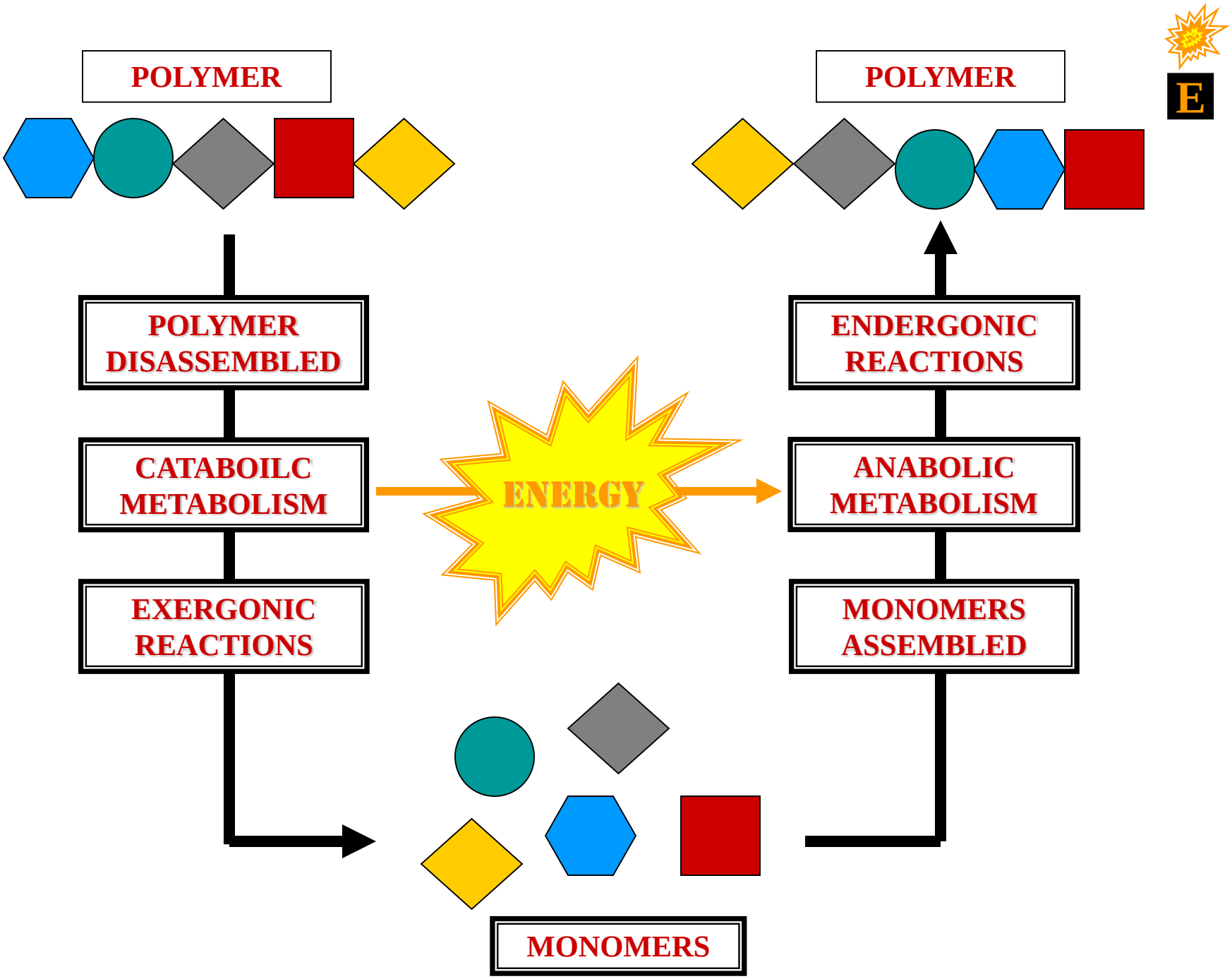
MONOMERS ASSEMBLED
MONOMERS

EXERGONIC REACTIONS & ENDERGONIC REACTIONS

!!!COUPLED!!!


POLYMER
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ENDERGONIC REACTIONS
CATABOILC METABOLISM
ENERGY
ANABOLIC METABOLISM
EXERGONIC REACTIONS
MONOMERS ASSEMBLED
MONOMERS

CHEMICAL ENERGY

?

PHOTOSYNTHESIS
&
RESPIRATION

QUESTION

WHAT IS THE INITIAL BIO-EGY SOURCE?

QUESTION

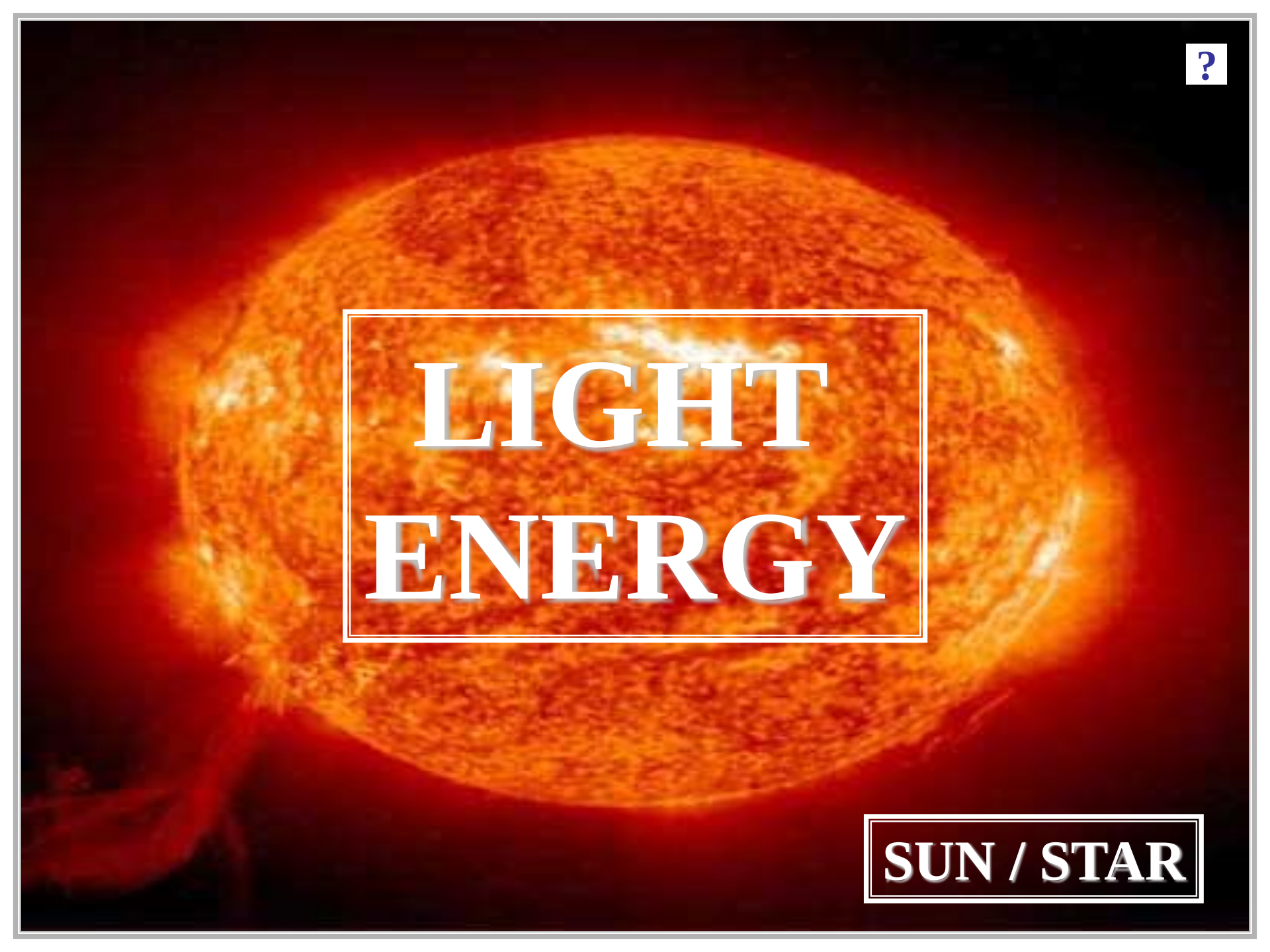
A

LIVING ORGANISMS

LIVING ORGANISMS

LIVING ORGANISMS

EARTH

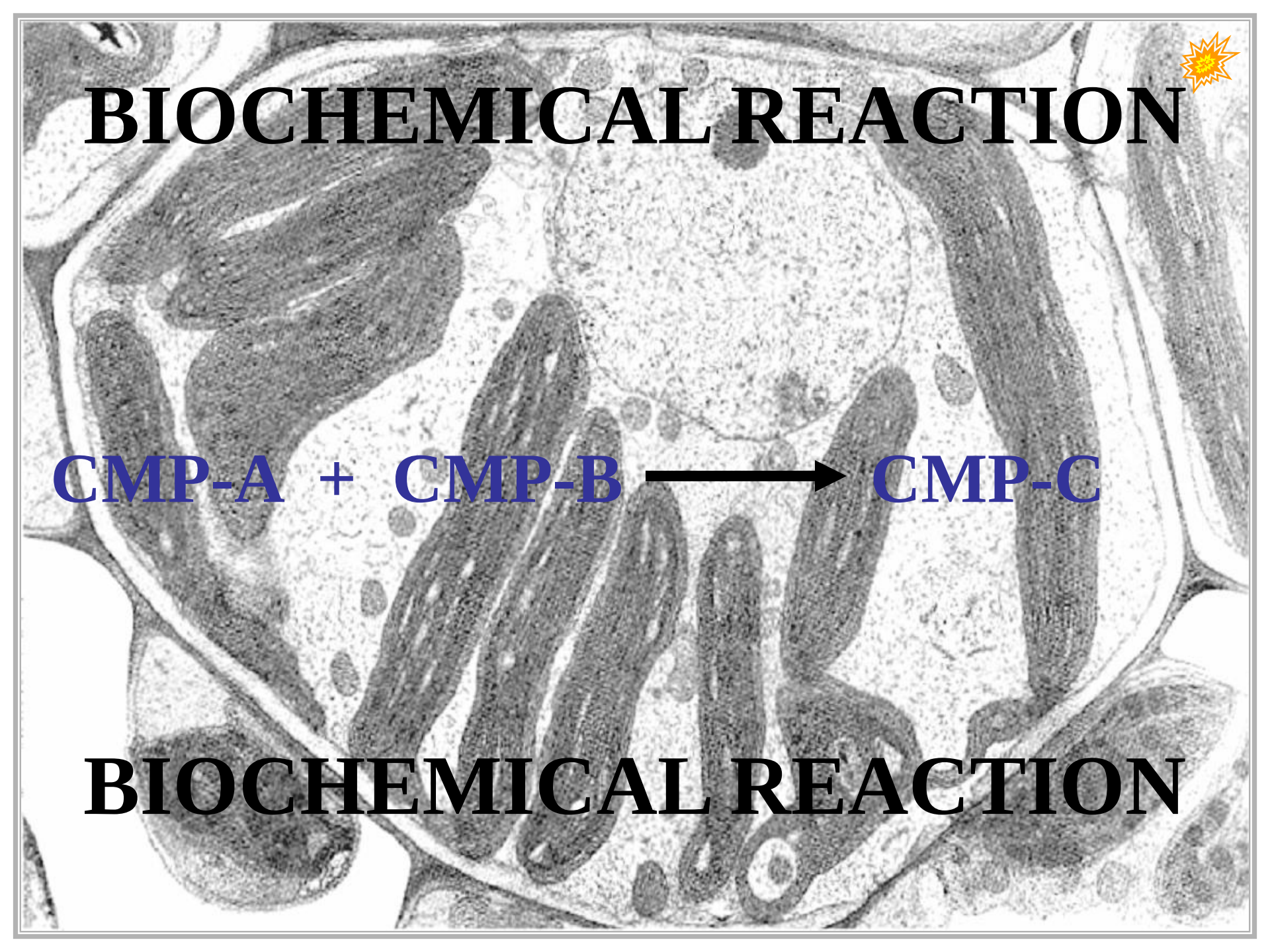

?
LIGHT ENERGY
SUN / STAR

QUESTION

LIGHT ENERGY MUST BE CONVERTED TO WHAT FORM OF ENERGY TO ENTER METABOLISM?

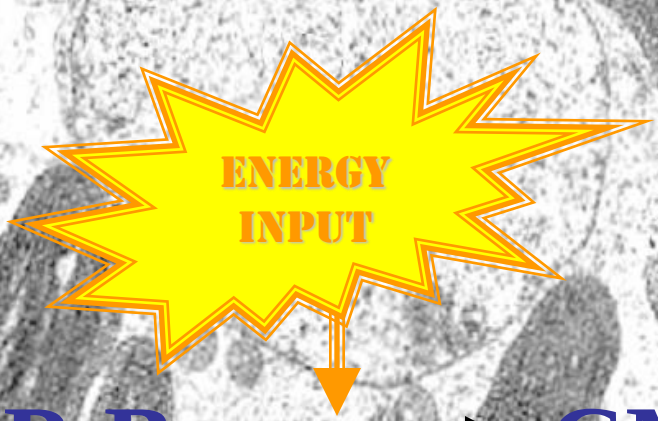
QUESTION

CHEMICAL ENERGY


BIOCHEMICAL REACTION
CMP-A + CMP-B → CMP-C
BIOCHEMICAL REACTION

BIOCHEMICAL REACTION

C



CMP-A + CMP-B → CMP-C

BIOCHEMICAL REACTION