

GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

+

HEXOKINASE

ATP

EGY

ADP

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

SPECIFIC SEQUENCE
BIOCHEMICAL REACTIONS

SPECIFIC SEQUENCE
BIOCHEMICAL REACTIONS

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

FRUCTOSE-1-6-PHOSPHATE

 = ENERGY



FRUCTOSE-1-6-PHOSPHATE

**SPECIFIC SEQUENCE
BIOCHEMICAL REACTIONS**

**ALDOLASE
ISOMERASE**

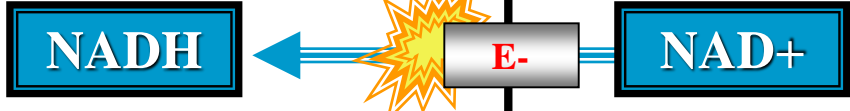
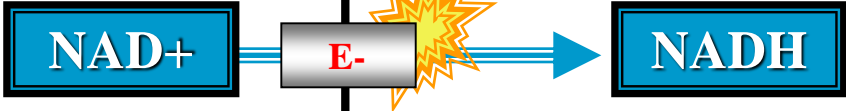
**SPECIFIC SEQUENCE
BIOCHEMICAL REACTIONS**

PHOSPHOGLYCERALDEHYDE - PGAL

PHOSPHOGLYCERALDEHYDE - PGAL

TRI-PHOSPHATE DEHYDROGENASE

TRI-PHOSPHATE DEHYDROGENASE



1-3-BISPHOSPHOGLYCERATE

1-3-BISPHOSPHOGLYCERATE

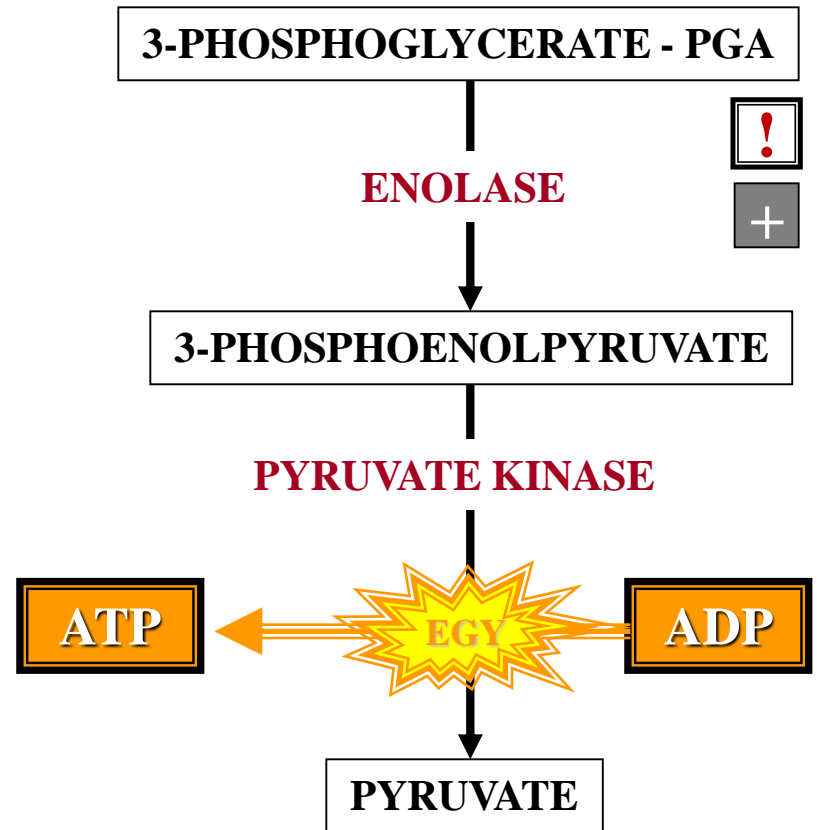
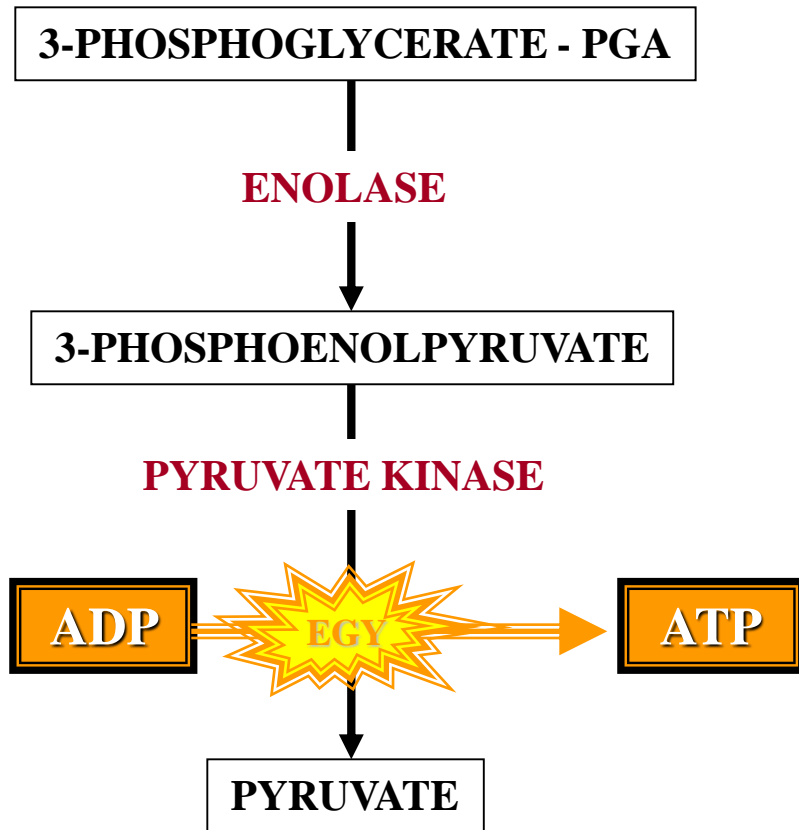
PHOSPHOGLYCEROKINASE

PHOSPHOGLYCEROKINASE



3-PHOSPHOGLYCERATE - PGA

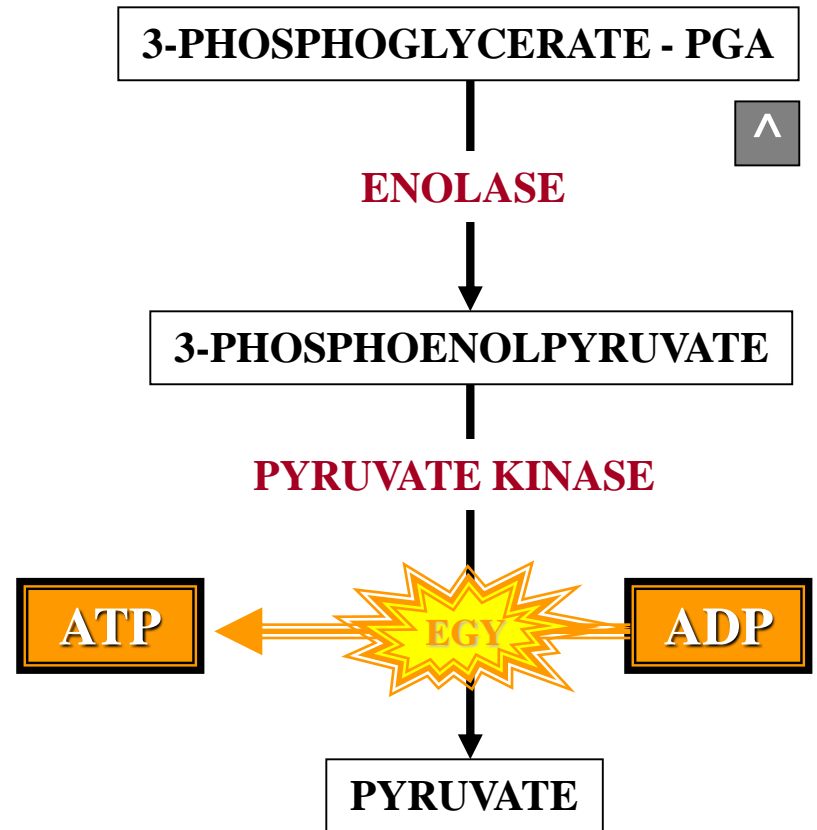
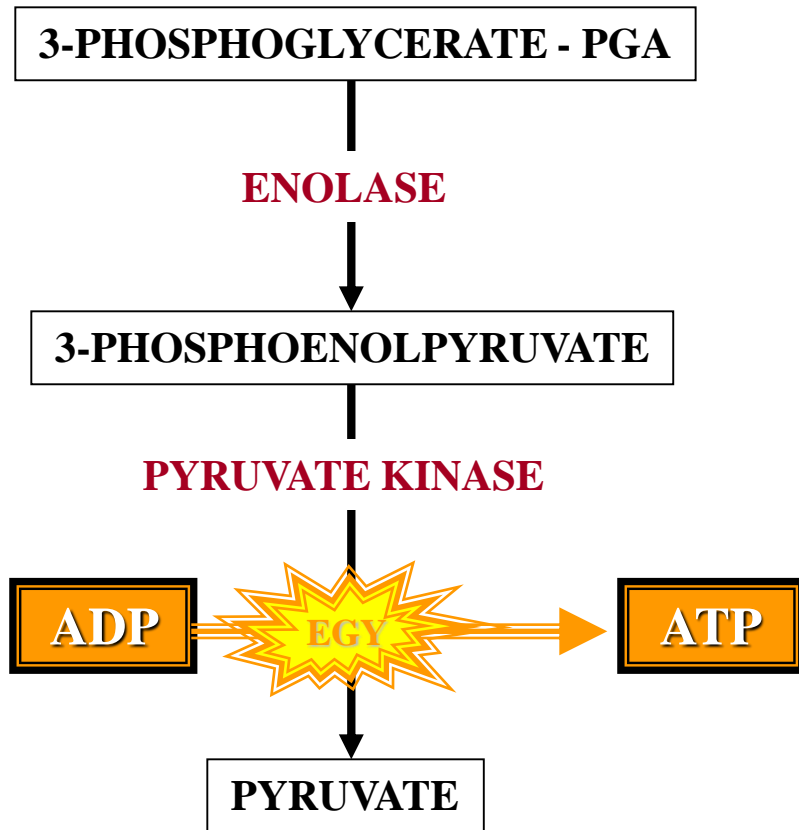
3-PHOSPHOGLYCERATE - PGA



CONSISTS: SPECIFIC SEQUENCE BIO-CHEM RXTS

BLACK = SUBSTRATE/PRODUCT

RED = ENZYME



CONSISTS: SUBSTRATE & ENZYME REACTIONS

BLACK = SUBSTRATE/PRODUCT

RED = ENZYME

SUBSTRATES & ENZYMES

SUBSTRATE

SUBSTRATE

**BIOCHEMICAL
COMPOUND
ACTED UPON BY AN
ENZYME**

SUBSTRATE

ENZYMIE



ENZYME

**PROTEIN
BIOCHEMICAL
CATALYST**

ENZYME

G

E

TWELFTH EDITION

CAMPBELL
BIOLOGY

URRY • CAIN • WASSERMAN
MINORSKY • ORR



GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

HEXOKINASE

ATP

EGY

ADP

A

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

ENZYMES

ENZYMES

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

FRUCTOSE-1-6-PHOSPHATE

RED = ENZYME

GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

HEXOKINASE

ATP

EGY

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GLUCOSE-6-PHOSPHATE

ENZYMES

PHOSPHOGLUCOISOMERASE

ENZYMES

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

FRUCTOSE-1-6-PHOSPHATE

RED = ENZYME

^



SUGAR

ENZYME NAME

SUGAR ENZYME NAME



SUGAR-

SUGAR ENZYME NAME

SUGAR ENZYME NAME



SUGAR-OSE

SUGAR ENZYME NAME

SUGAR ENZYME NAME

SUGAR-

SUGAR ENZYME NAME

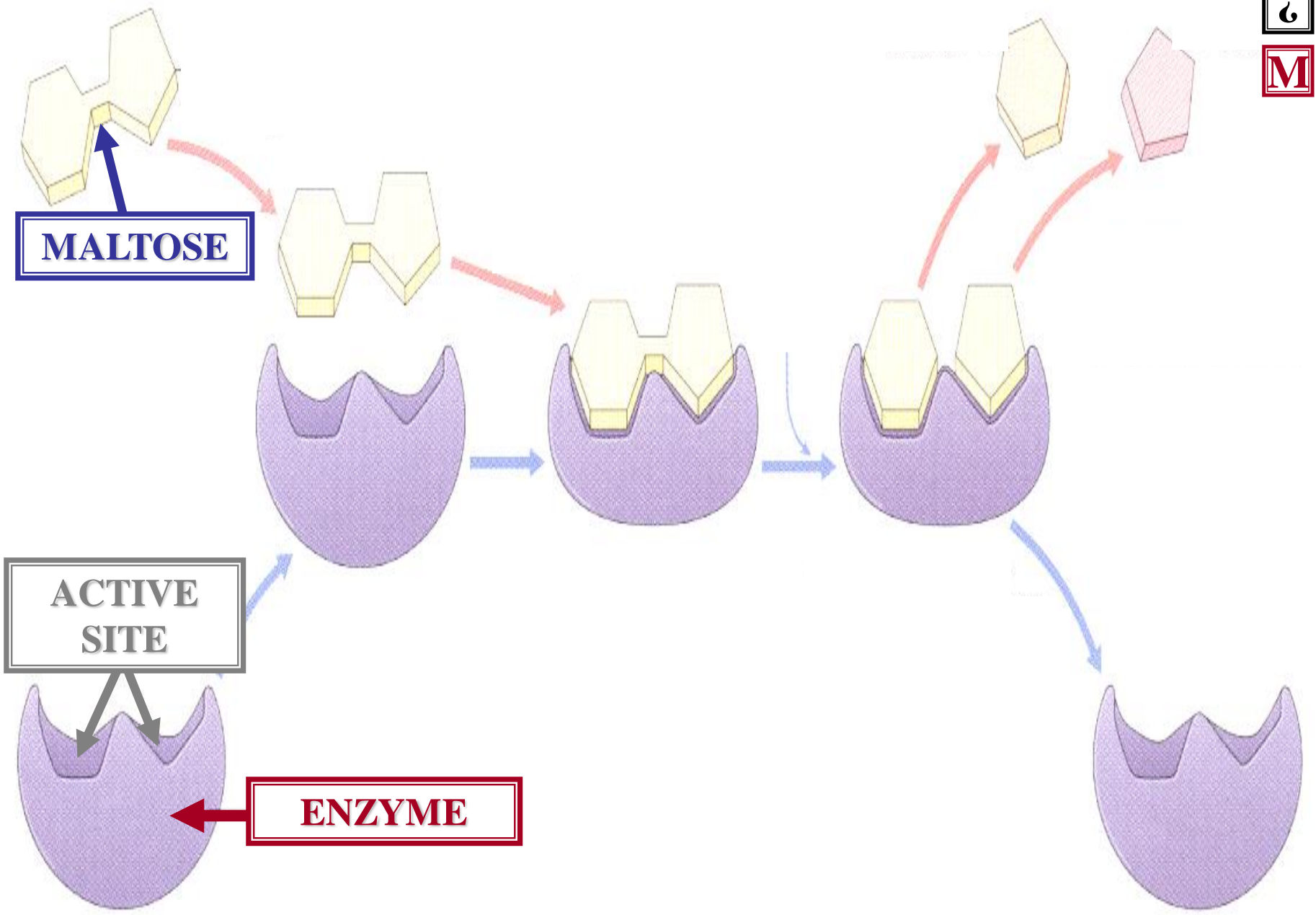
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SUGAR-ASE

SUGAR ENZYME NAME



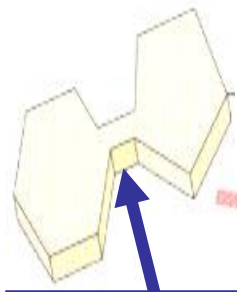
SUGAR
ENZYME NAME
EXAMPLES



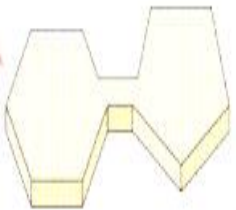
MALTOSE

ACTIVE SITE

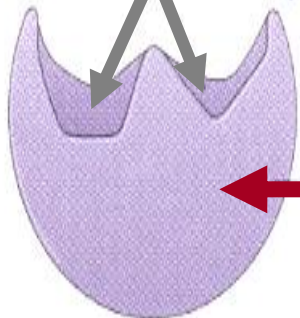
ENZYME



MALTOSE

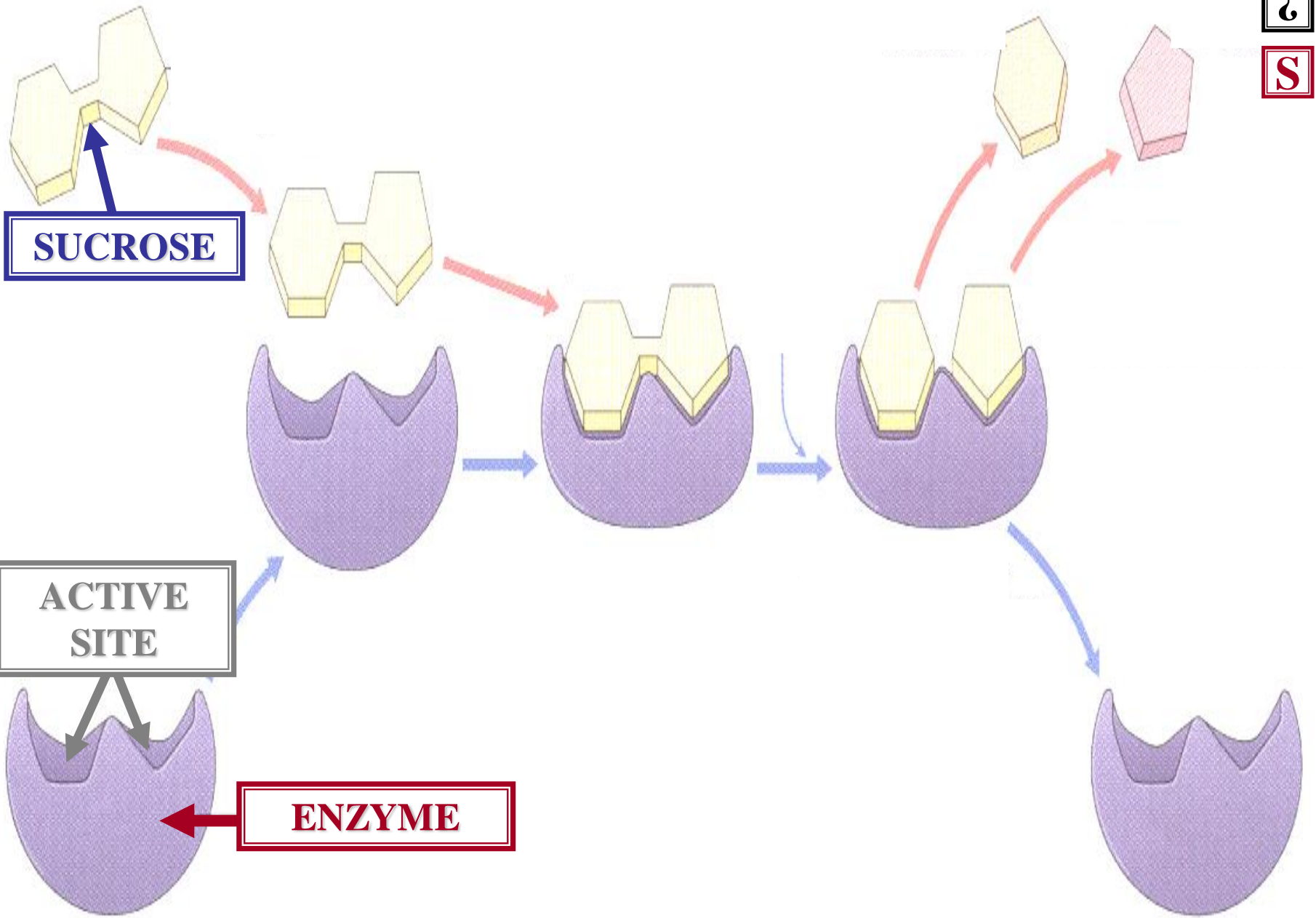


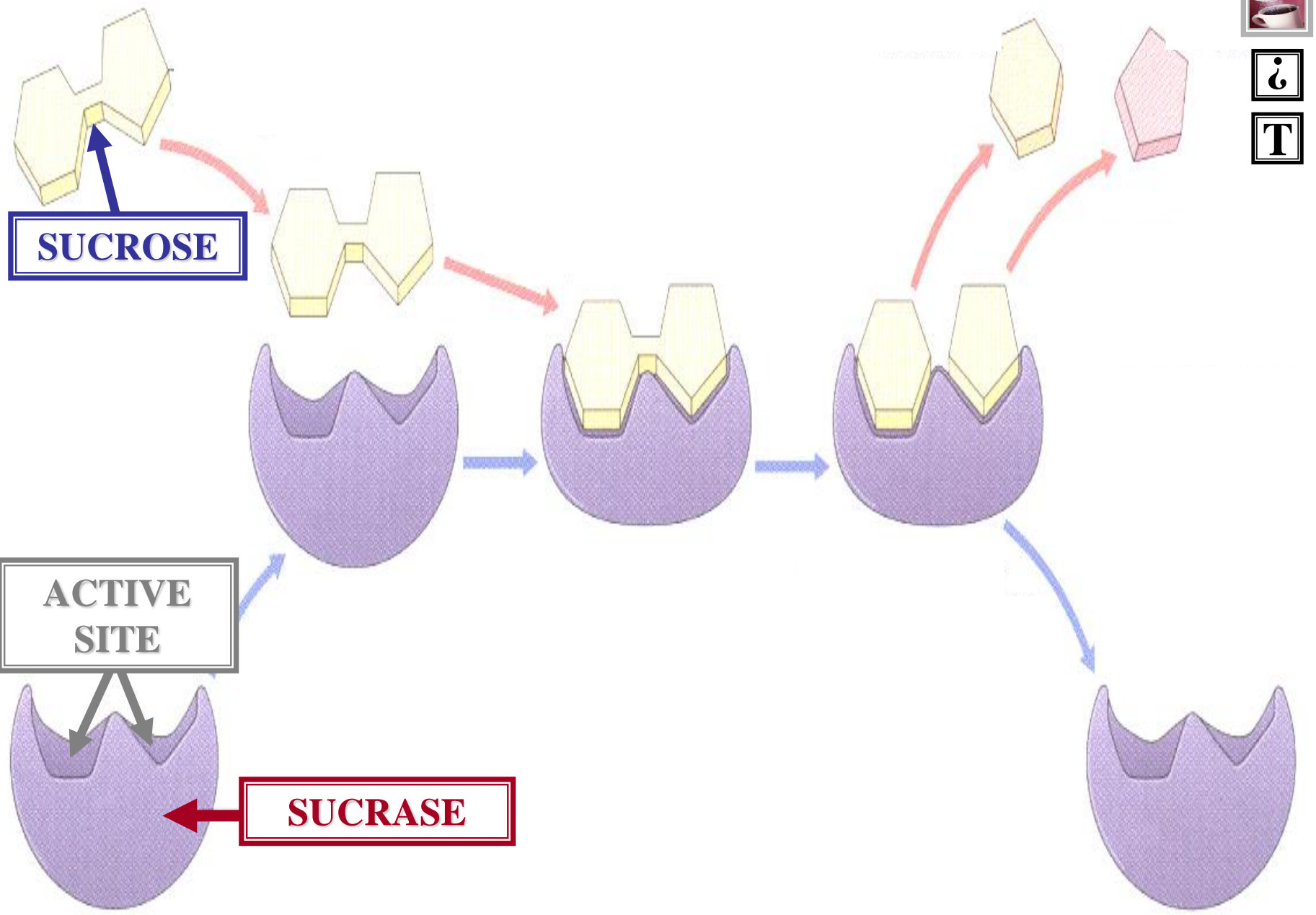
ACTIVE SITE



MALTASE







SUCROSE

ACTIVE SITE

SUCRASE

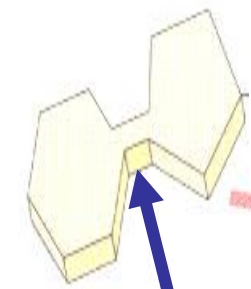


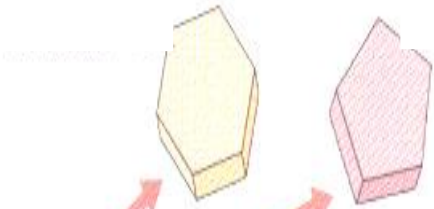
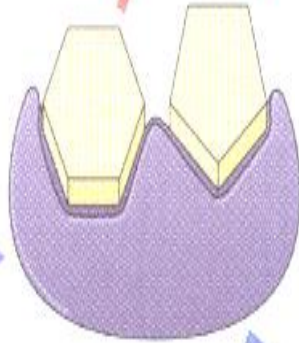
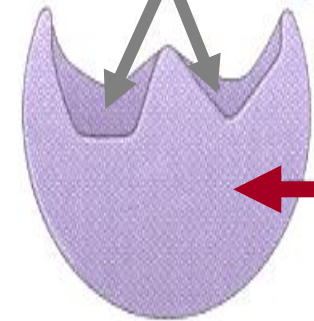
TABLE SUGAR



SUCROSE

ACTIVE SITE

SUCRASE



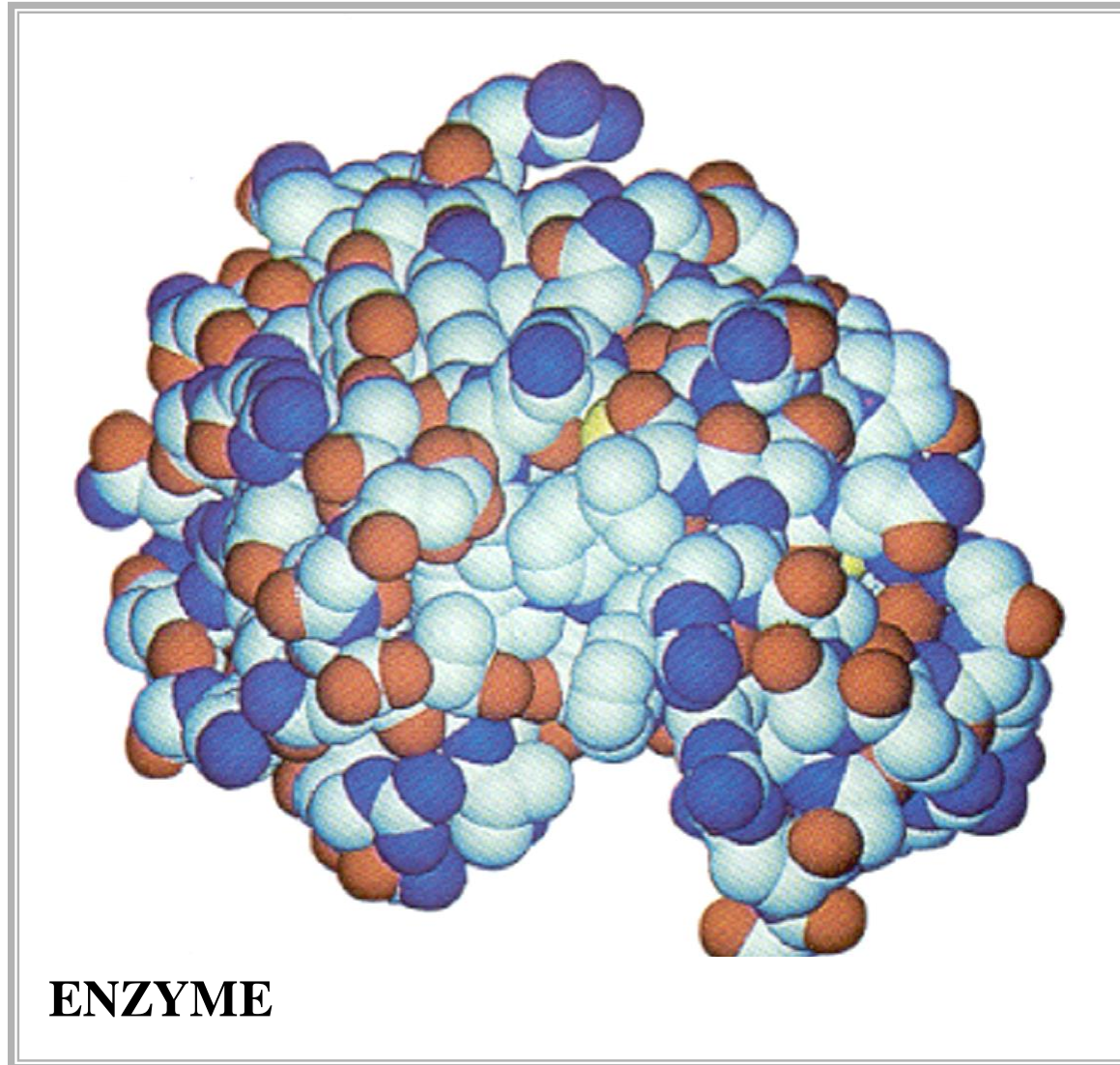


ENZYMES

FEATURES

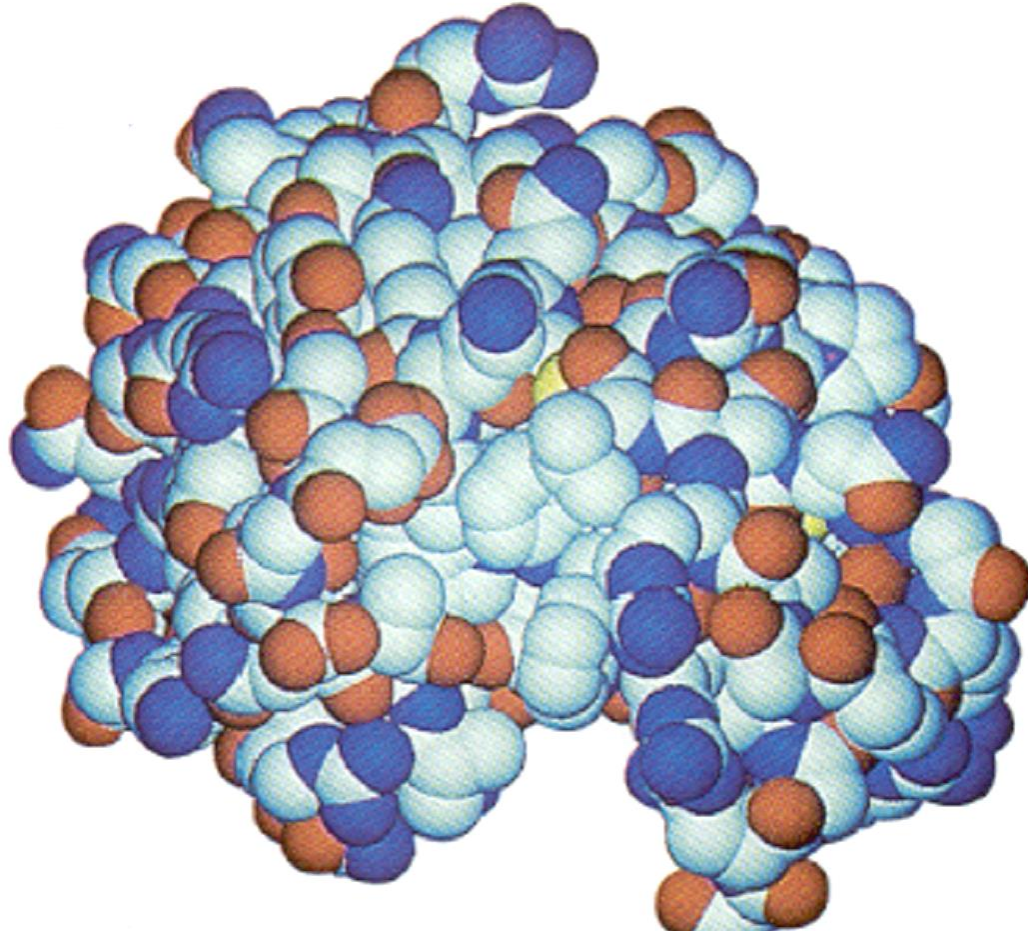
ENZYME FEATURES

COMPUTER GENERATED MODEL



ENZYME FEATURES

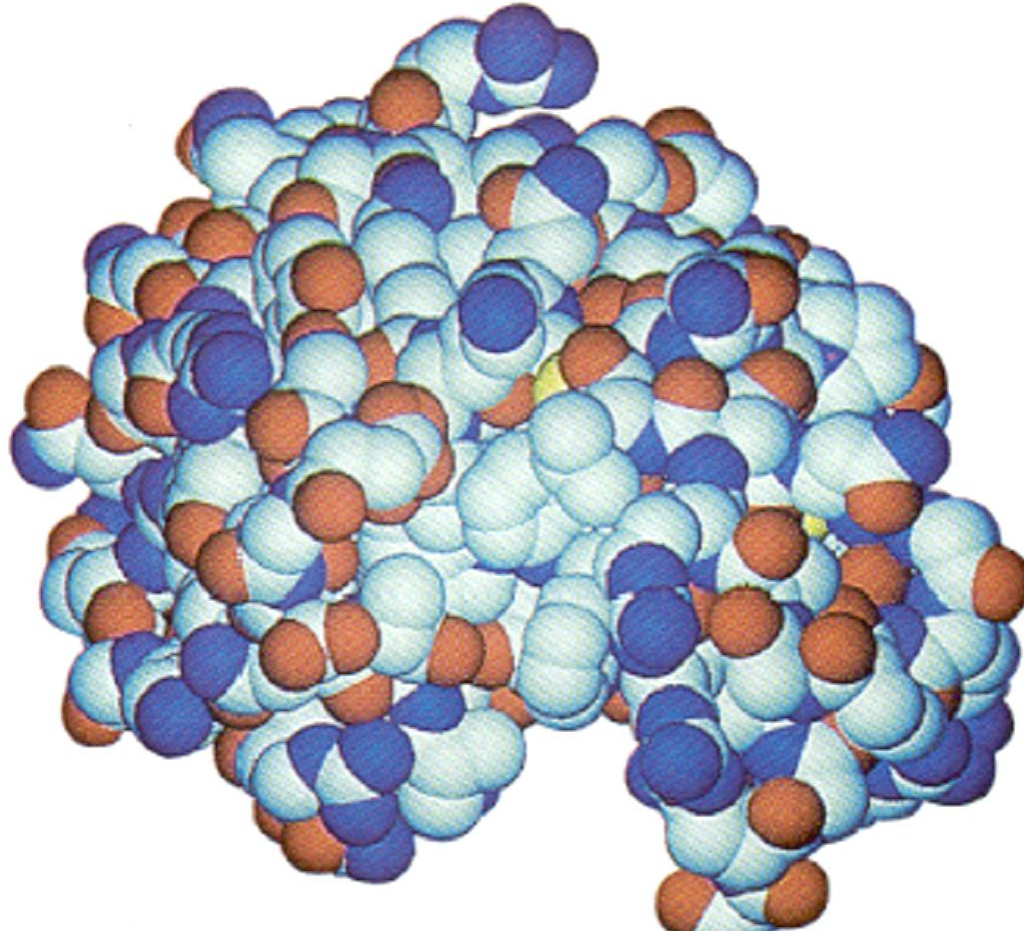
COMPUTER GENERATED MODEL



ENZYME: LARGE COMPLEX PROTEIN

ENZYME FEATURES

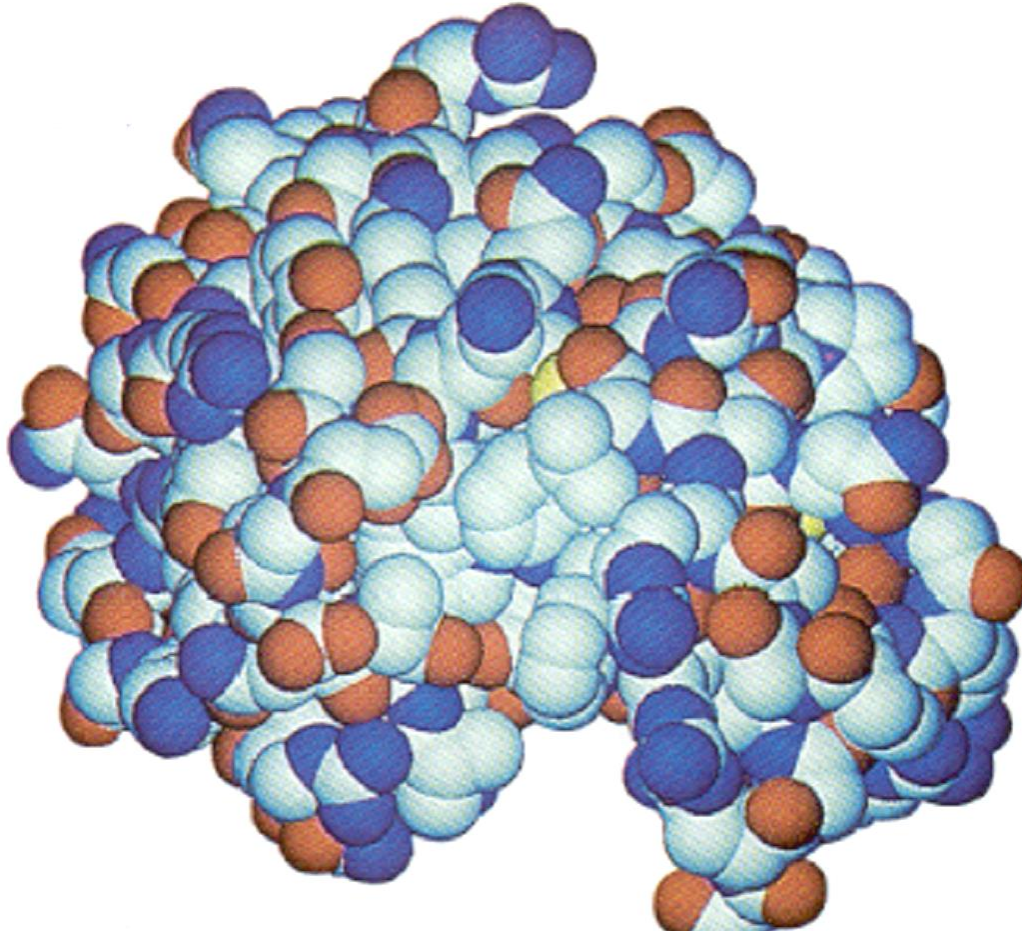
COMPUTER GENERATED MODEL



ENZYME: INCREASES RXT RATE

ENZYME FEATURES

COMPUTER GENERATED MODEL

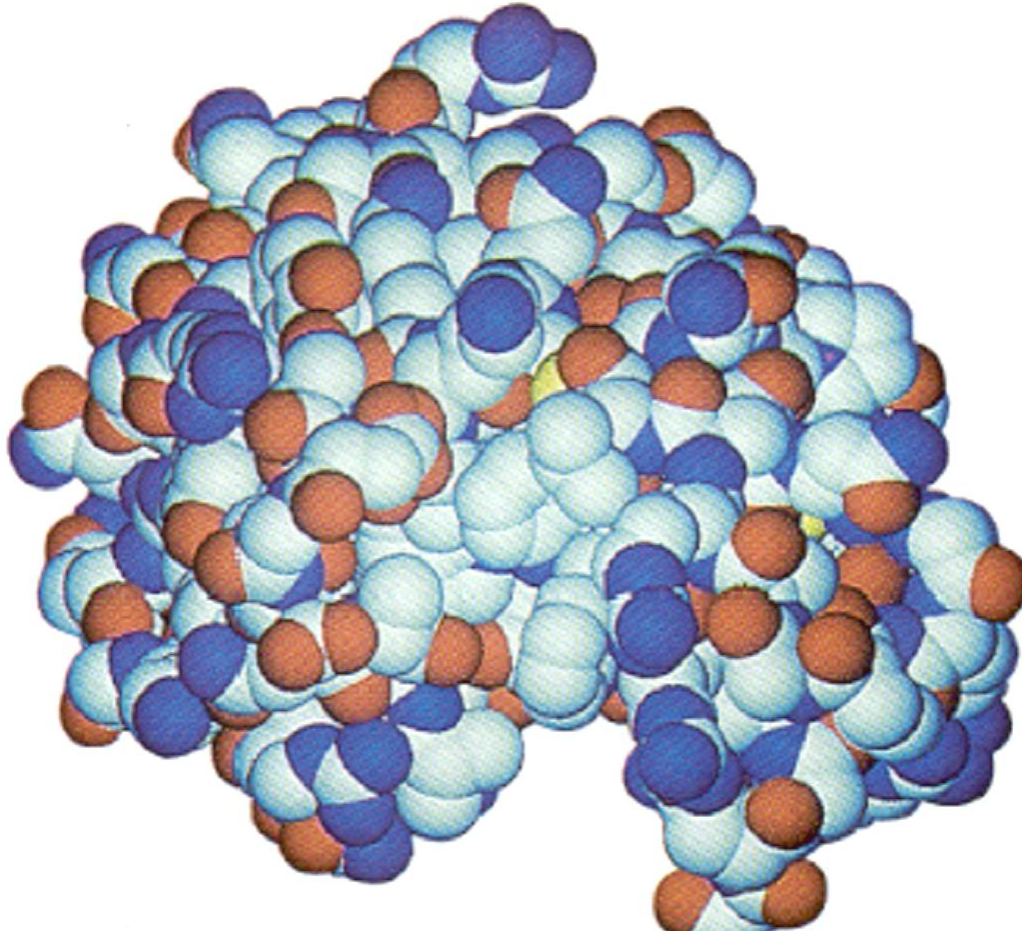


ENZYME: SUBSTRATE SPECIFIC

ENZYME FEATURES



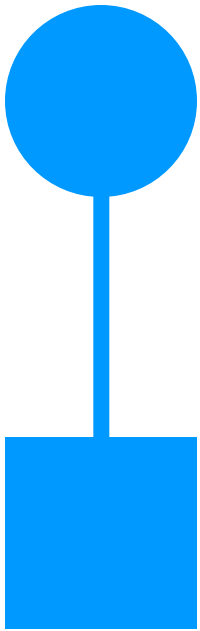
COMPUTER GENERATED MODEL



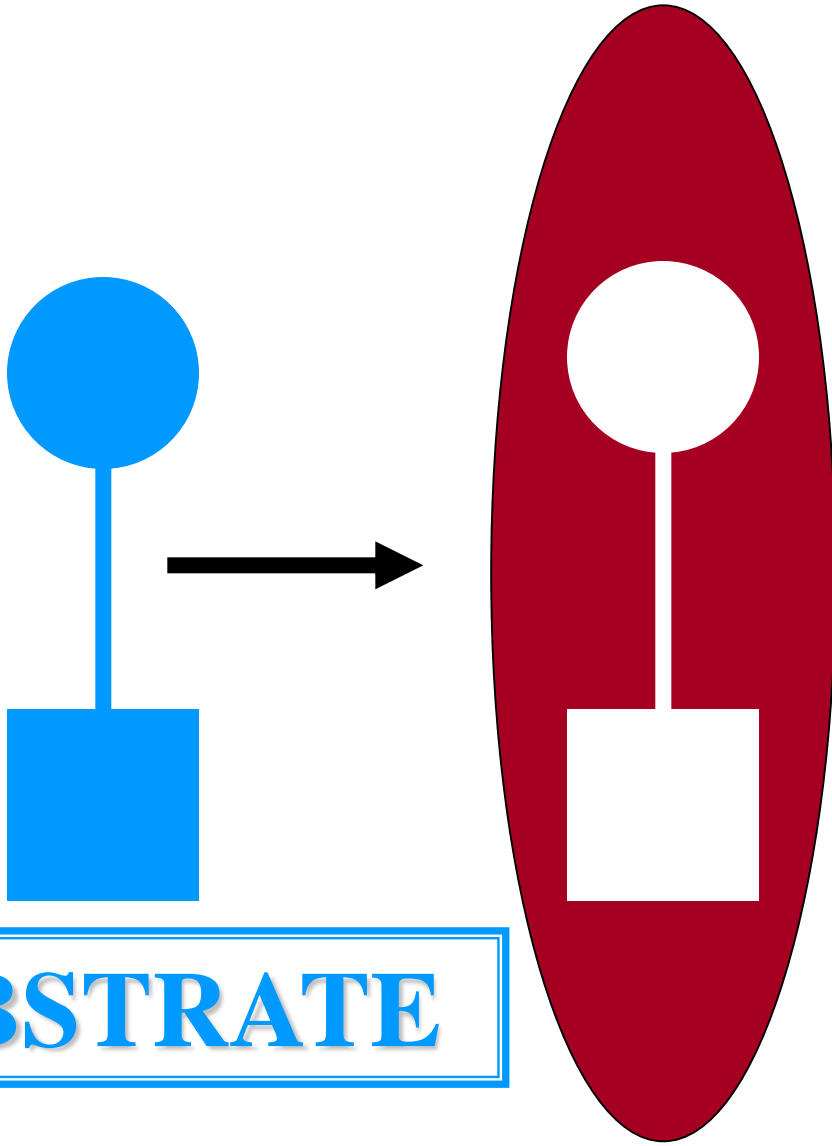
ENZYME: USED REPEATEDLY



SUBSTRATE & ENZYME INTERACTION

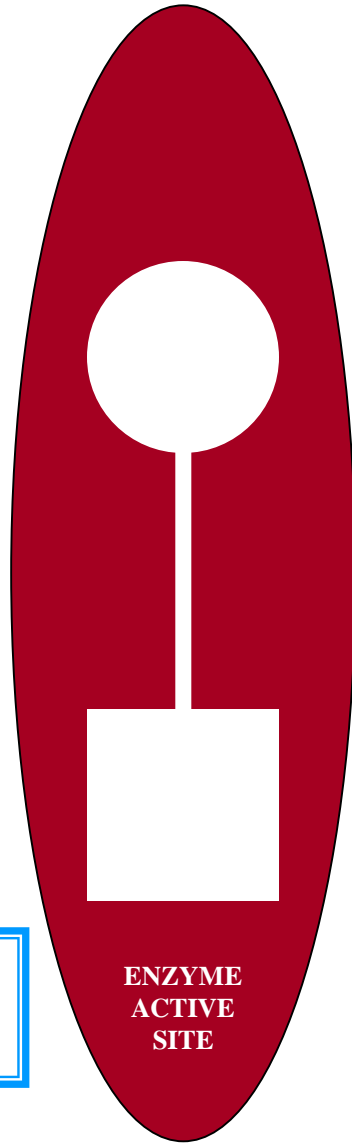
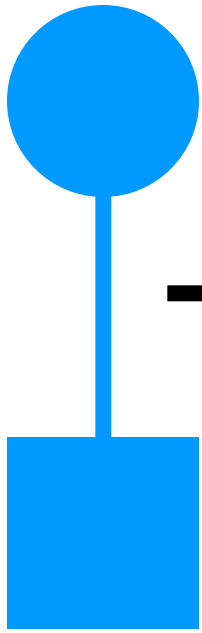


SUBSTRATE



SUBSTRATE

ENZYME



**ACTIVE
SITE**

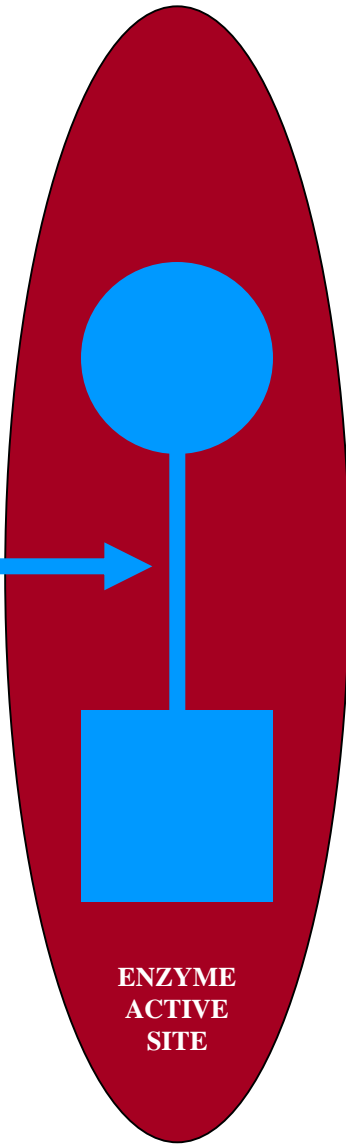
SUBSTRATE

ENZYME

ENZYME
ACTIVE
SITE

SUBSTRATE & ENZYME INTERACTION

SUBSTRATE



**ACTIVE
SITE**

ENZYME

ENZYME ACTIVE SITE

ACTIVE SITE



ACTIVE SITE

ENZYME REGION

ACTIVE SITE



ACTIVE SITE

ENZYME REGION

**INTERACTS WITH
SUBSTRATE →**

ACTIVE SITE



ACTIVE SITE

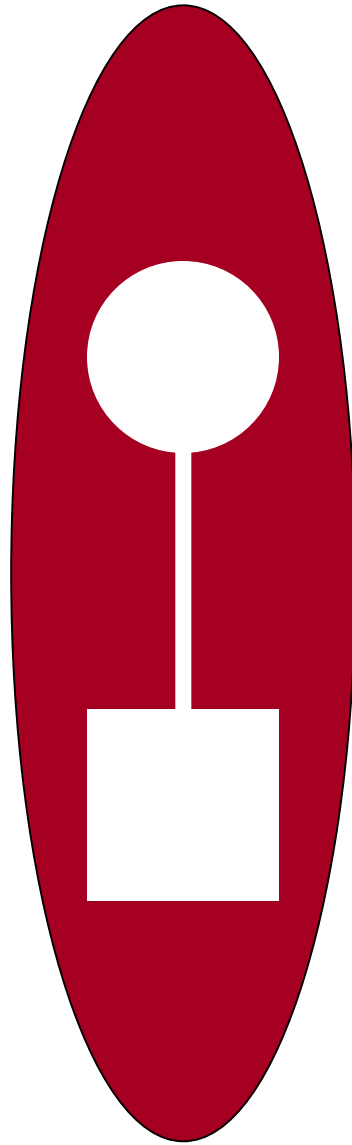
ENZYME REGION

INTERACTS WITH

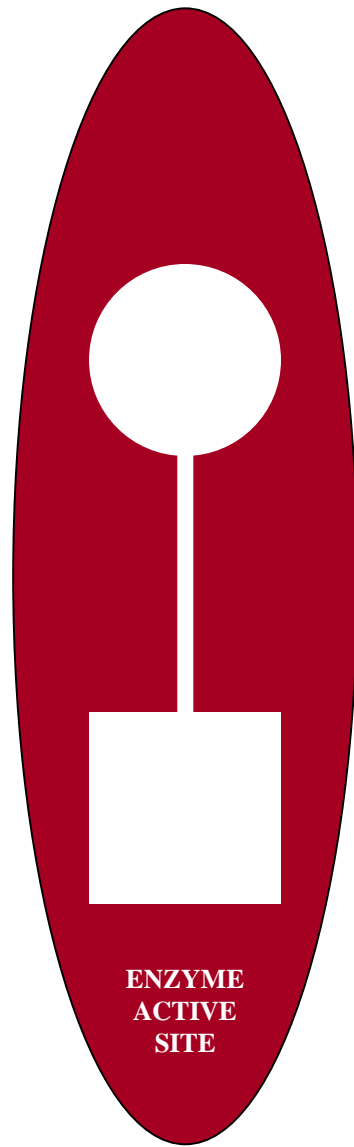
SUBSTRATE →

SUB/ENZ COMPLEX

ACTIVE SITE

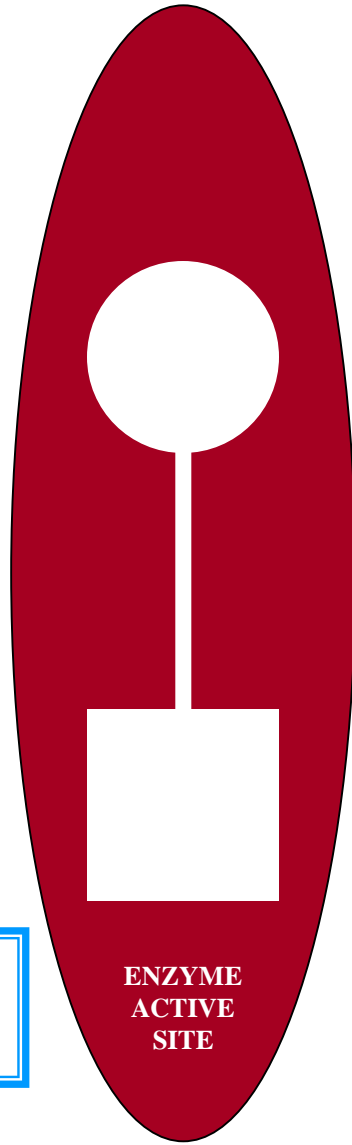
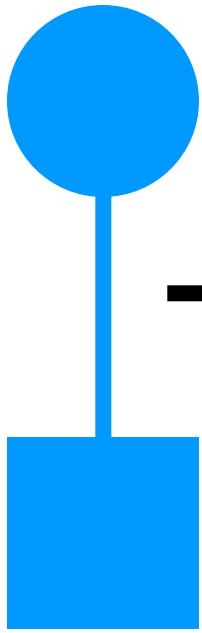


ENZYME



**ACTIVE
SITE**

ENZYME

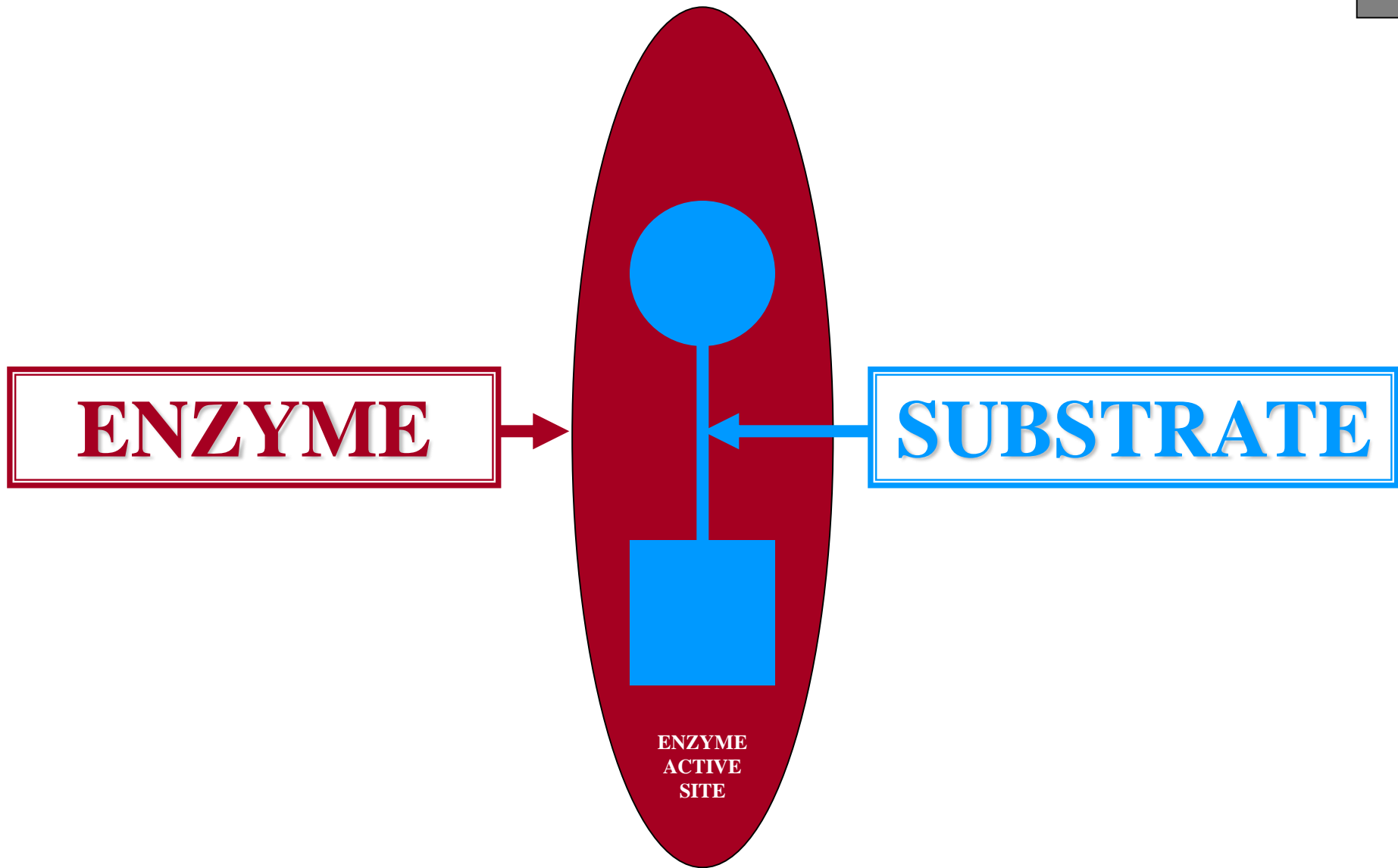


**ACTIVE
SITE**

SUBSTRATE

ENZYME

ENZYME
ACTIVE
SITE

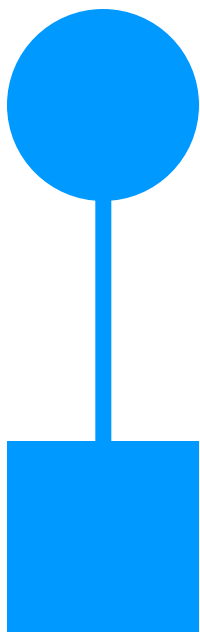


SUBSTRATE / ENZYME COMPLEX

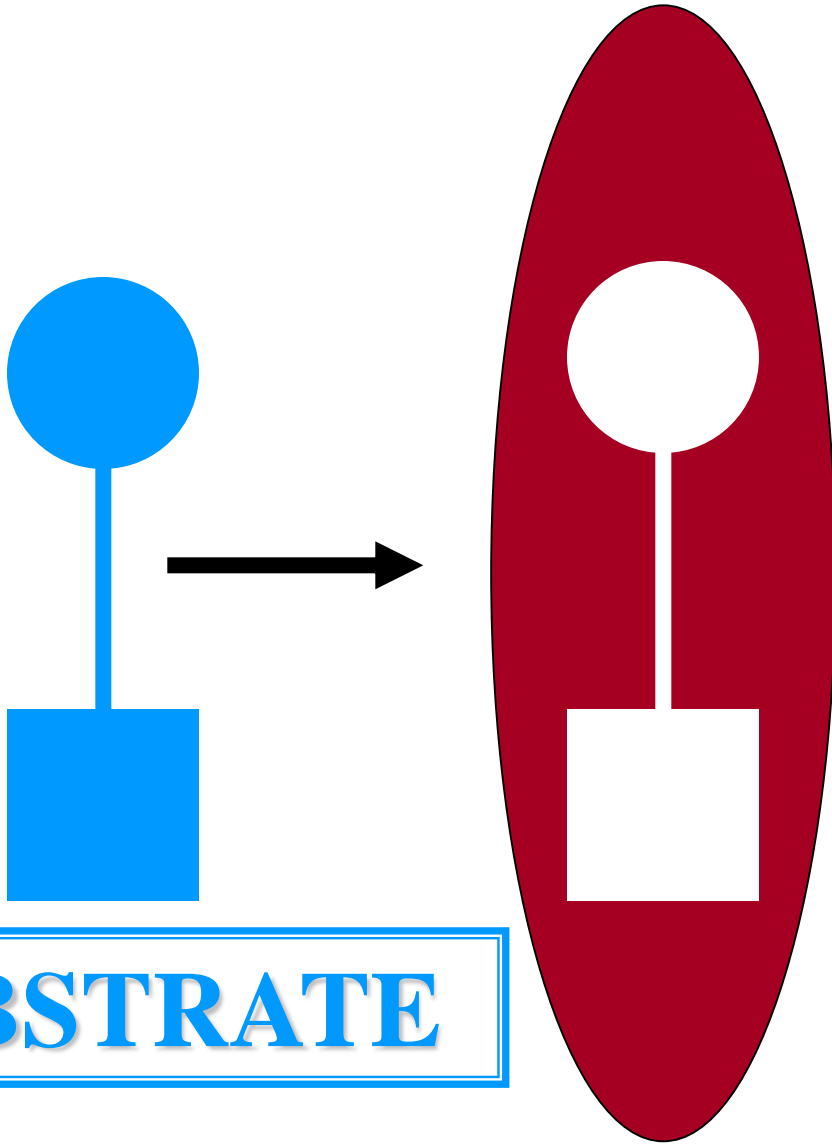
**“LOCK & KEY”
ANALOGY
OR
“INDUCED FIT”
ANALOGY**



“LOCK & KEY” ANALOGY

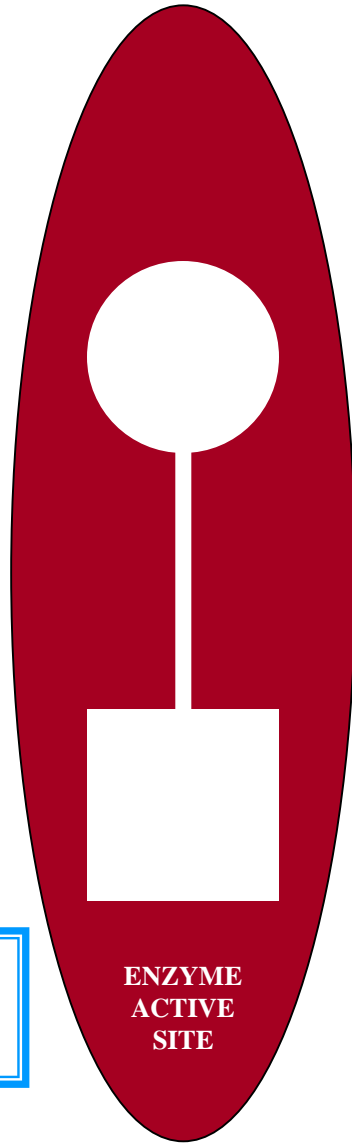
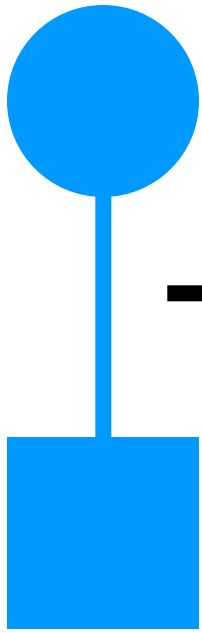


SUBSTRATE



SUBSTRATE

ENZYME



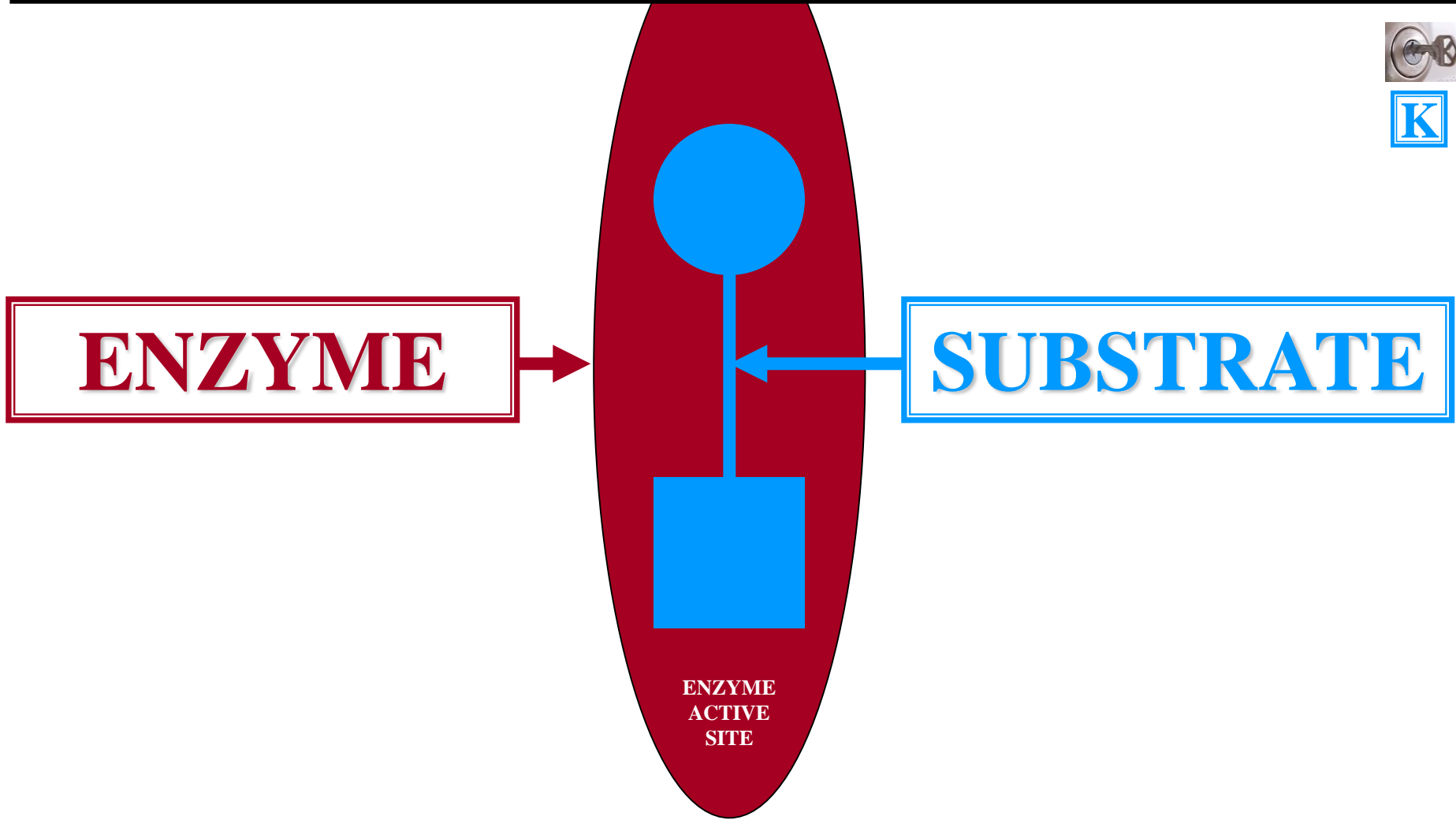
**ACTIVE
SITE**

SUBSTRATE

ENZYME

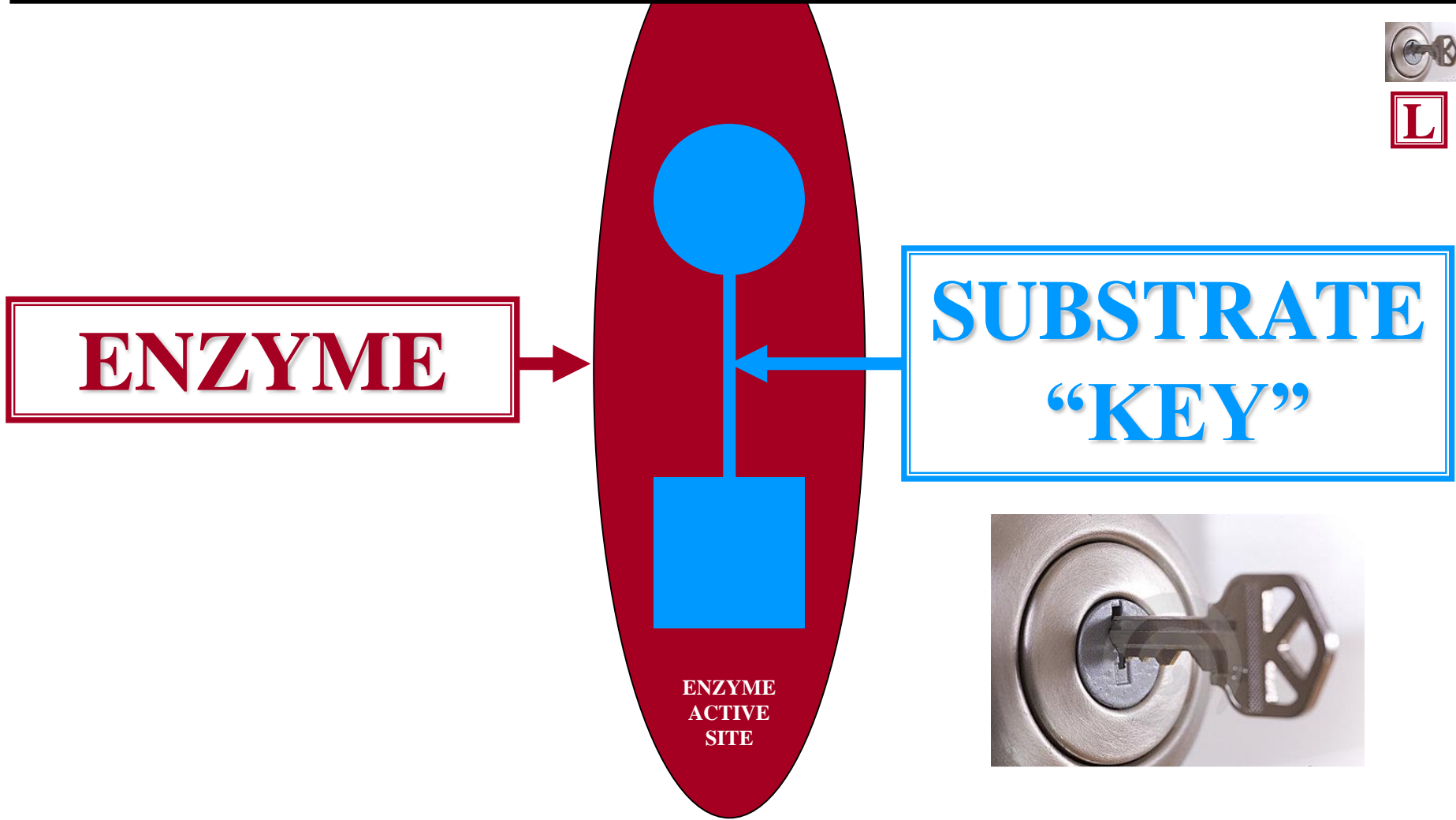
ENZYME
ACTIVE
SITE

SUBSTRATE / ENZYME COMPLEX



LOCK & KEY ANALOGY

SUBSTRATE / ENZYME COMPLEX



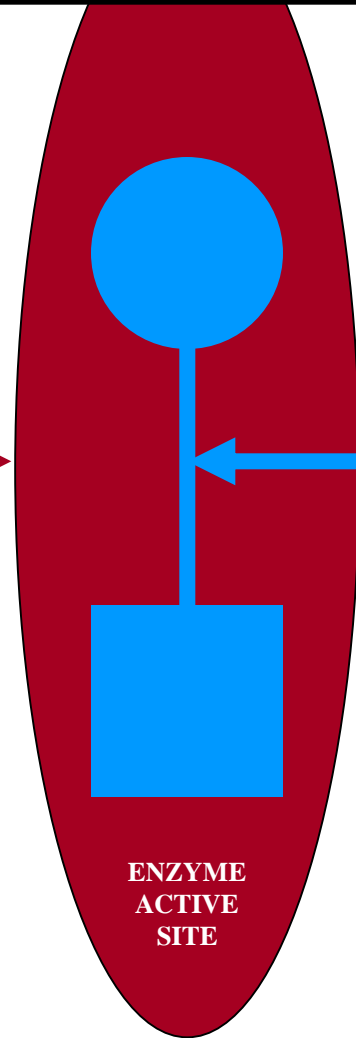
LOCK & KEY ANALOGY

SUBSTRATE / ENZYME COMPLEX



**ENZYME
“LOCK”**

**SUBSTRATE
“KEY”**




ENZYME
ACTIVE
SITE



LOCK & KEY ANALOGY



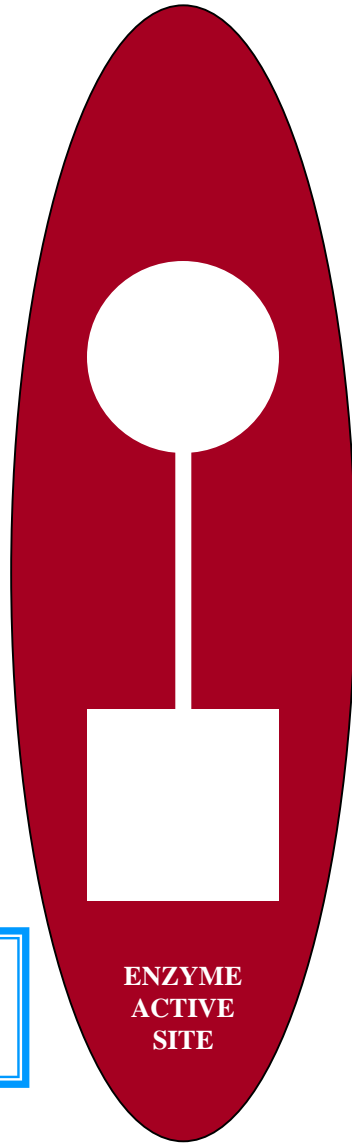
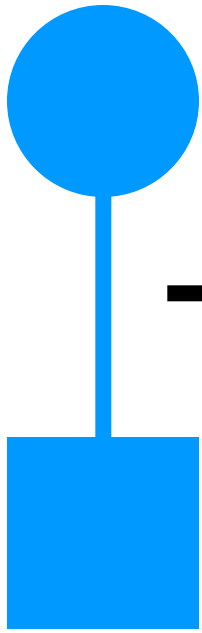
***ENZYME
ACTIVE SITE
SUBSTRATE
SPECIFIC***



**SUBSTRATE
ENZYME
INTERACTION
APPLIED**



SUBSTRATE

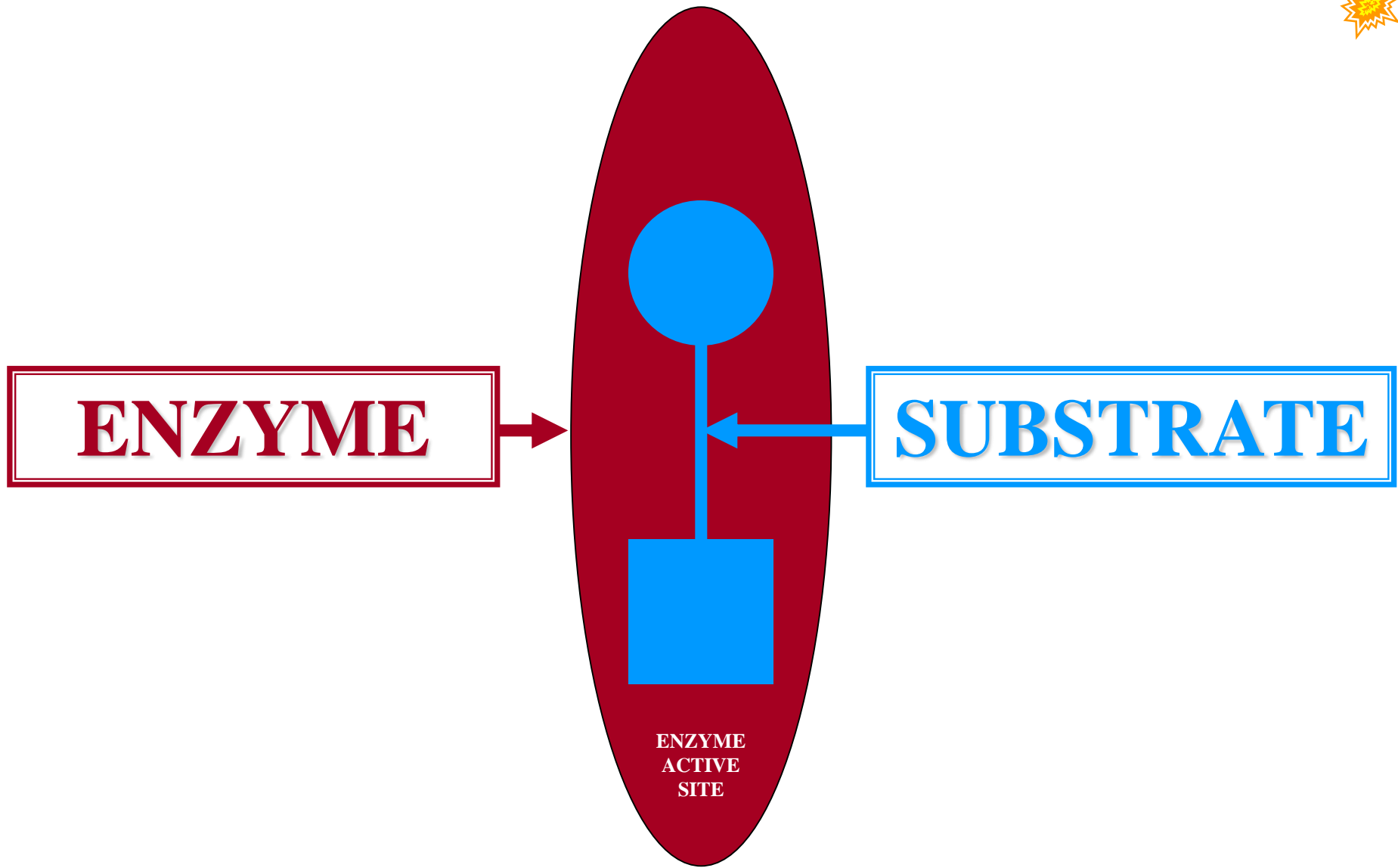


**ACTIVE
SITE**

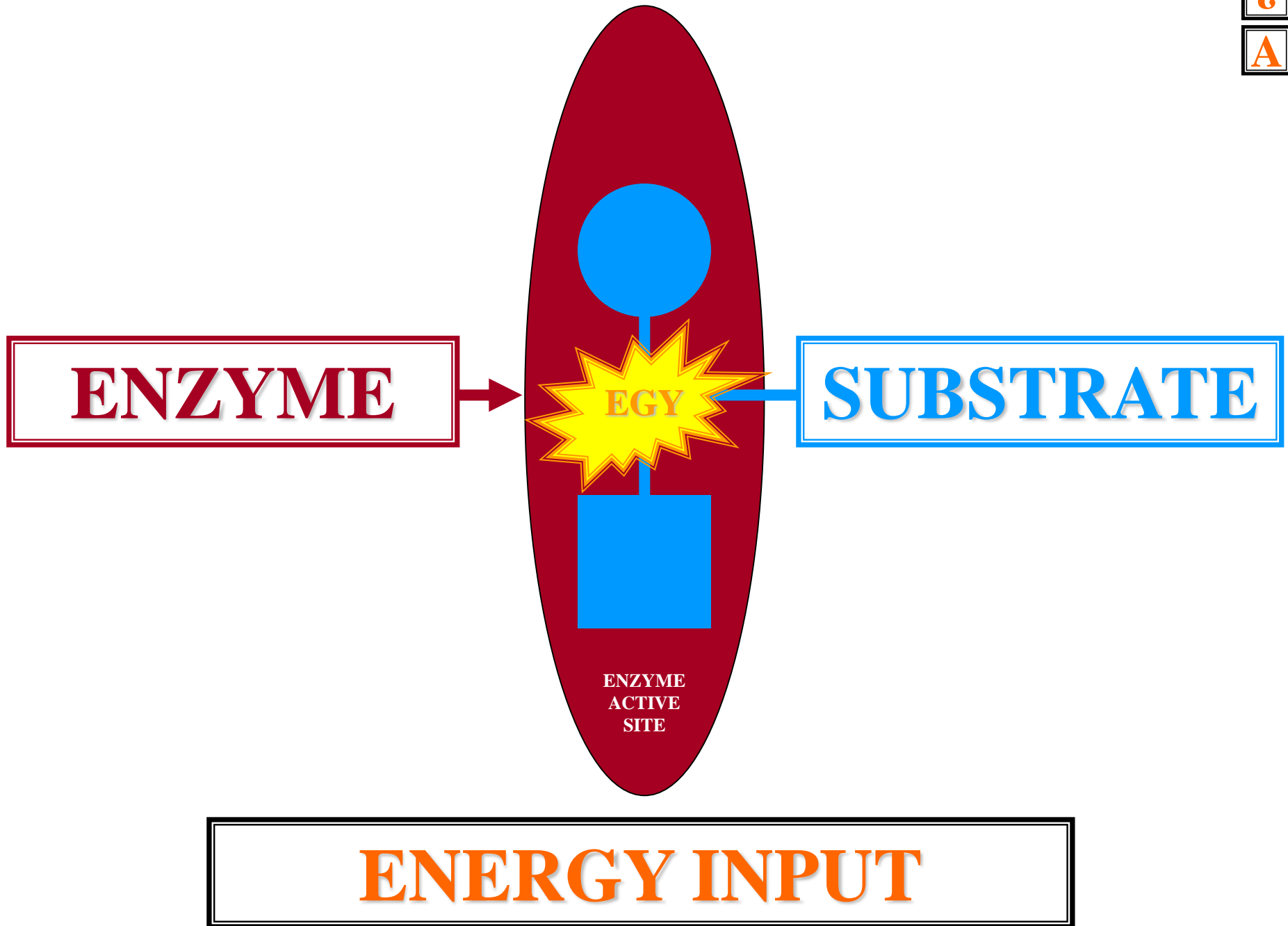
SUBSTRATE

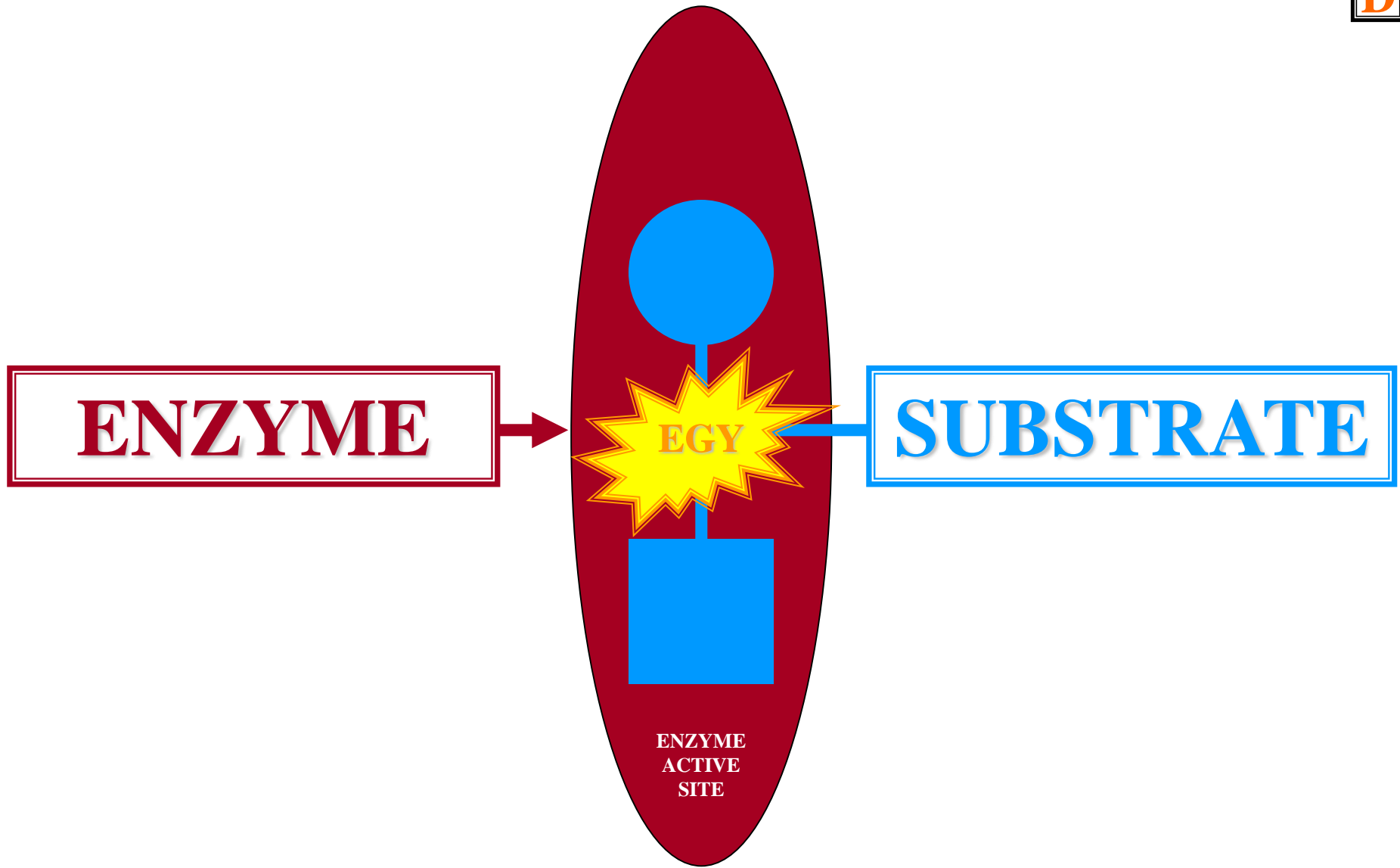
ENZYME

ENZYME
ACTIVE
SITE

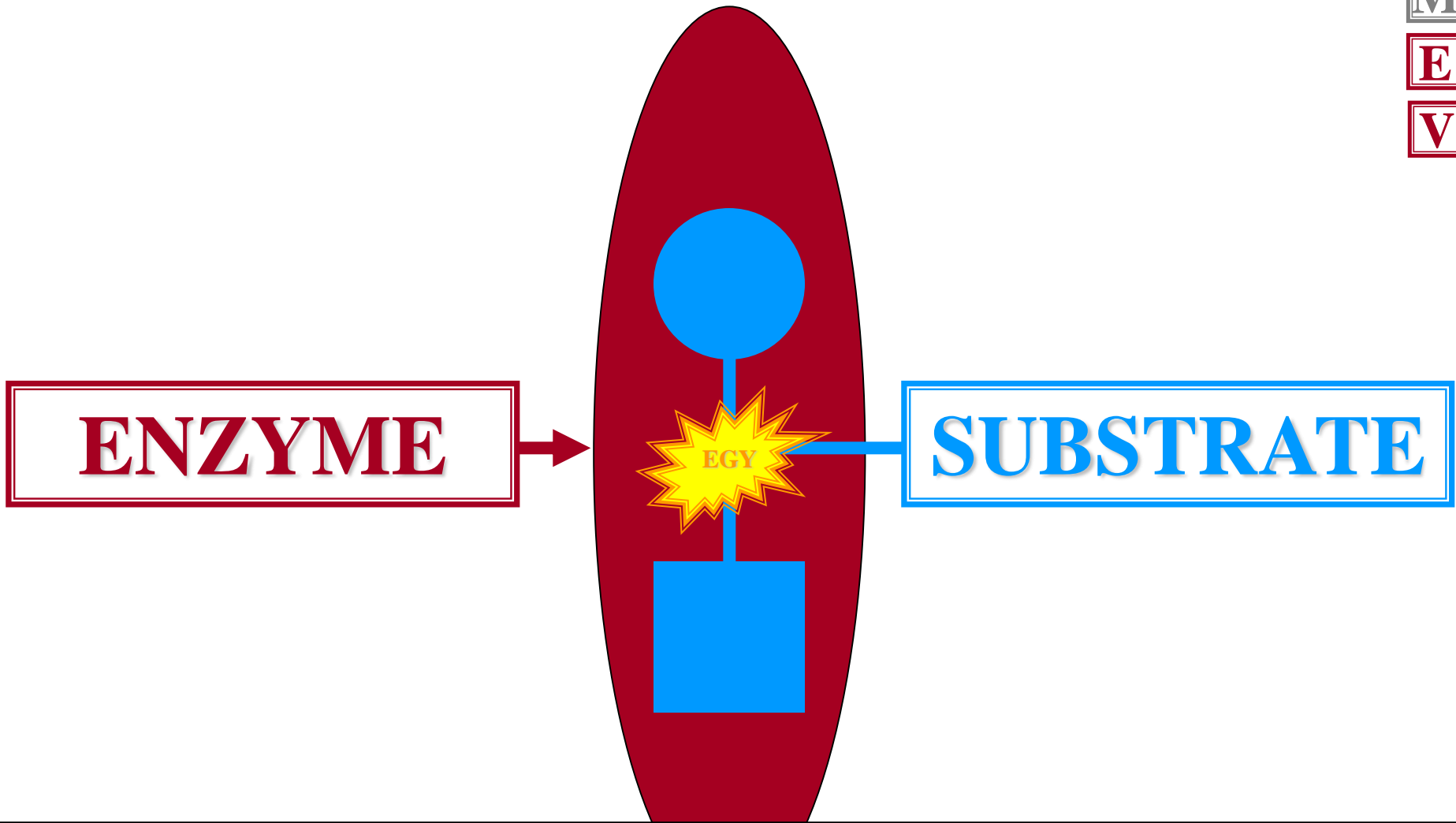


SUBSTRATE / ENZYME COMPLEX





ACTIVATION ENERGY



**ENZYME DECREASES
ACTIVATION ENERGY**

METABOLISM

GLUCOSE

METABOILSM

HEXOKINASE

ATP

EGY

ADP

E
D

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

FRUCTOSE-1-6-PHOSPHATE

ENZYMES
VITAL TO
METABOLISM

ENZYMES
VITAL TO
METABOLISM

RED = ENZYME

METABOLISM

GLUCOSE

METABOILSM

HEXOKINASE

>

ATP

EGY

ADP

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

ENZYMES
DECREASES
ACTIVATION ENERGY

ENZYMES
DECREASES
ACTIVATION ENERGY

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP

EGY

ADP

FRUCTOSE-1-6-PHOSPHATE

RED = ENZYME



***ENZYMES
ENSURE
EFFICIENT
METABOLISM***

An electron micrograph showing a cross-section of a cell. The image displays various organelles, including a large nucleus with a prominent nucleolus, rough endoplasmic reticulum, and several mitochondria with visible cristae. A red letter 'E' in a white box is located in the upper right corner, with a red arrow pointing downwards towards a specific structure within the cell.

E
↓

***ORANIZATION
INCREASES***

***ENTROPY
DECREASES***

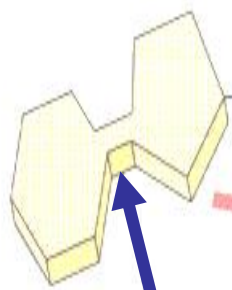
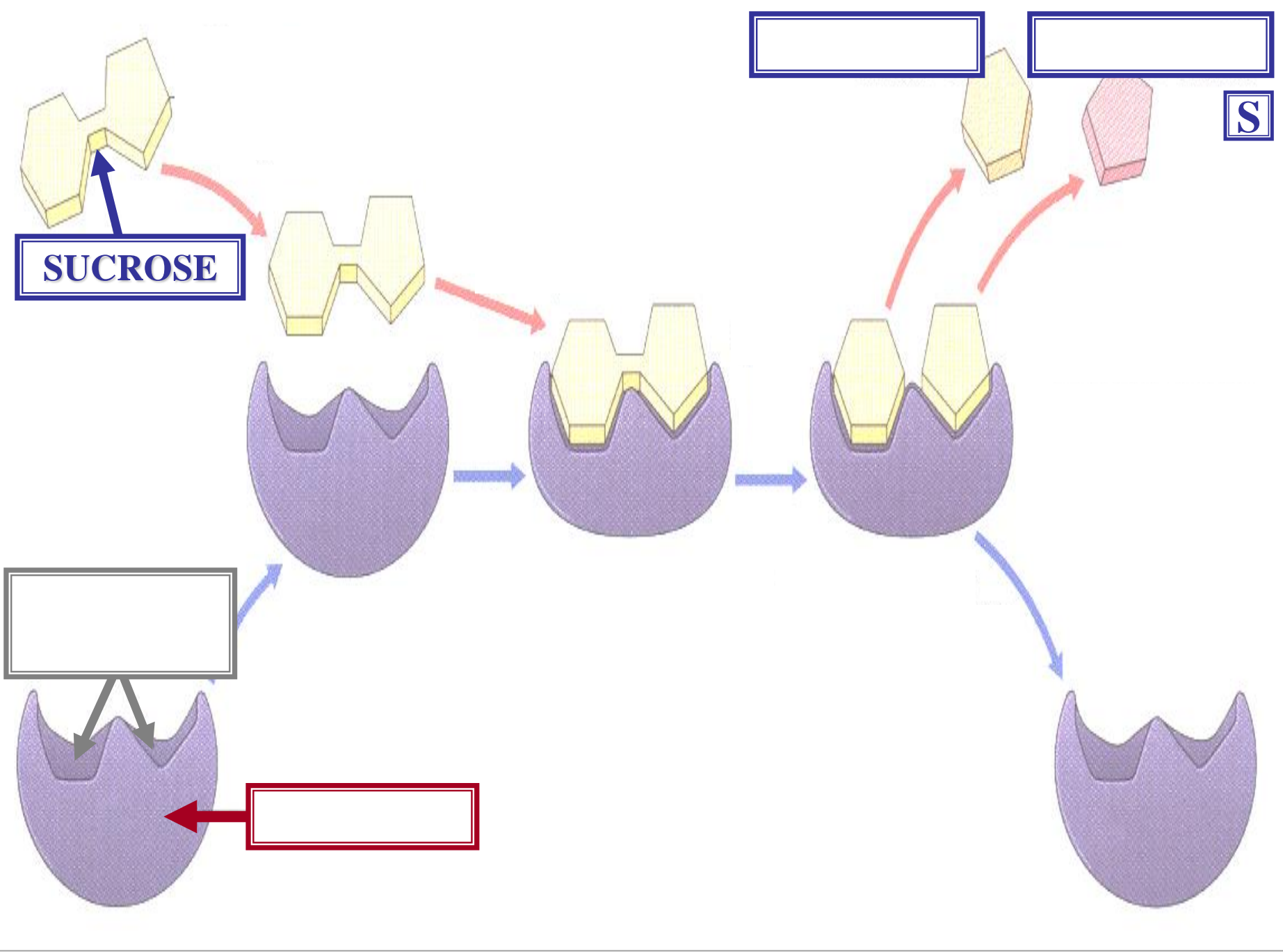


HOMEOSTASIS





**SUBSTRATE
&
ENZYME
INTERACTION
SUMMARY**



SUCROSE

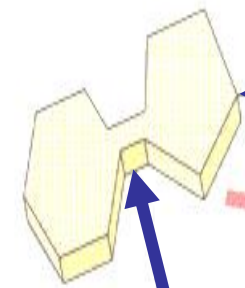
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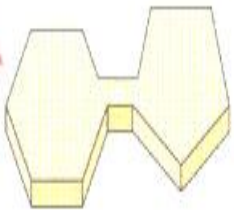
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SUGAR

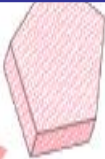
SUCROSE



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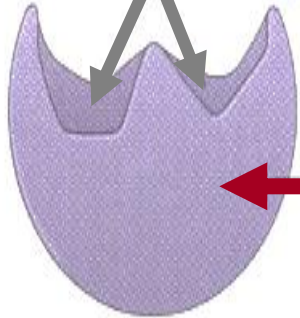
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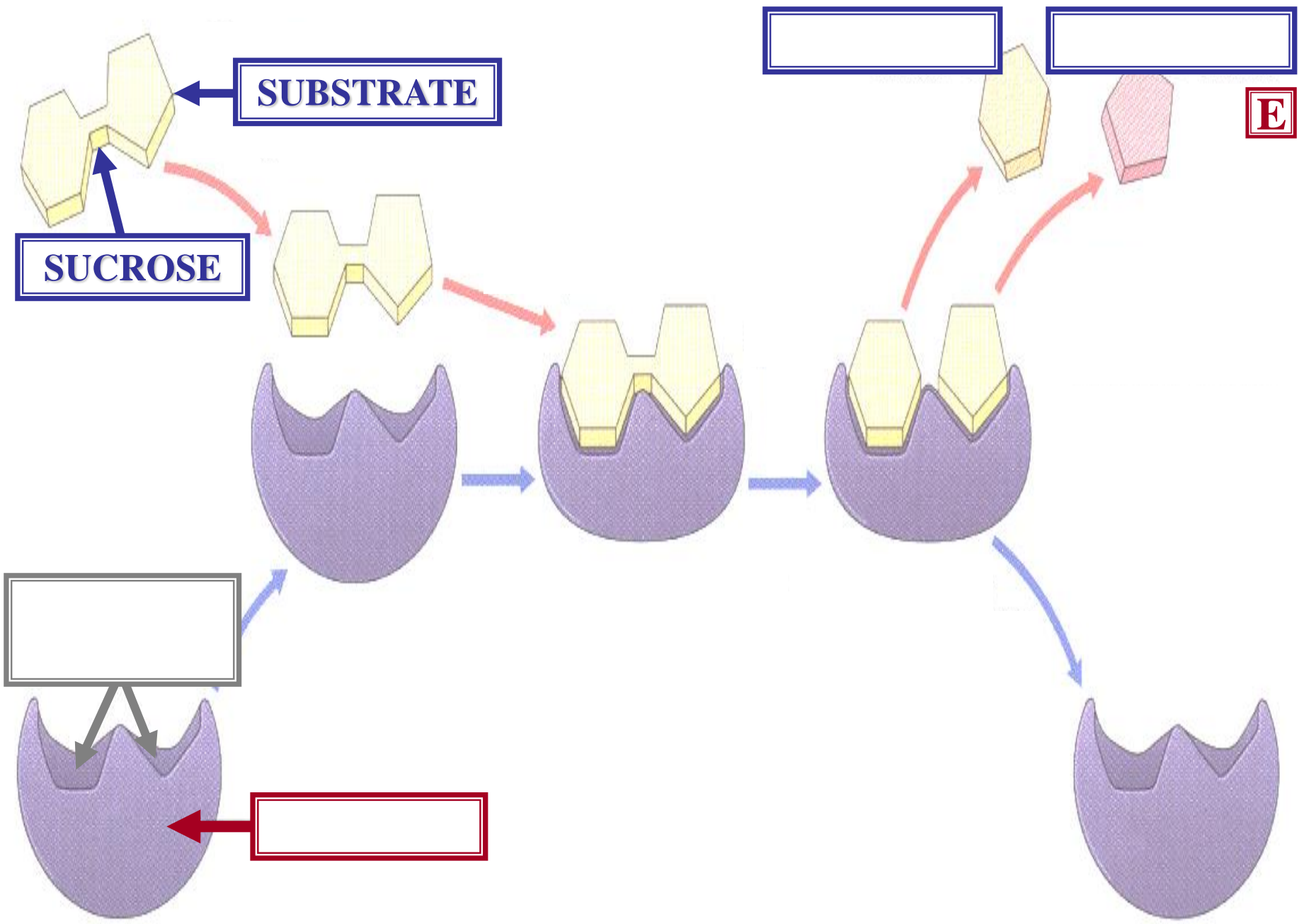
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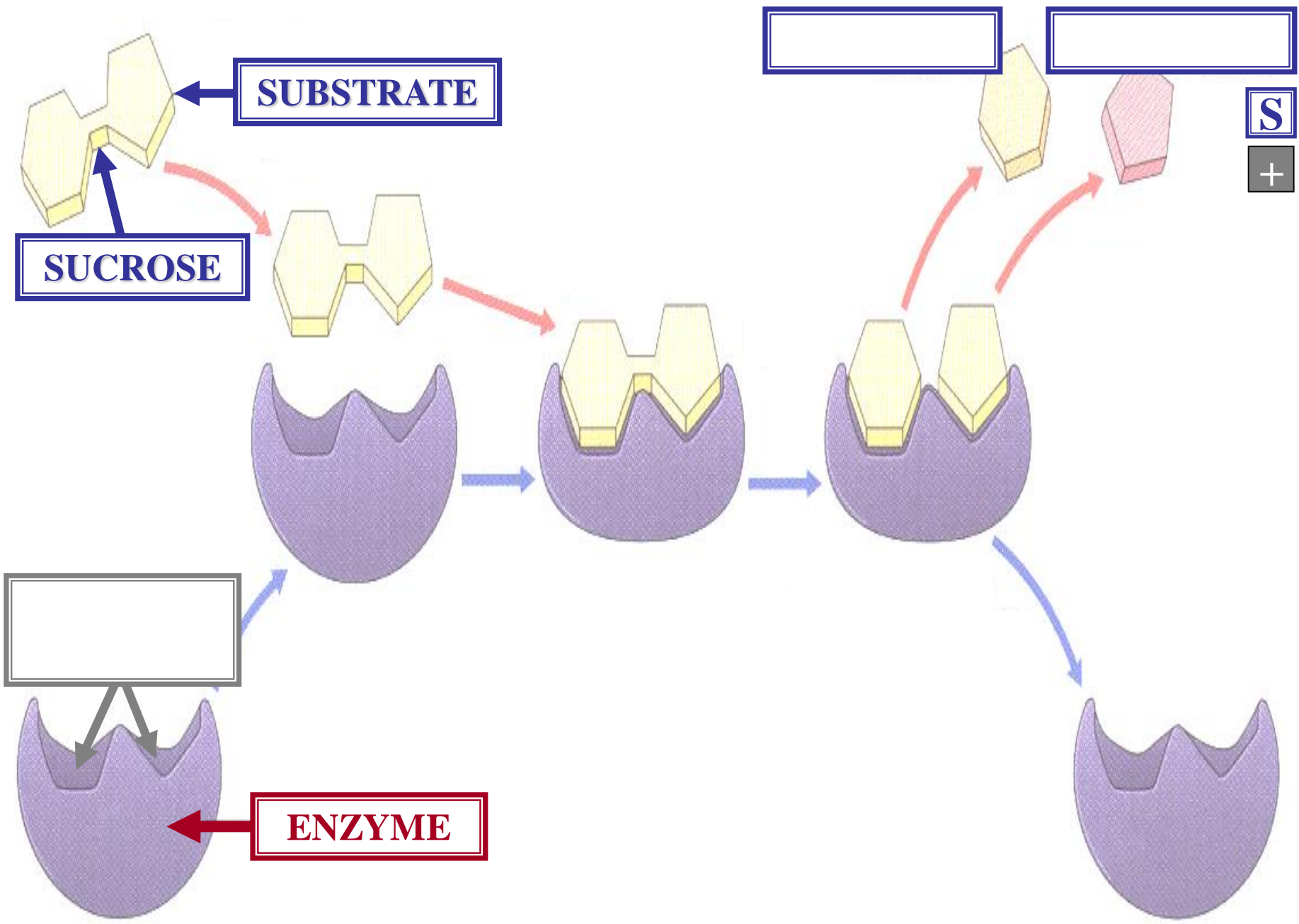


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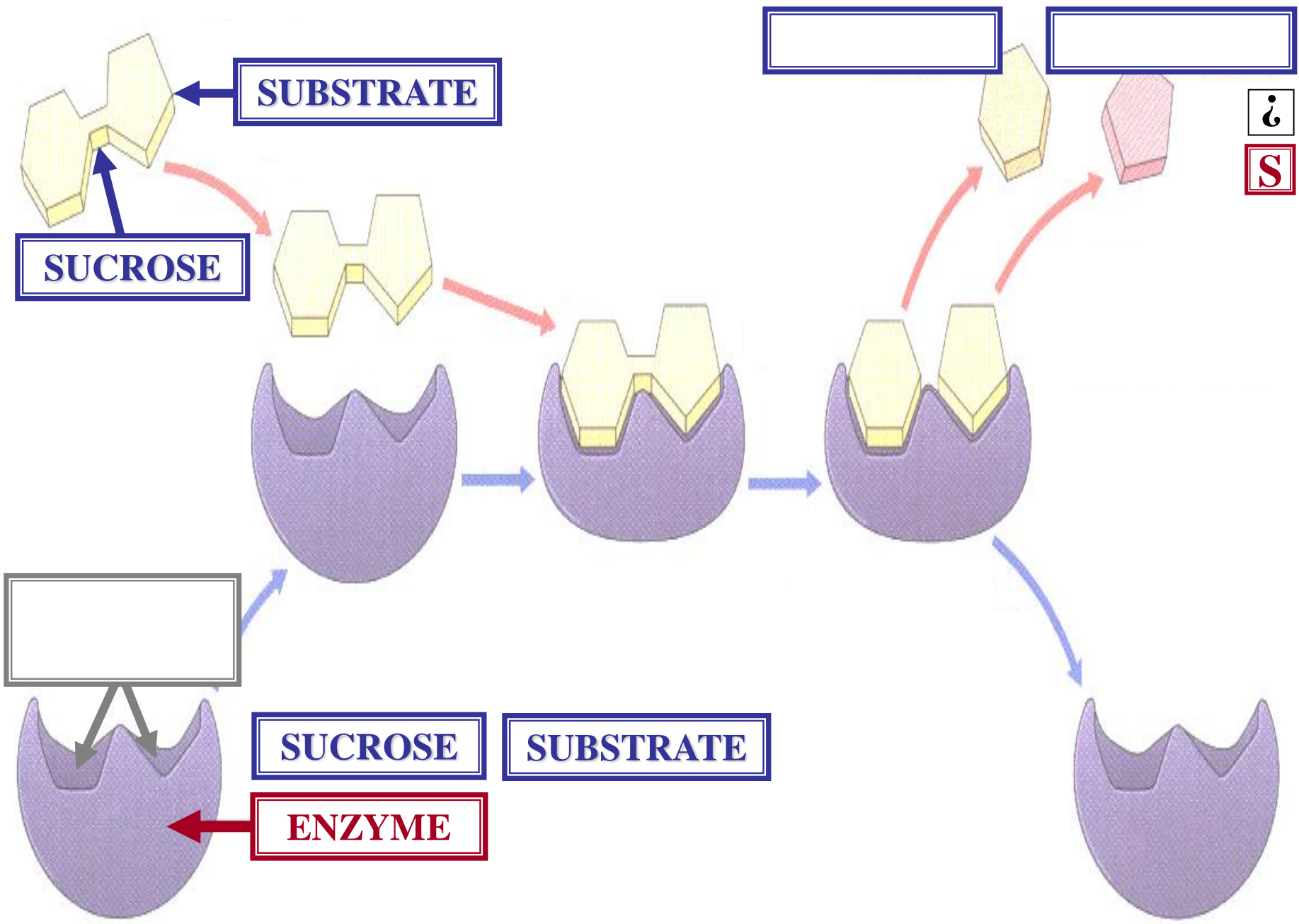
SUBSTRATE

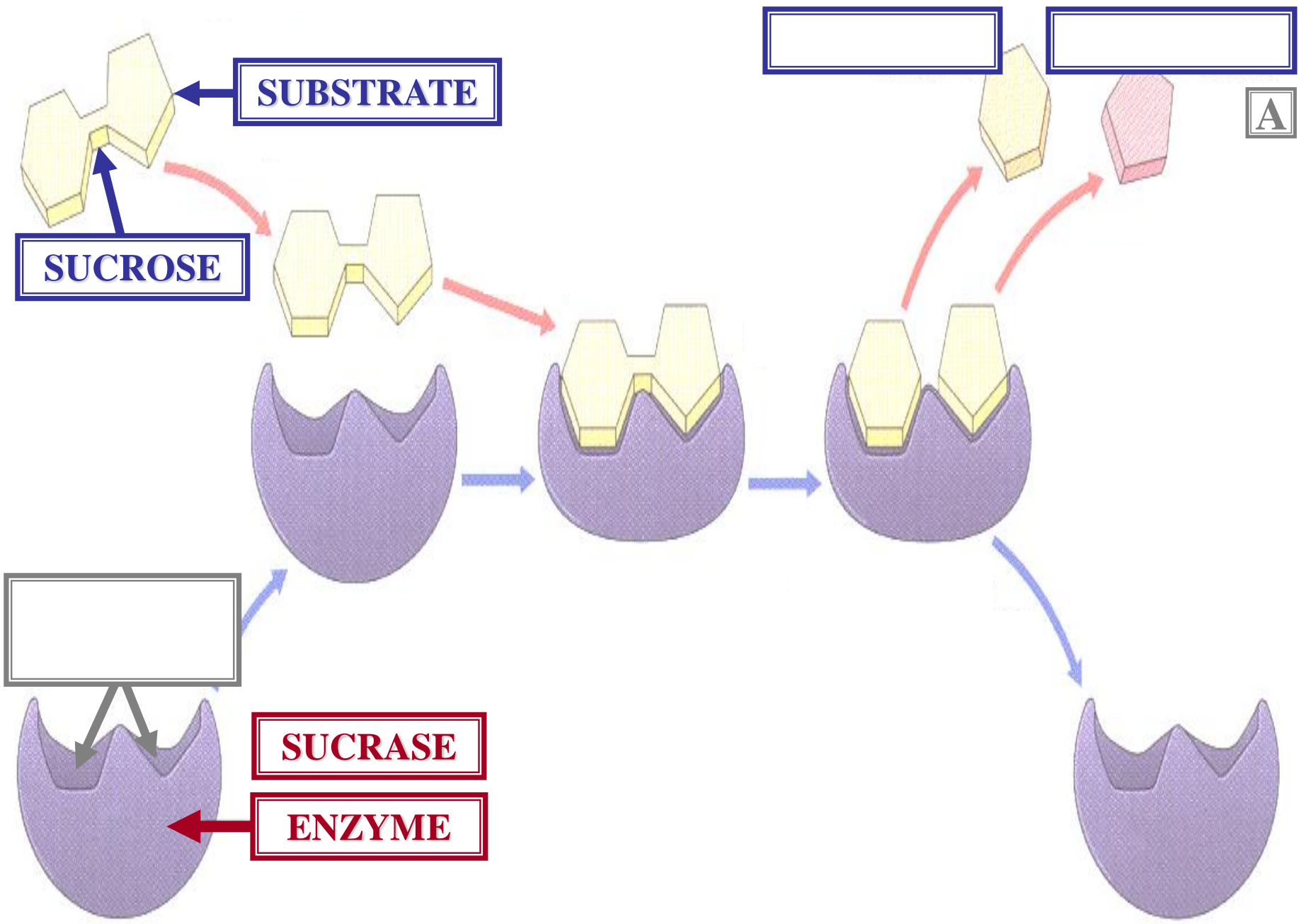
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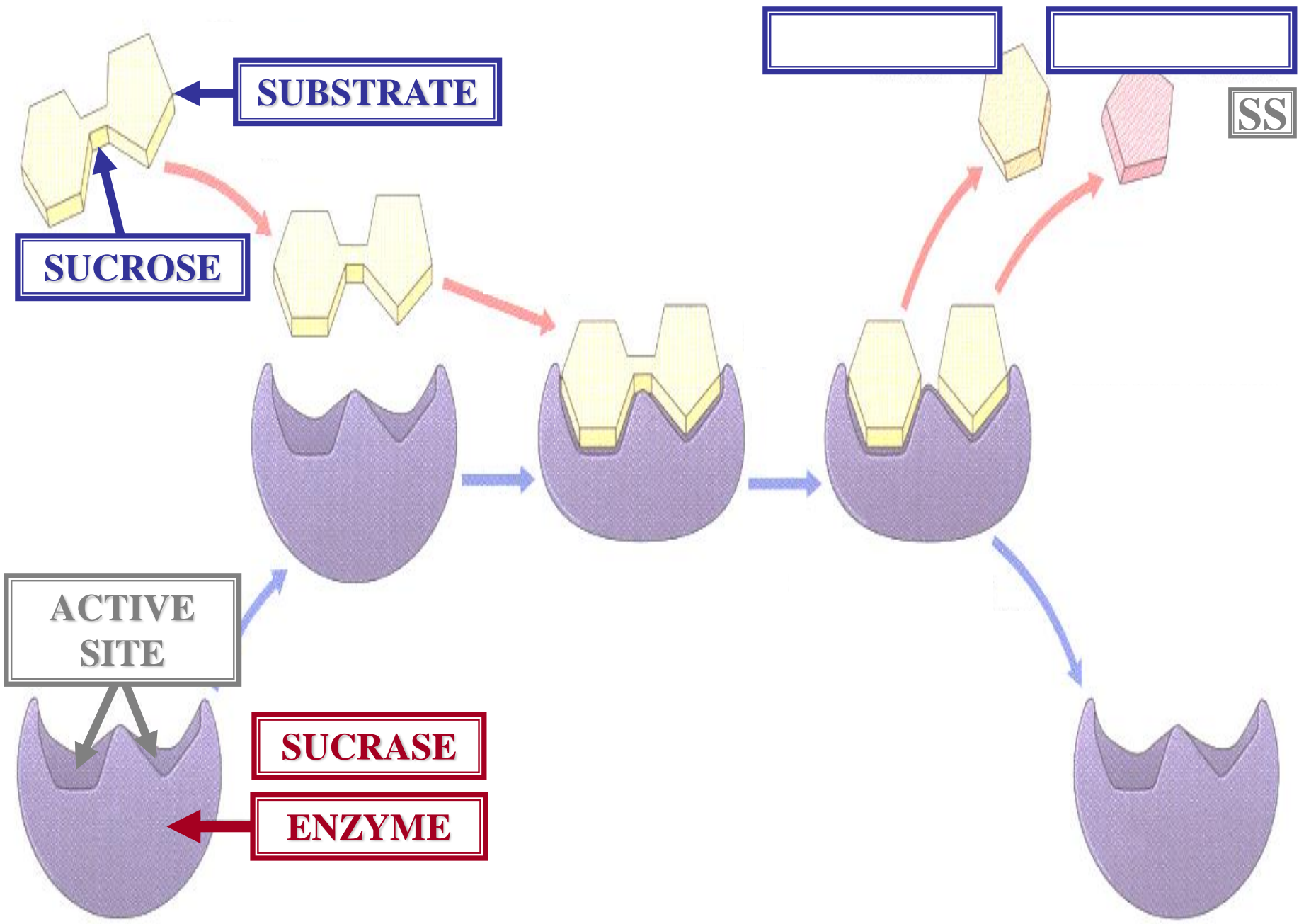
ENZYME

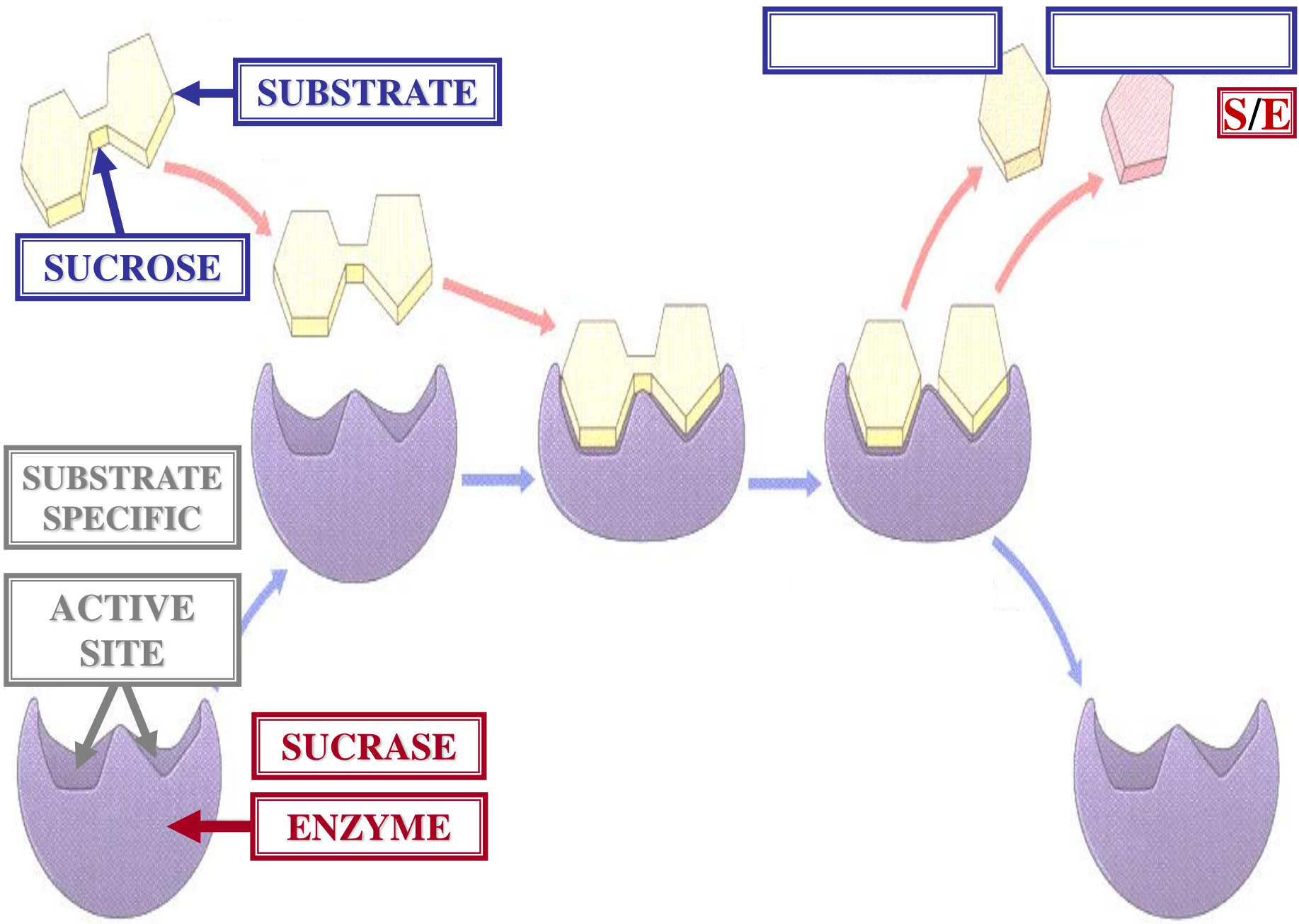
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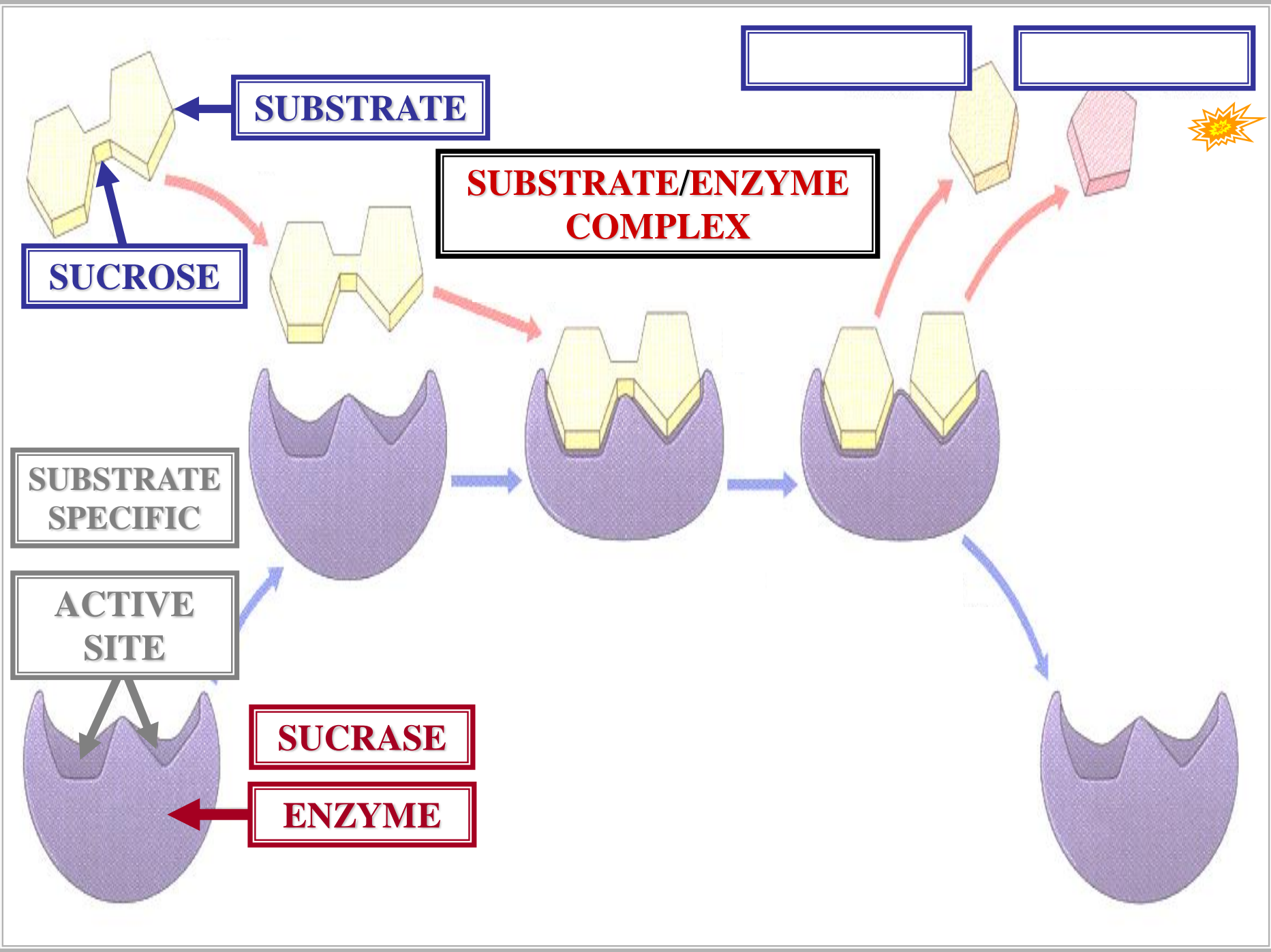
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SUBSTRATE

SUCROSE

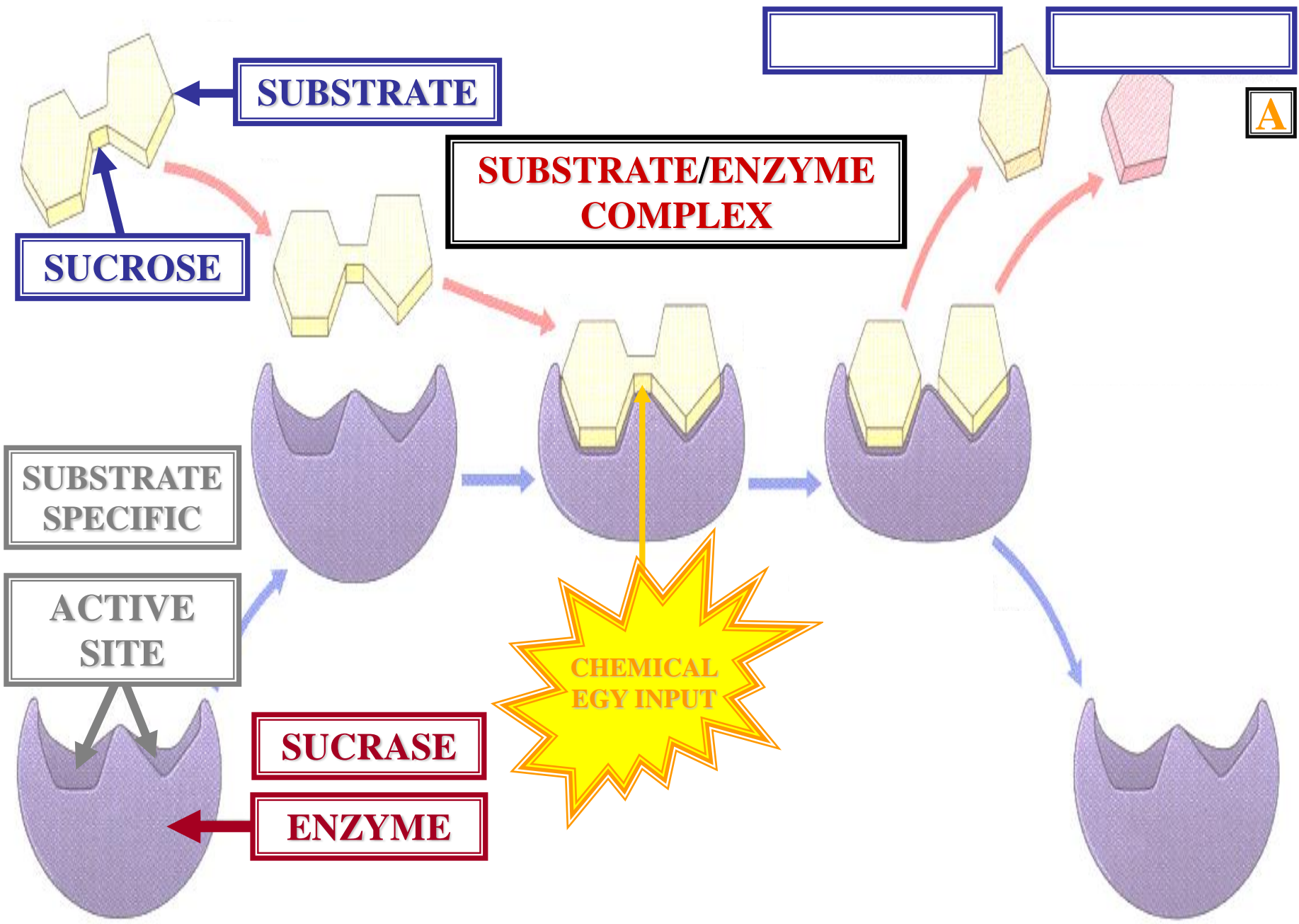
**SUBSTRATE/ENZYME
COMPLEX**

**SUBSTRATE
SPECIFIC**

**ACTIVE
SITE**

SUCRASE

ENZYME



SUBSTRATE

SUCROSE

**SUBSTRATE/ENZYME
COMPLEX**

**SUBSTRATE
SPECIFIC**

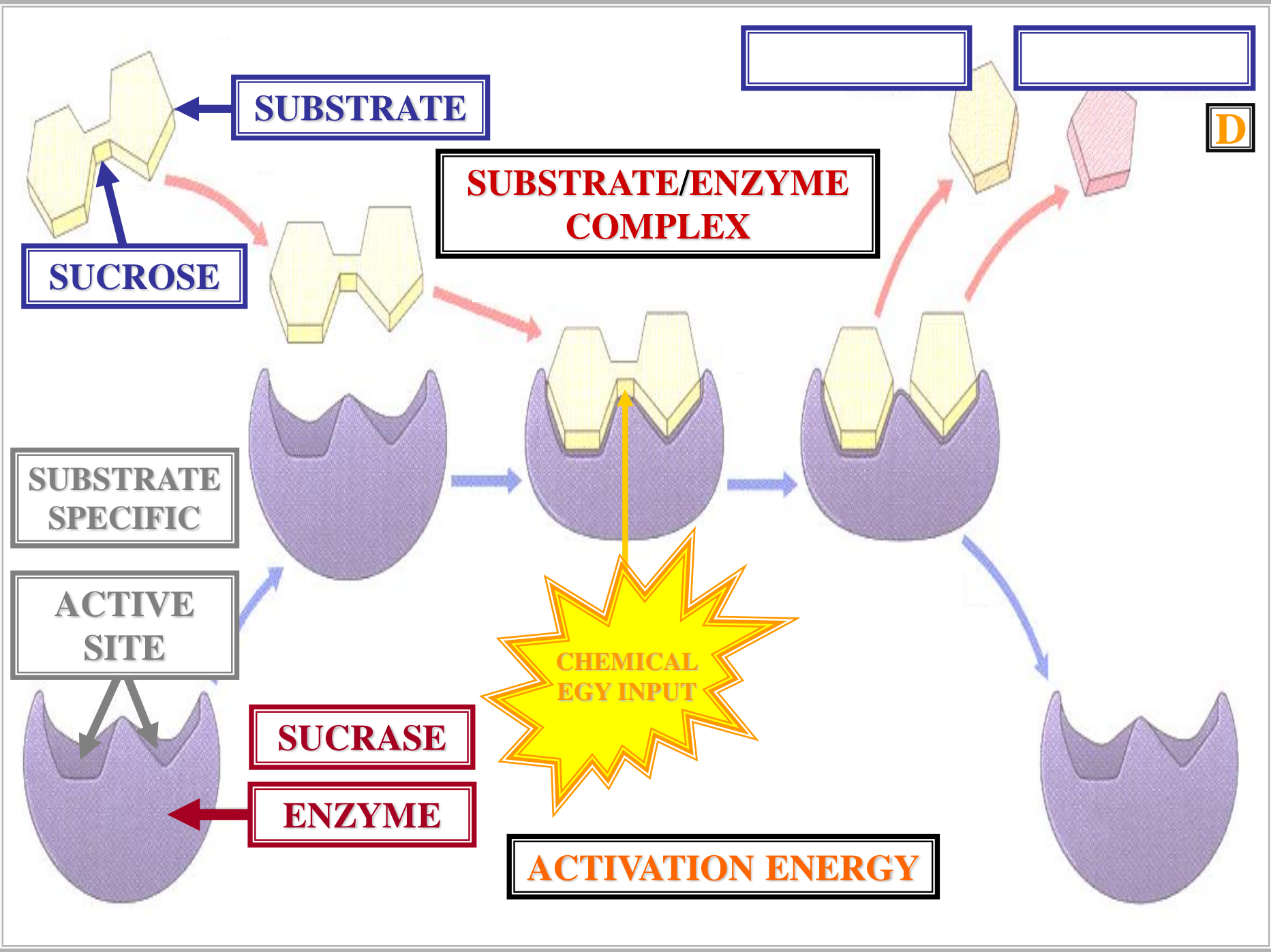
**ACTIVE
SITE**

SUCRASE

ENZYME

**CHEMICAL
ENERGY
INPUT**

A



SUBSTRATE

SUCROSE

**SUBSTRATE/ENZYME
COMPLEX**

**SUBSTRATE
SPECIFIC**

**ACTIVE
SITE**

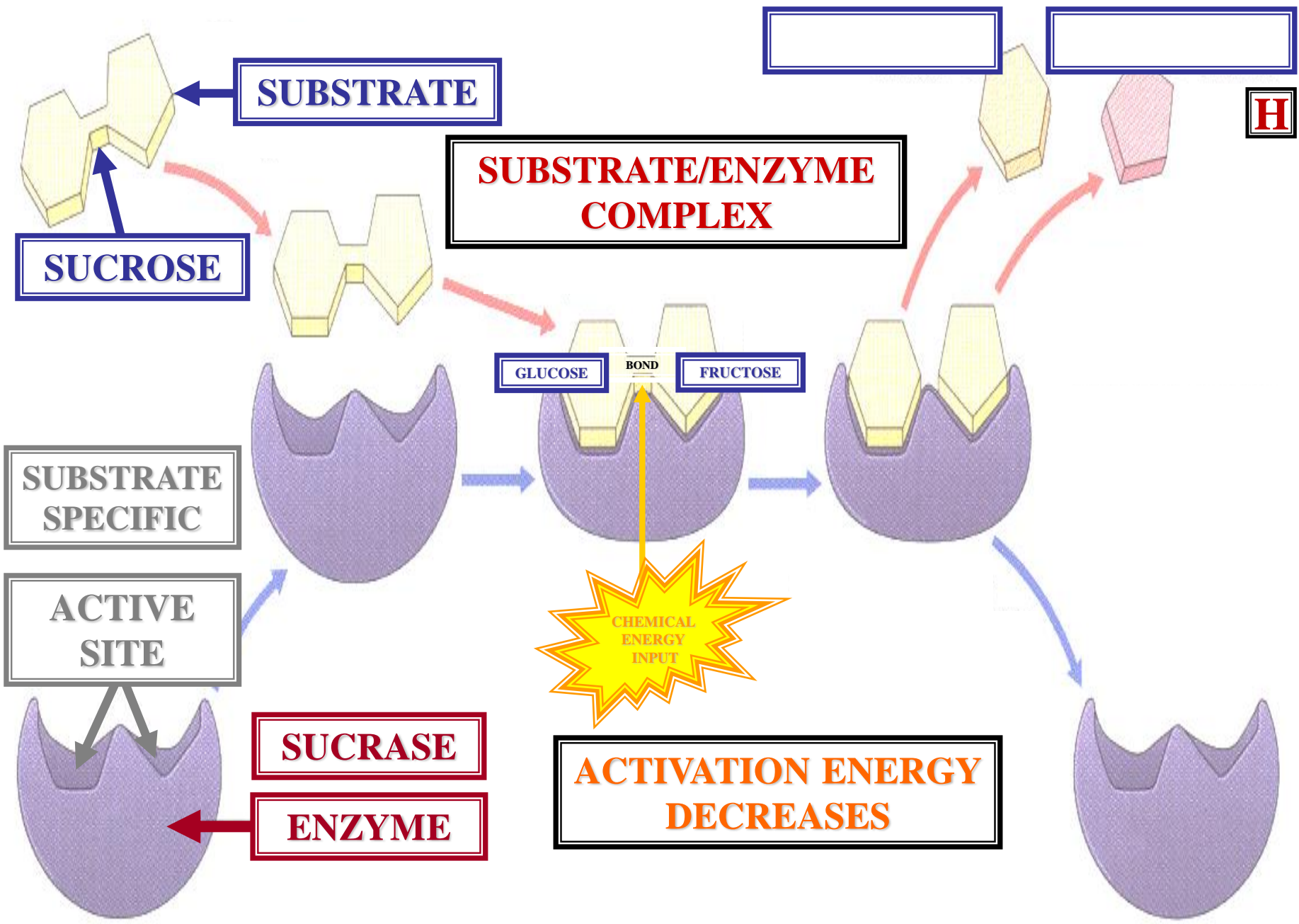
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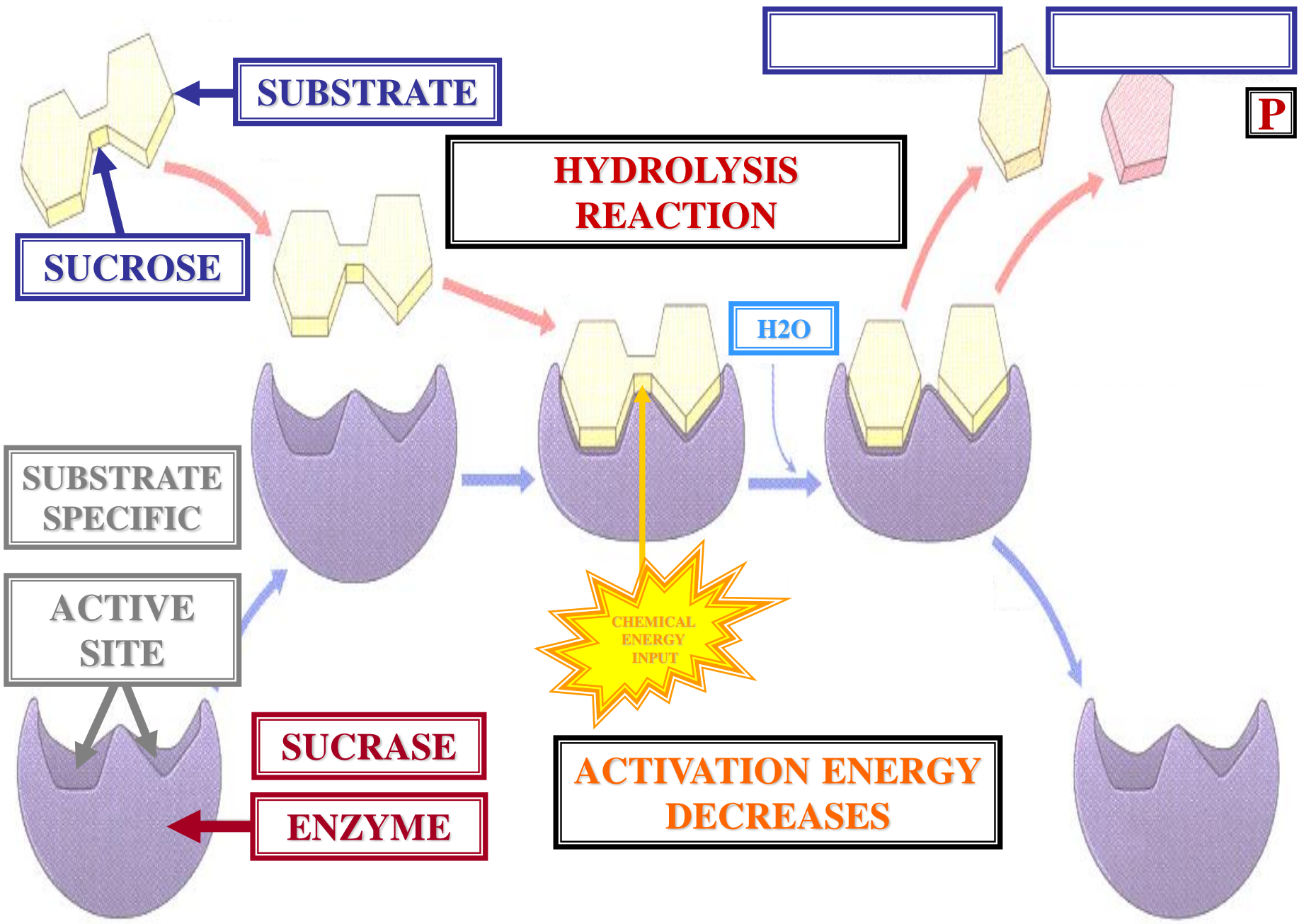
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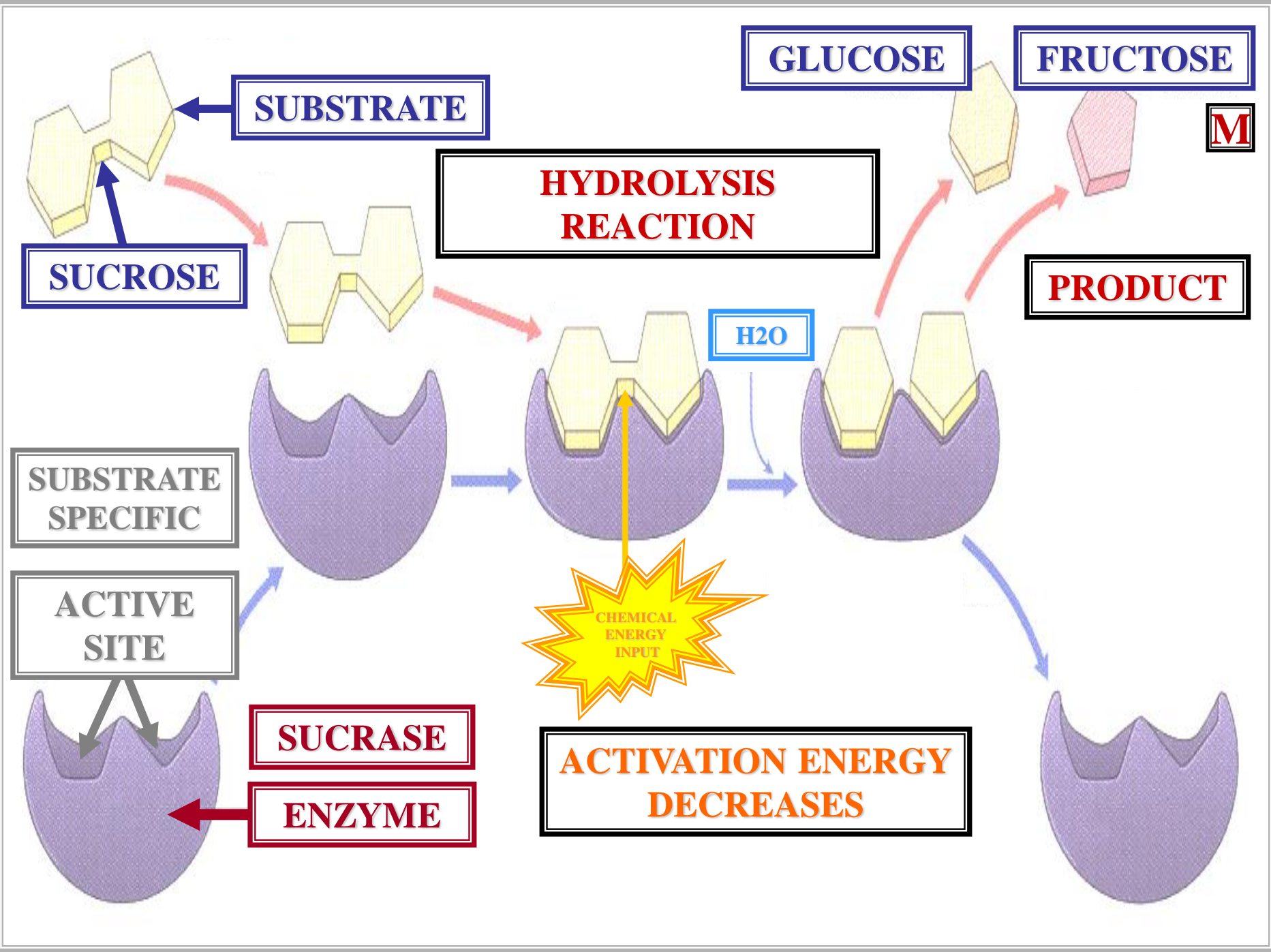
**CHEMICAL
ENERGY INPUT**

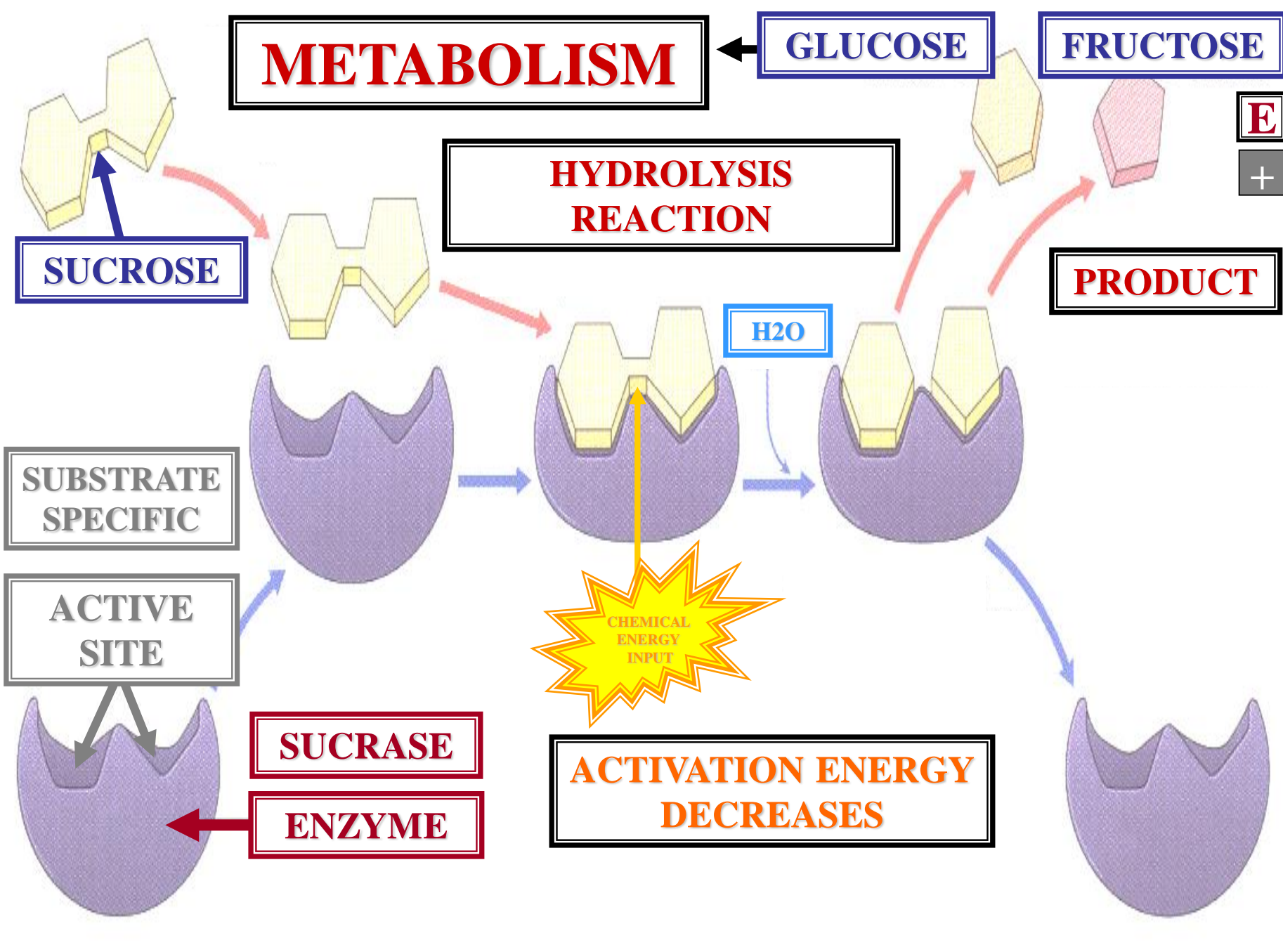
ACTIVATION ENERGY

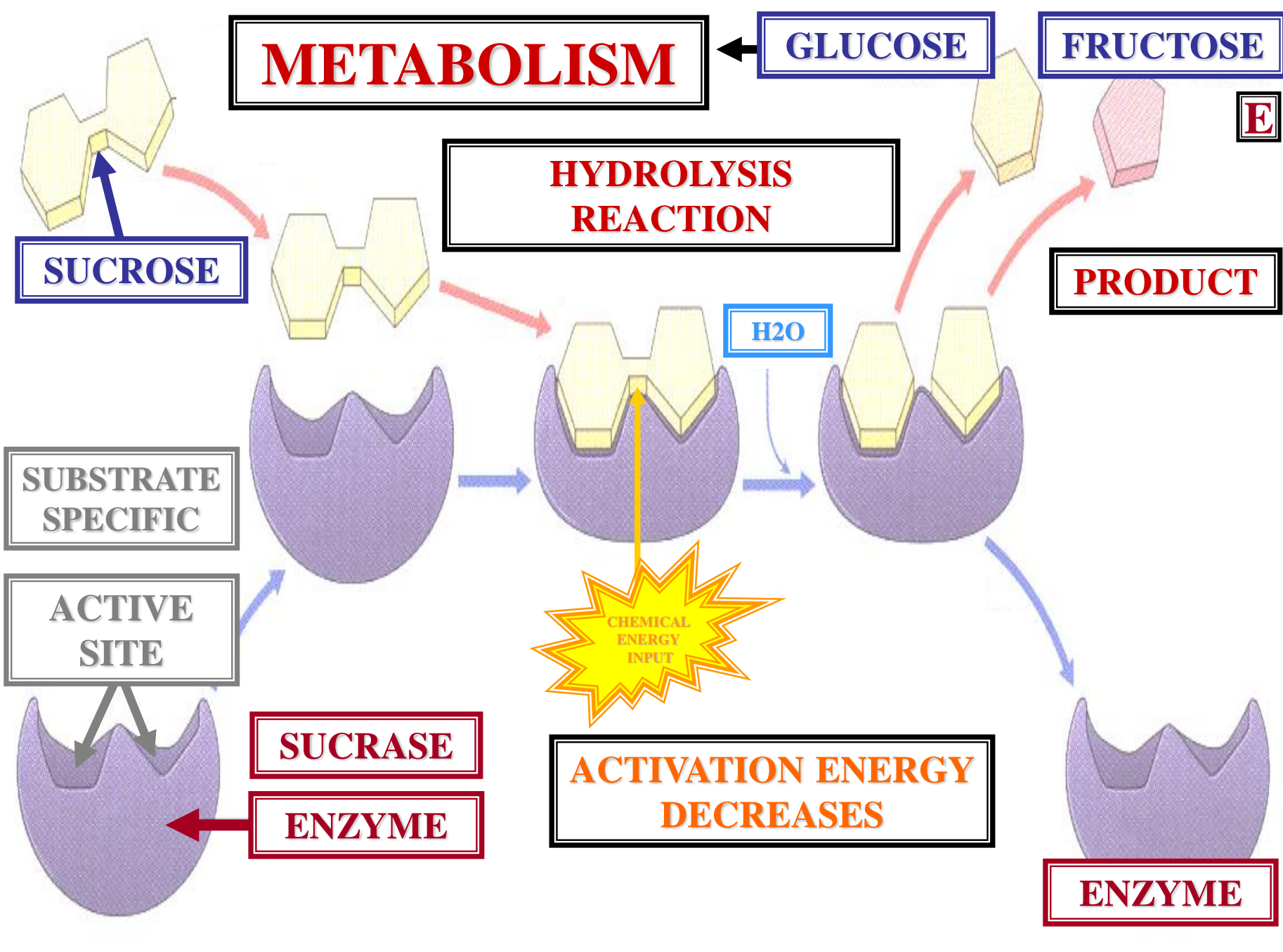
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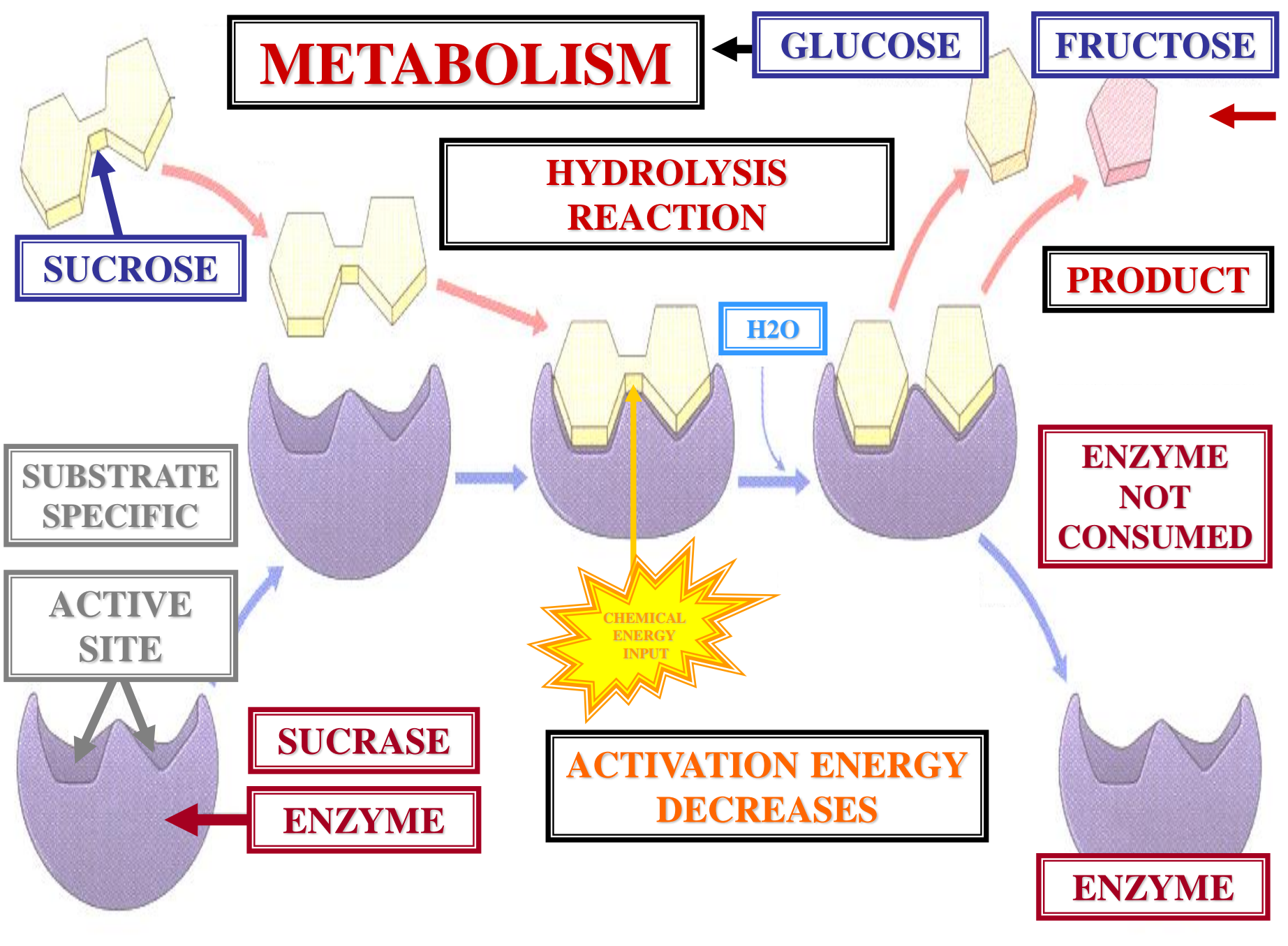


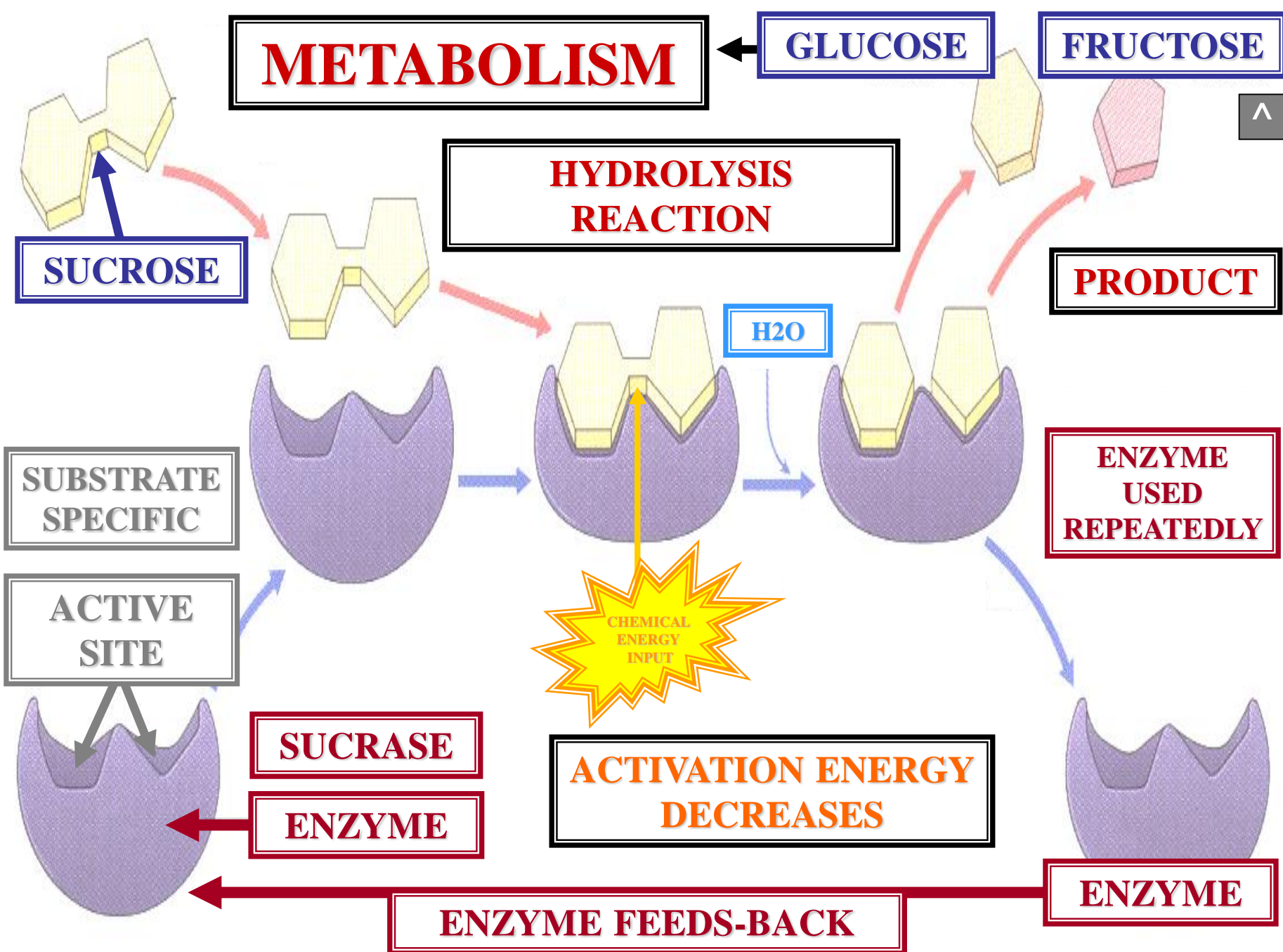












METABOLISM

GLUCOSE

FRUCTOSE

HYDROLYSIS REACTION

SUCROSE

PRODUCT

H₂O

SUBSTRATE SPECIFIC

ENZYME USED REPEATEDLY

ACTIVE SITE

CHEMICAL ENERGY INPUT

SUCRASE ENZYME

ACTIVATION ENERGY DECREASES

ENZYME

ENZYME FEEDS-BACK

CO-FACTORS

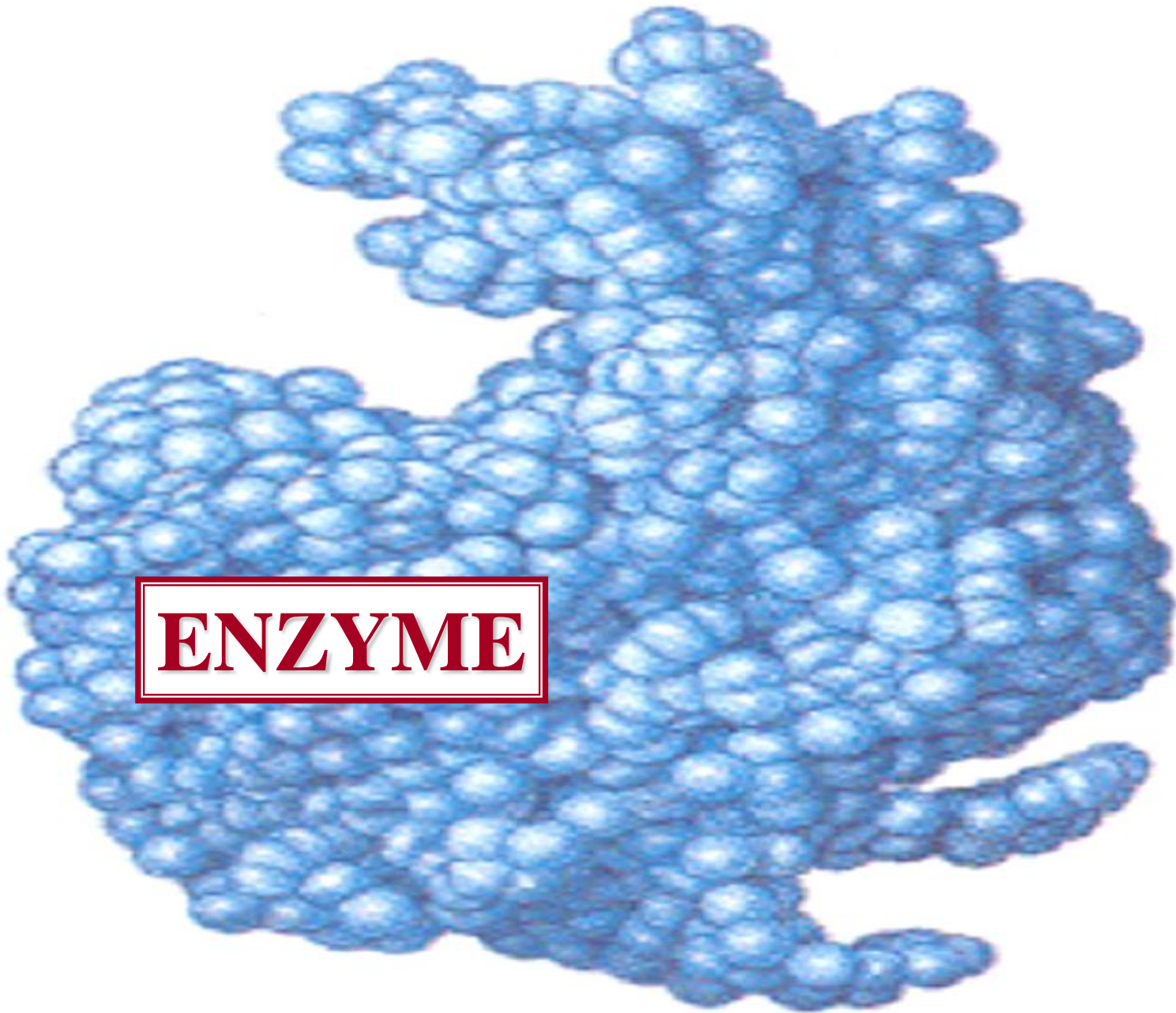
CO-FACTOR

CO-FACTOR



**INORGANIC OR ORGANIC
ENZYME PROMOTOR**

CO-FACTOR

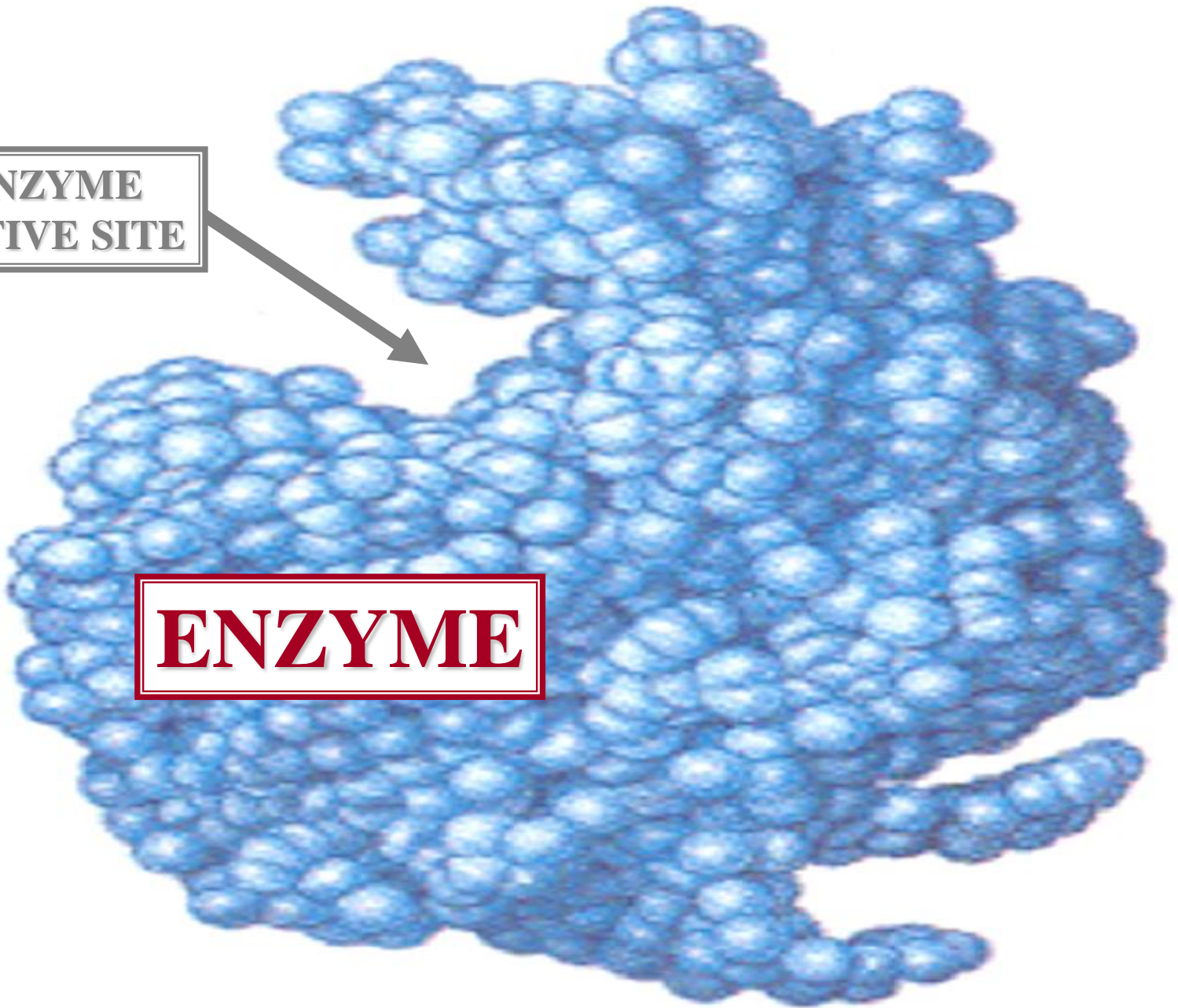


ENZYME

**ENZYME
ACTIVE SITE**



ENZYME





SUBSTRATE

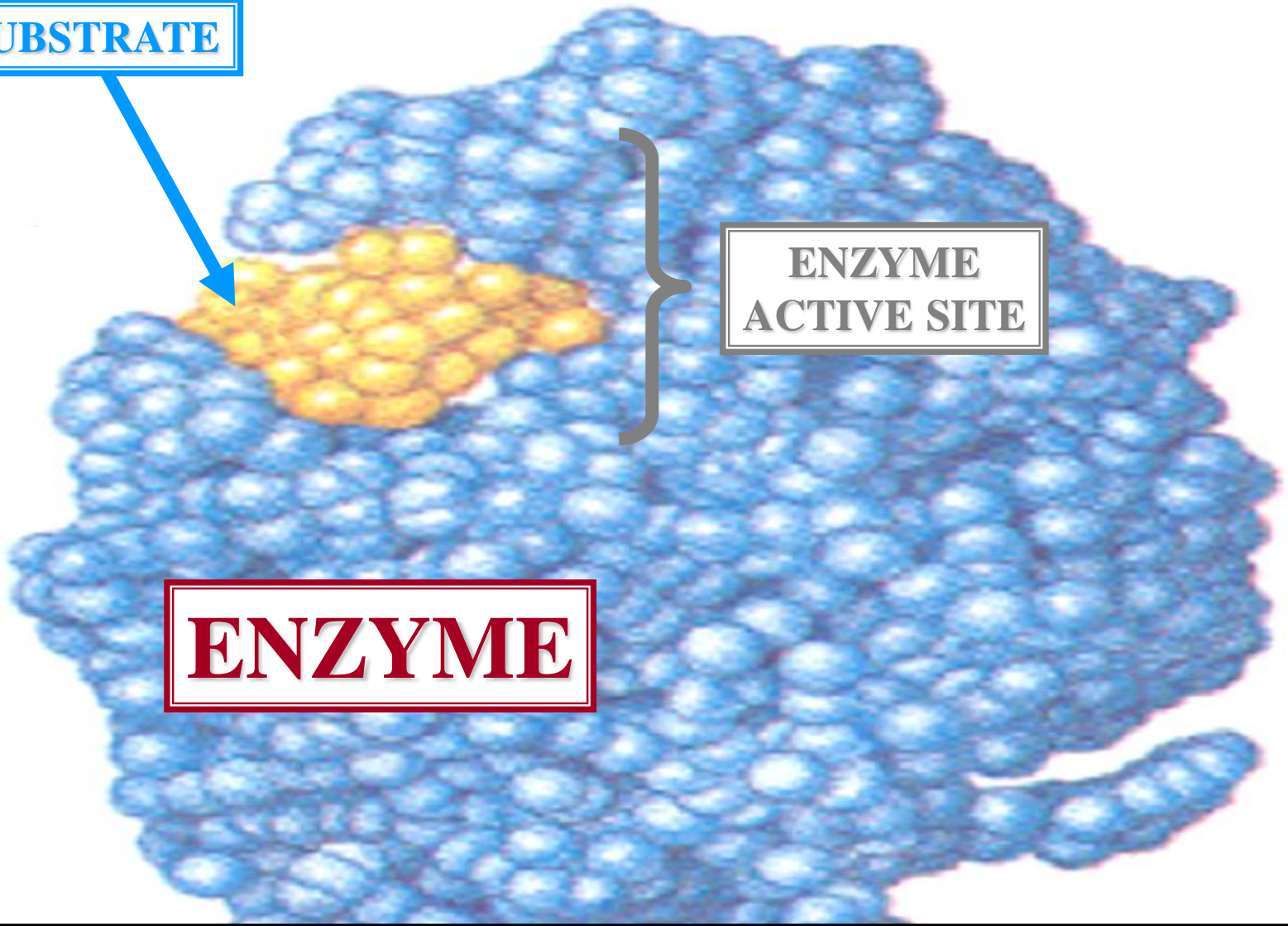


**ENZYME
ACTIVE SITE**



ENZYME

SUBSTRATE / ENZYME COMPLEX





SUBSTRATE



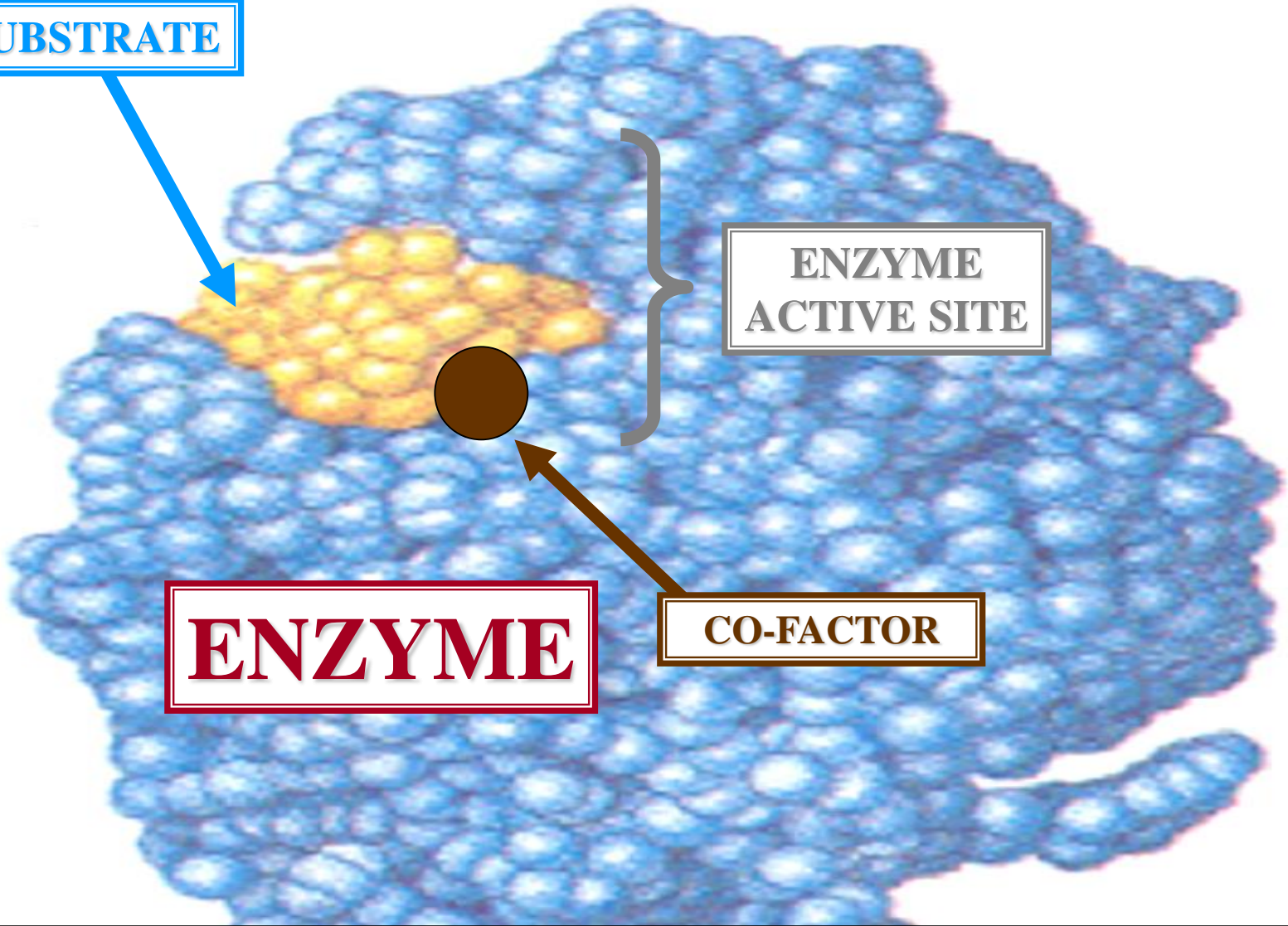
**ENZYME
ACTIVE SITE**



ENZYME

CO-FACTOR

SUBSTRATE / ENZYME COMPLEX



SUBSTRATE



**ENZYME
ACTIVE SITE**



ENZYME

CO-FACTOR

ASSISTS SUB/ENZ INTERACTION

SUBSTRATE / ENZYME COMPLEX



SUBSTRATE



**ENZYME
ACTIVE SITE**

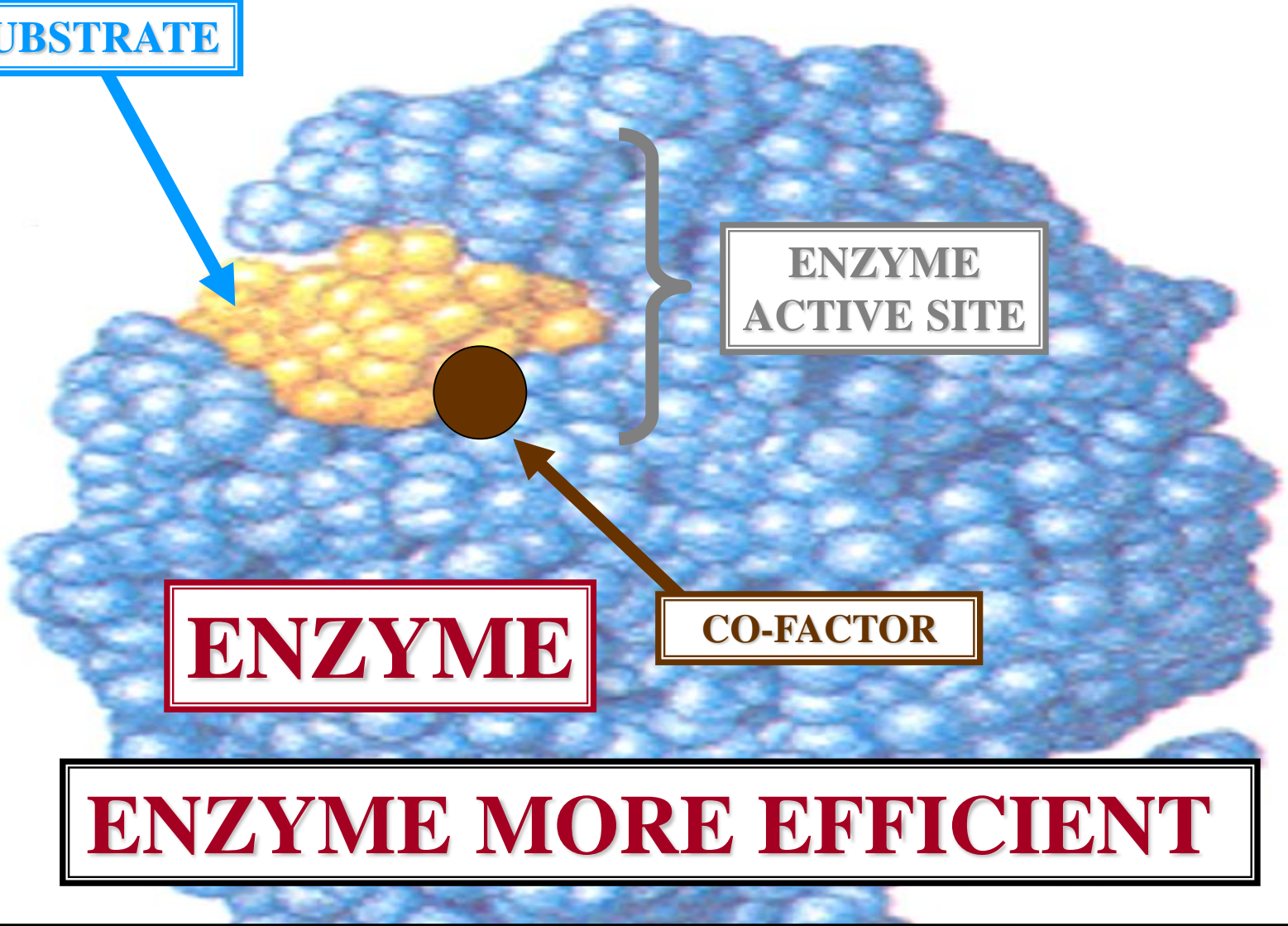


ENZYME

CO-FACTOR

ENZYME MORE EFFICIENT

SUBSTRATE / ENZYME COMPLEX



SUBSTRATE



ENZYM
ACTIVE SITE

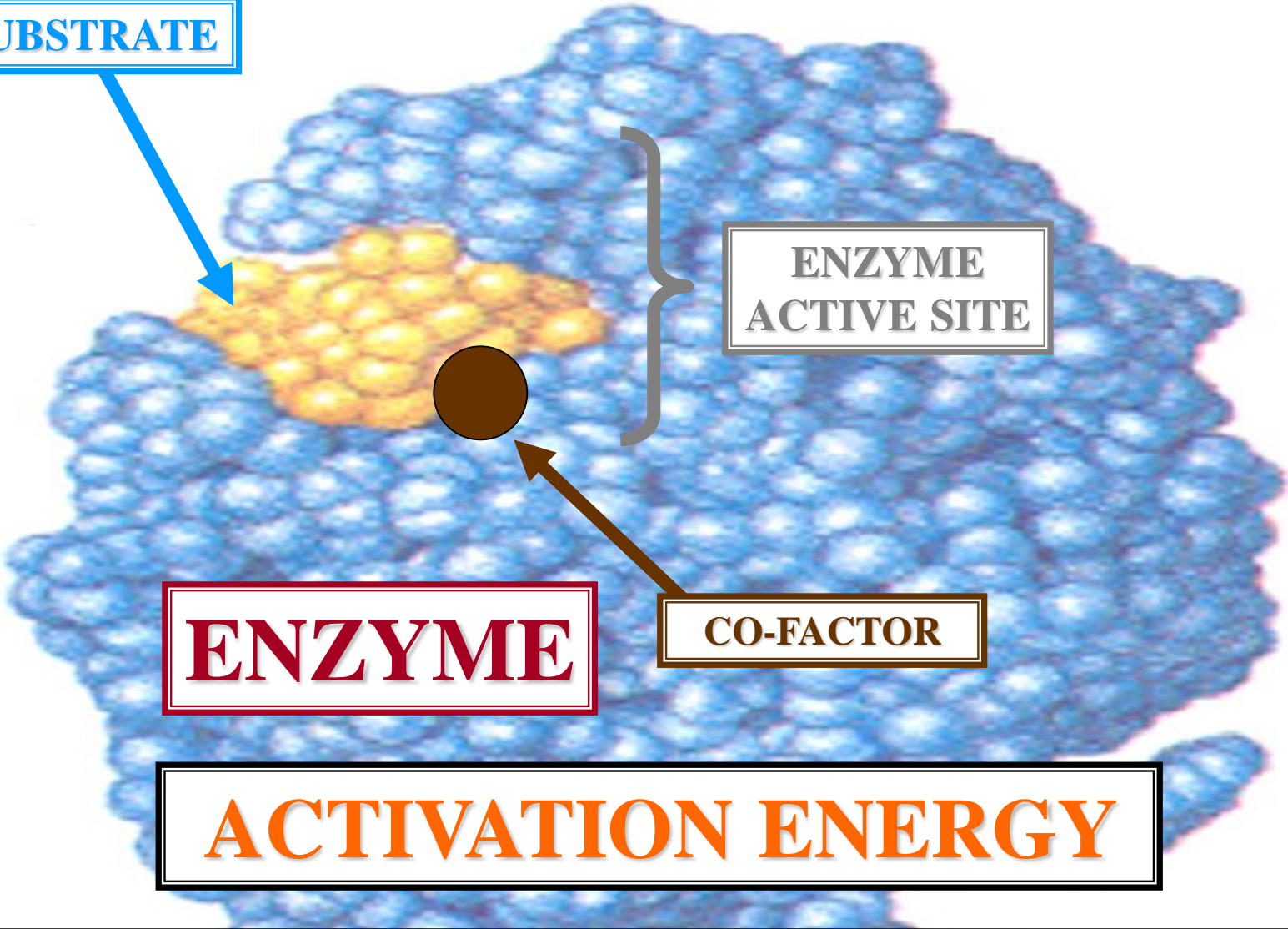


ENZYM

CO-FACTOR

ACTIVATION ENERGY

SUBSTRATE / ENZYME COMPLEX



EG

CU

SUBSTRATE

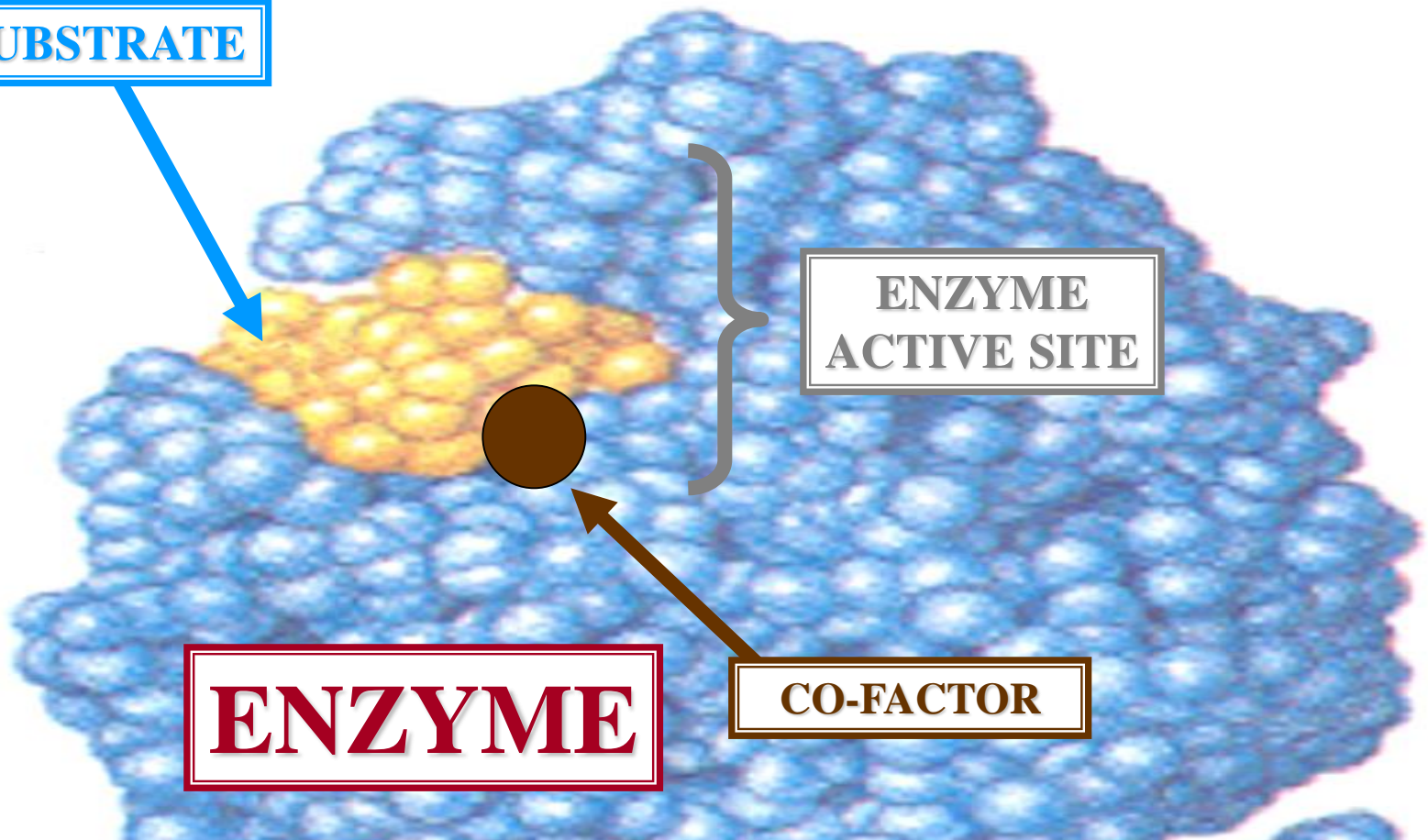
ENZYM
ACTIVE SITE

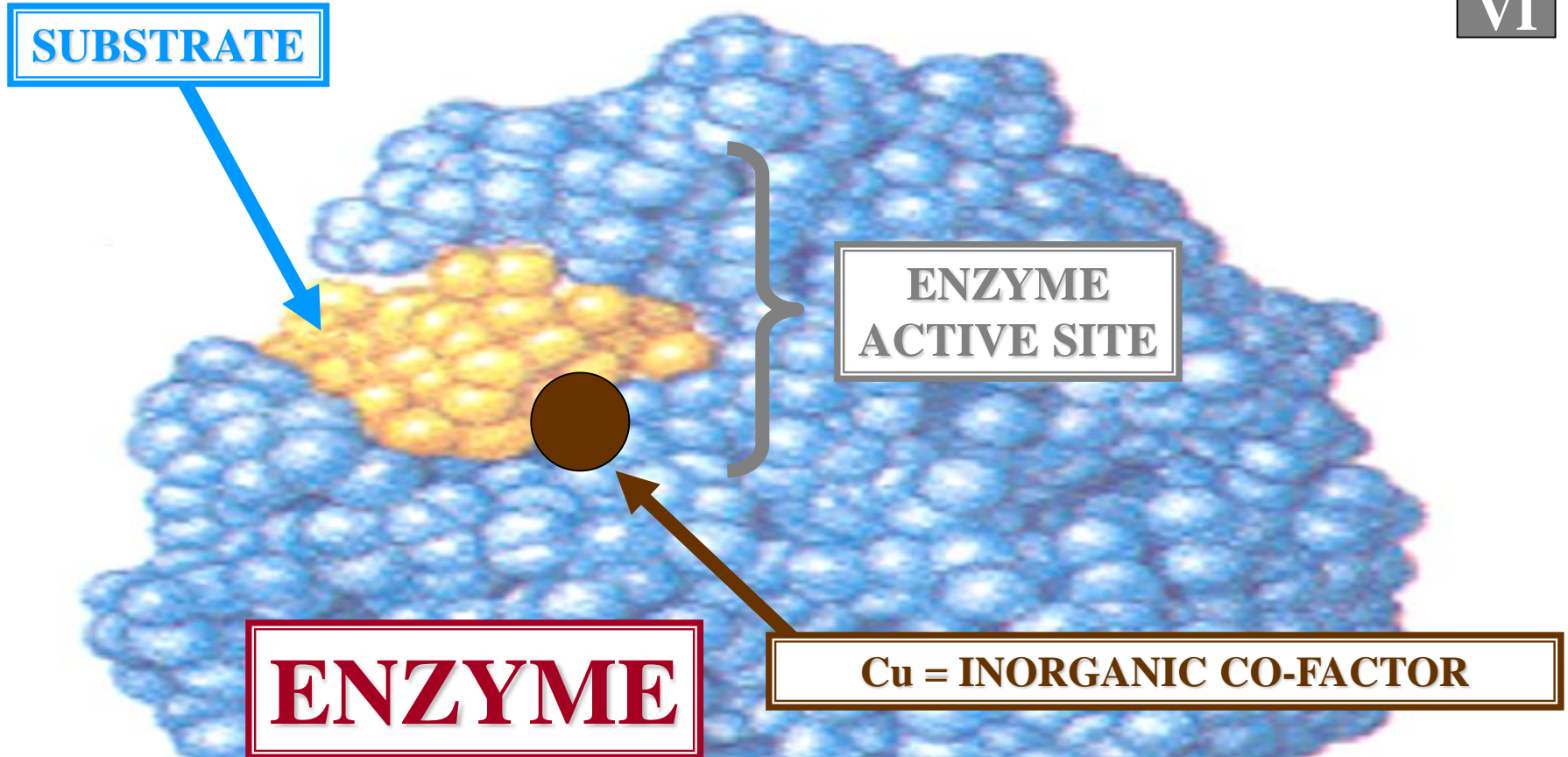
ENZYM

CO-FACTOR

DECREASES ACTIVATION ENERGY

SUBSTRATE / ENZYME COMPLEX





DECREASES ACTIVATION ENERGY

SUBSTRATE / ENZYME COMPLEX



SUBSTRATE



**ENZYME
ACTIVE SITE**



ENZYME

VITAMINS = ORGANIC CO-FACTORS

DECREASES ACTIVATION ENERGY

SUBSTRATE / ENZYME COMPLEX



VITAMINS = ORGANIC COFACTORS



COFACTORS

ENSURE

EFFICIENT

ENZYMES



***COFACTORS
ENSURE
EFFICIENT
METABOLISM***