



METABOLISM

GLUCOSE

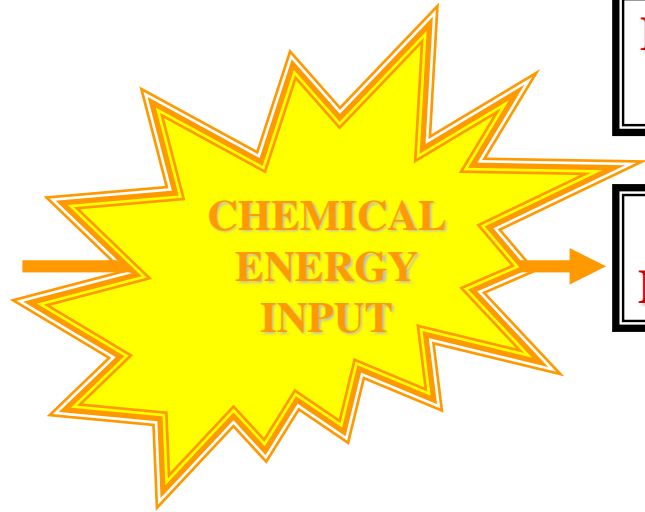
G

AEROBIC
RESPIRATION

EXERGONIC
REACTIONS

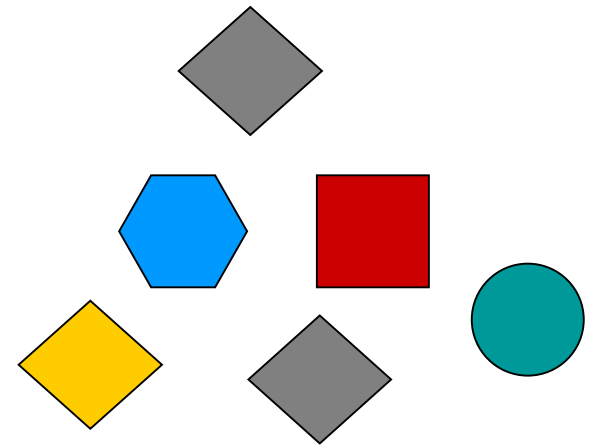
CO₂

WATER



ENDERGONIC
REACTIONS

ANABOLIC
METABOLISM



 = CHEMICAL ENERGY

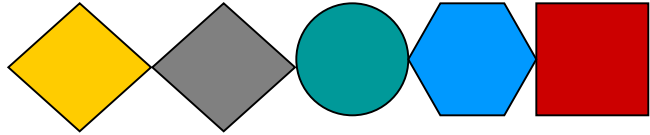
BUILDING BLOCKS



METABOLISM

GLUCOSE

COMPLEX BIO-CHEM-CMPS

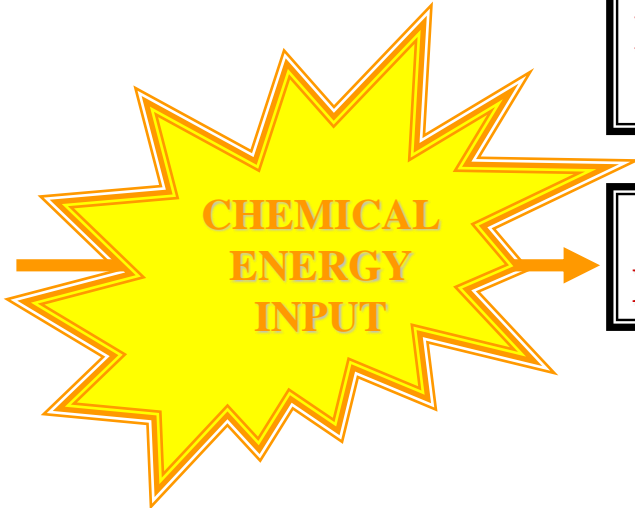


AEROBIC RESPIRATION

EXERGONIC REACTIONS

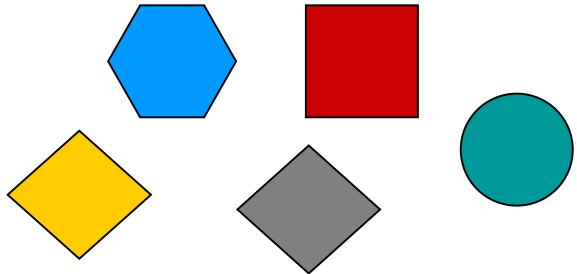
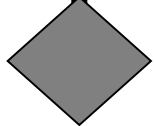
CO2

WATER



ENDERGONIC REACTIONS

ANABOLIC METABOLISM



BUILDING BLOCKS



***CELL
GROWTH
&
MAINTENANCE***



HOMEOSTASIS



ANAEROBIC RESPIRATION OVERVIEW

METABOLISM

GLUCOSE



CM

AN

 = CHEMICAL ENERGY

METABOLISM

GLUCOSE



**CATABOLIC
METABOLISM**

**ANAEROBIC
RESPIRATION**



 = CHEMICAL ENERGY

METABOLISM

GLUCOSE



CATABOLIC
METABOLISM

ANAEROBIC
RESPIRATION

CO₂

ETHANOL



METABOLISM

GLUCOSE



CATABOLIC
METABOLISM

ANAEROBIC
RESPIRATION

OXYGEN REQUIRED ?

CO₂

ETHANOL

 = CHEMICAL ENERGY

0





METABOLISM

GLUCOSE



CATABOLIC
METABOLISM

ANAEROBIC
RESPIRATION

OXYGEN NOT REQUIRED

CO₂

ETHANOL



= CHEMICAL ENERGY

METABOLISM

GLUCOSE

G

ANAEROBIC
RESPIRATION

EXERGONIC
REACTIONS

CO₂

ETHANOL



?

P

METABOLISM

GLUCOSE



ANAEROBIC
RESPIRATION

EXERGONIC
REACTIONS



CO₂

ETHANOL



PHOSPHORYLATIONS

 = CHEMICAL ENERGY

METABOLISM

GLUCOSE



ANAEROBIC
RESPIRATION



EXERGONIC
REACTIONS

PHOSPHORYLATIONS

CO₂

ETHANOL

 = CHEMICAL ENERGY

METABOLISM

B



GLUCOSE



ANAEROBIC
RESPIRATION



ANABOLIC
METABOLISM

EXERGONIC
REACTIONS



CO₂

ETHANOL

 = CHEMICAL ENERGY

METABOLISM

GLUCOSE



**ANAEROBIC
RESPIRATION**

**EXERGONIC
REACTIONS**

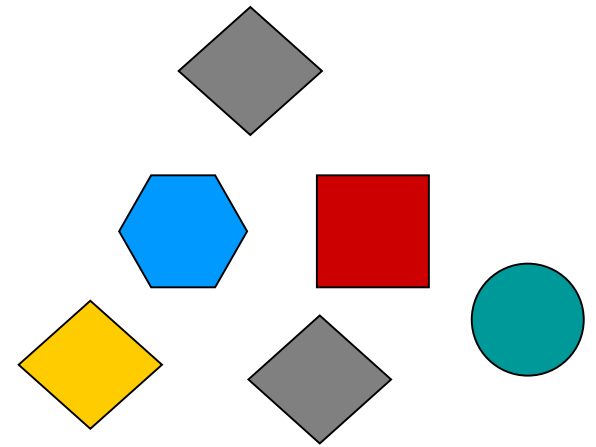


CO₂

ETHANOL



**ANABOLIC
METABOLISM**



= CHEMICAL ENERGY

BUILDING BLOCKS

METABOLISM

GLUCOSE



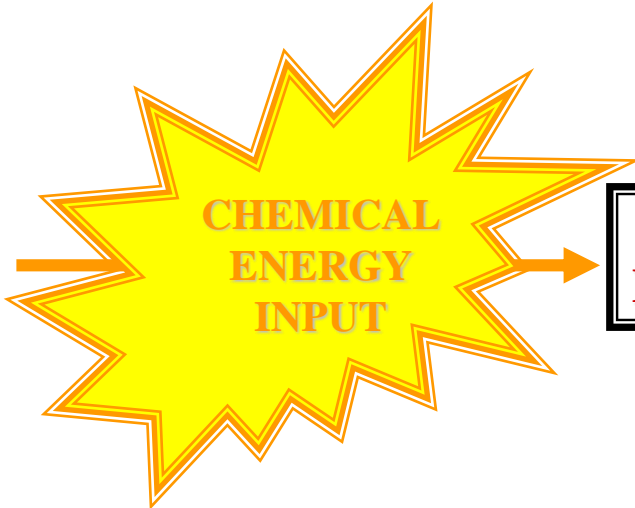
ANAEROBIC RESPIRATION

EXERGONIC REACTIONS

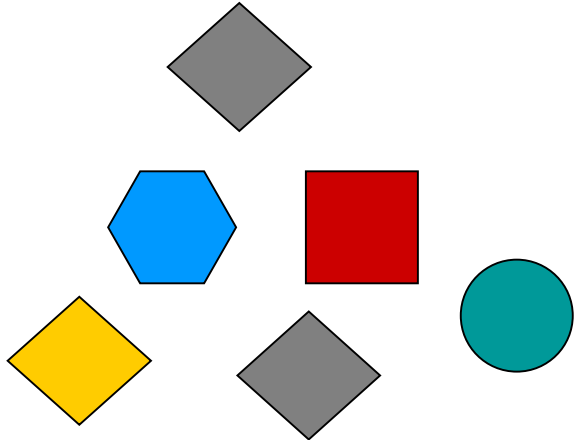


CO₂

ETHANOL



ANABOLIC METABOLISM



= CHEMICAL ENERGY

BUILDING BLOCKS



METABOLISM

GLUCOSE



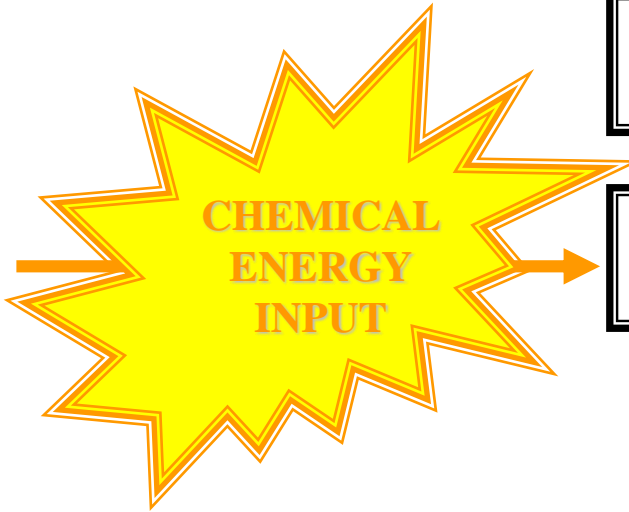
**ANAEROBIC
RESPIRATION**

**EXERGONIC
REACTIONS**



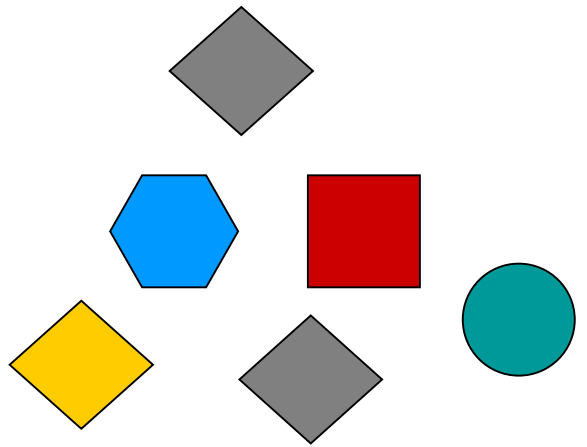
CO₂

ETHANOL



**ENDERGONIC
REACTIONS**

**ANABOLIC
METABOLISM**



= **CHEMICAL ENERGY**

BUILDING BLOCKS



METABOLISM

GLUCOSE



ANAEROBIC RESPIRATION

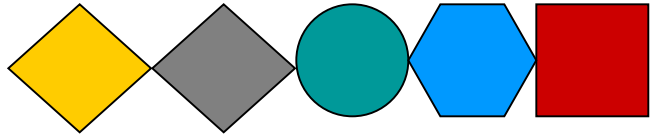
EXERGONIC REACTIONS



CO₂

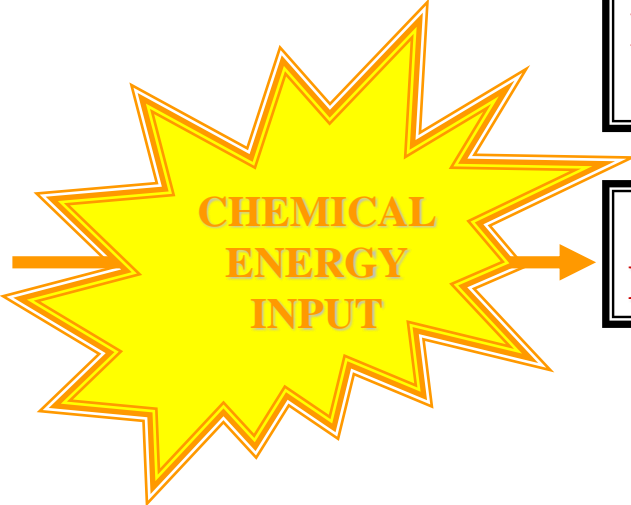
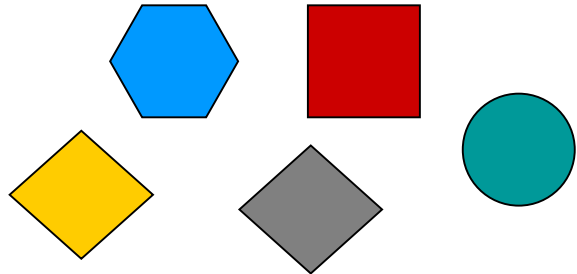
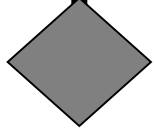
ETHANOL

COMPLEX BIO-CHEM-CMPS



ENDERGONIC REACTIONS

ANABOLIC METABOLISM



= CHEMICAL ENERGY

BUILDING BLOCKS

***CELL
GROWTH
&
MAINTENANCE***

?

HOMEOSTASIS



QUESTION

WHAT WOULD THE

CELL PREFER

AEROBIC

OR

ANAEROBIC?

QUESTION

ANSWER

**AEROBIC
RESPIRATION**

ANSWER



ENERGY



AEROBIC RESPIRATION



AEROBIC RESPIRATION EQUATION

AEROBIC RESPIRATION EQUATION

AEROBIC RESPIRATION EQUATION

AEROBIC RESPIRATION EQUATION



AEROBIC RESPIRATION EQUATION



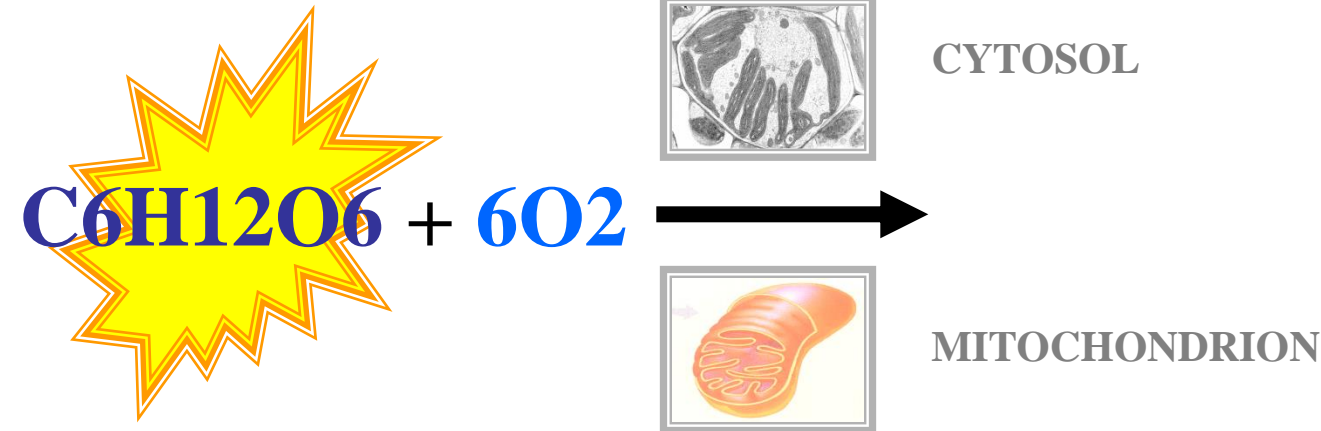
AEROBIC RESPIRATION EQUATION



AEROBIC RESPIRATION EQUATION



AEROBIC RESPIRATION EQUATION



AEROBIC RESPIRATION EQUATION

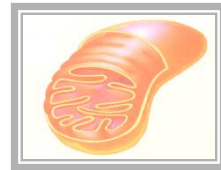
 = CHEM ENERGY



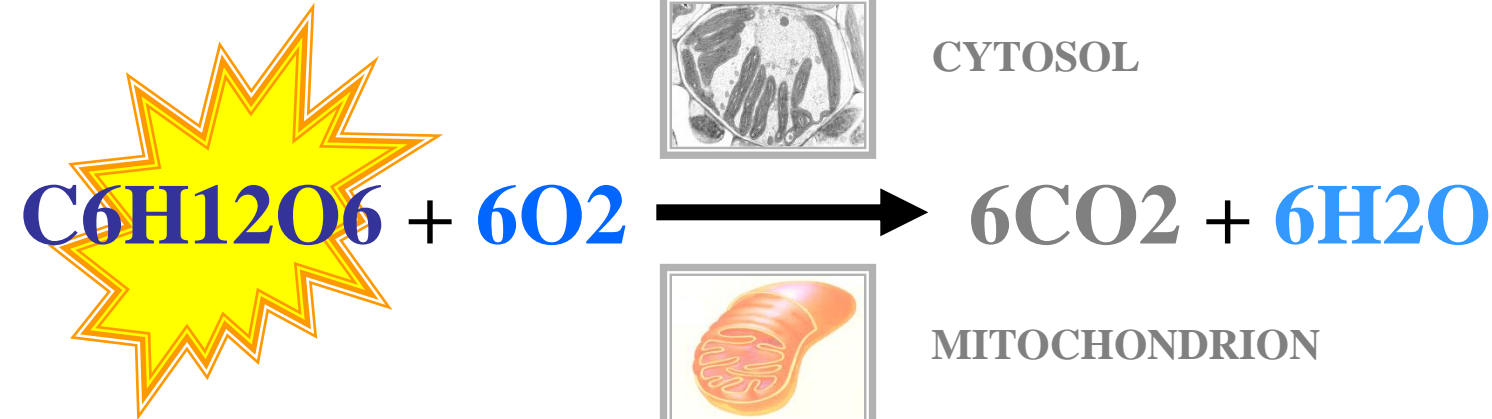
AEROBIC RESPIRATION EQUATION



CYTOSOL



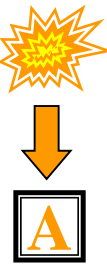
MITOCHONDRION



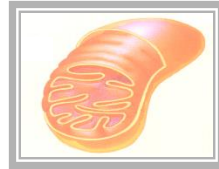
AEROBIC RESPIRATION EQUATION

 = CHEM ENERGY

AEROBIC RESPIRATION EQUATION



CYTOSOL

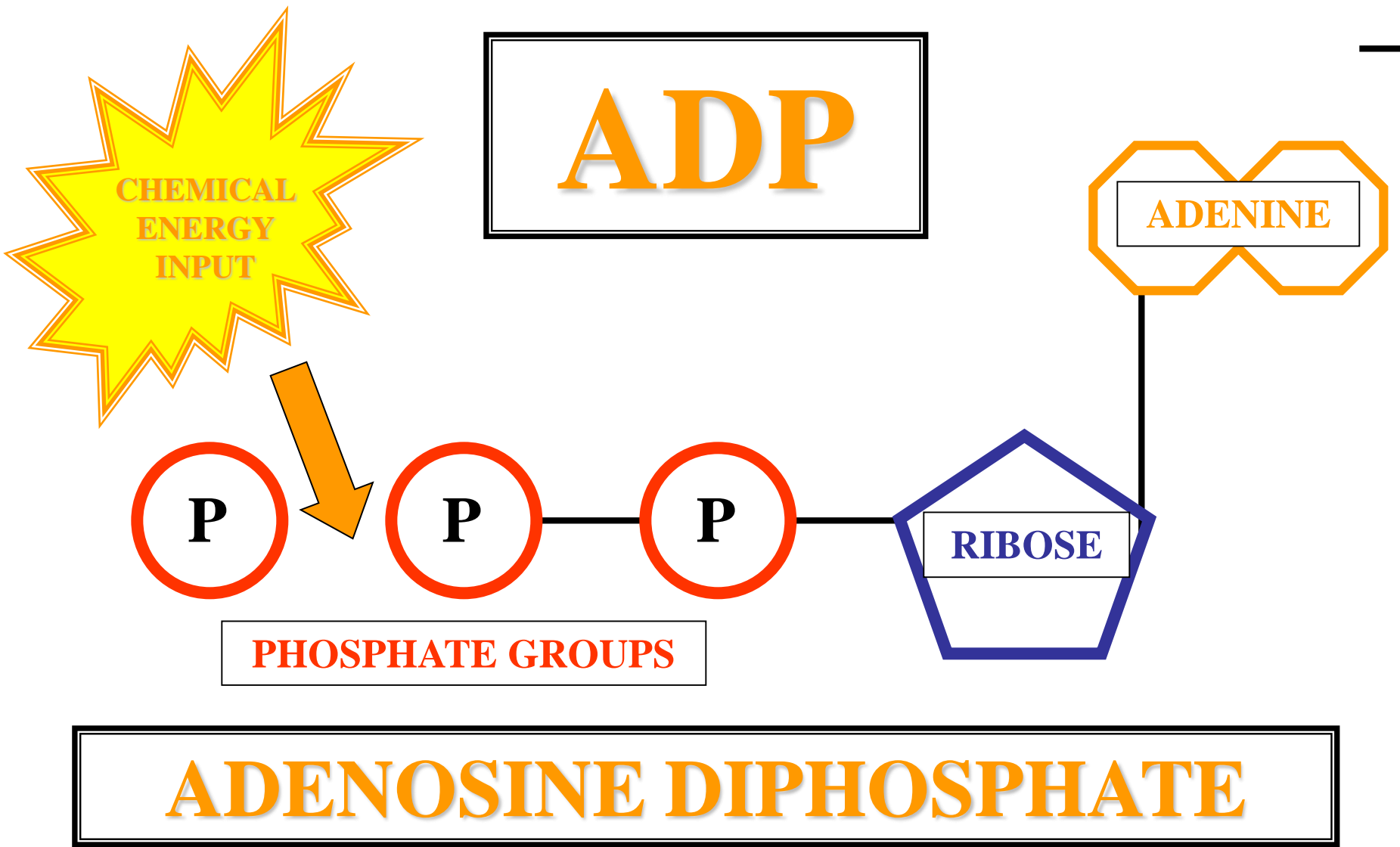


MITOCHONDRION

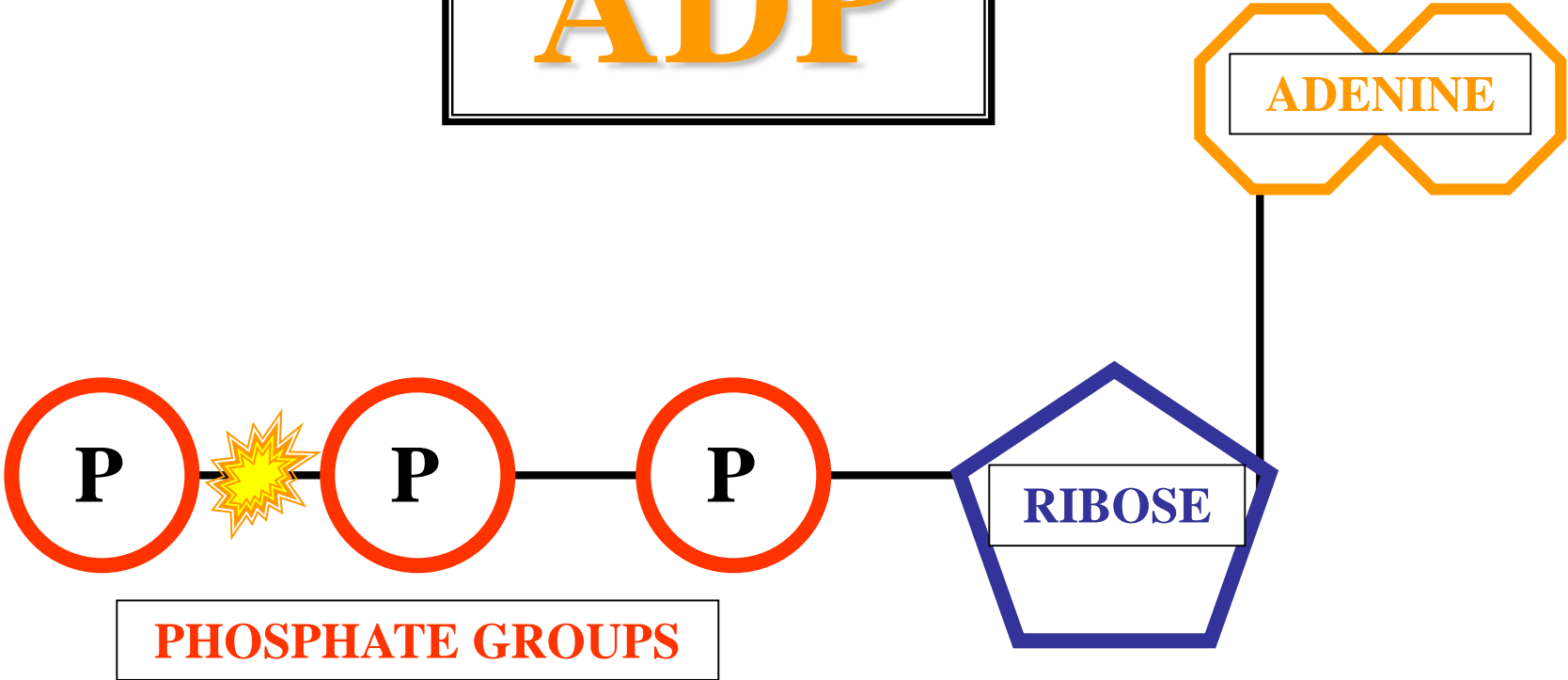


AEROBIC RESPIRATION EQUATION





ADP



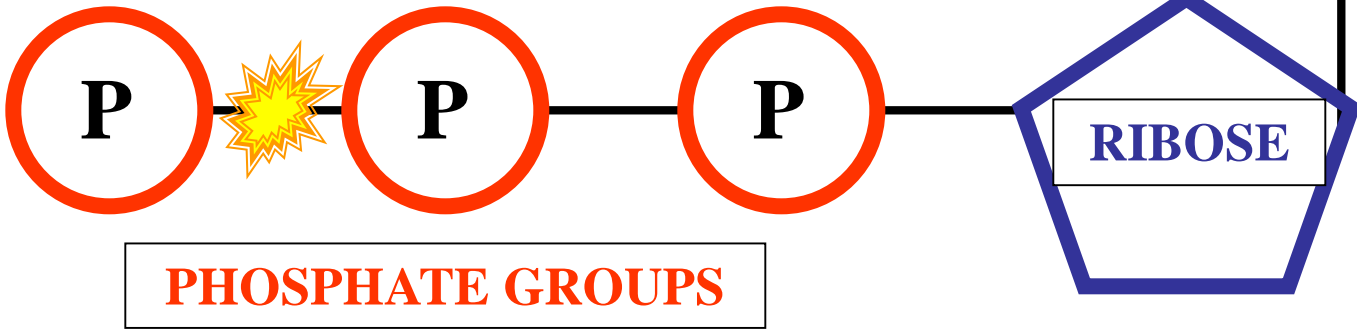
ADENOSINE DIPHOSPHATE

 = HOLDS BIO-CHEM ENERGY

ADP



PHOSPHORYLATION



ADENOSINE DIPHOSPHATE

 = HOLDS BIO-CHEM ENERGY

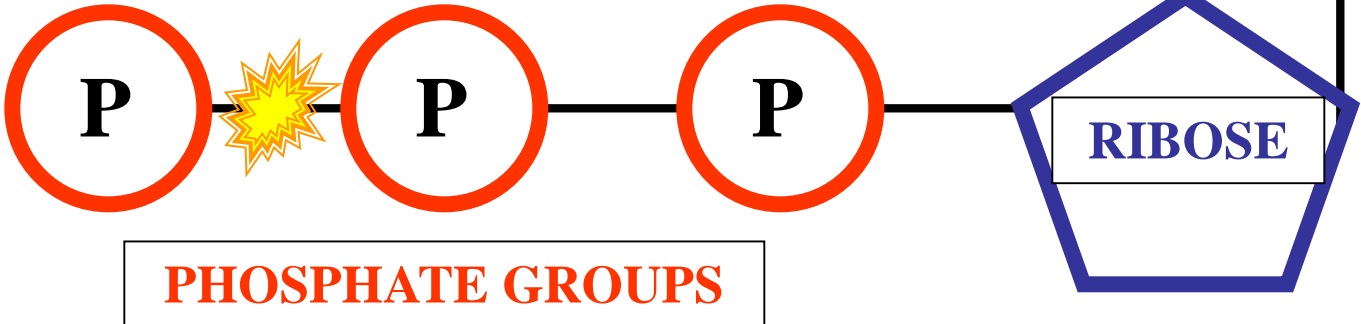
ATP

?

P



PHOSPHORYLATION



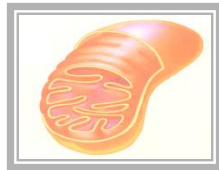
ADENOSINE TRIPHOSPHATE

 = HOLDS BIO-CHEM ENERGY

AEROBIC RESPIRATION EQUATION



CYTOSOL



MITOCHONDRION

PHOSPHORYLATIONS

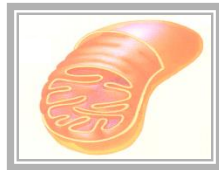
AEROBIC RESPIRATION EQUATION



AEROBIC RESPIRATION EQUATION



CYTOSOL



MITOCHONDRION

PHOSPHORYLATIONS

AEROBIC RESPIRATION EQUATION



METABOLISM

GLUCOSE

G

CATABOLIC
METABOLISM

AEROBIC
RESPIRATION

CO₂

WATER

36 ATP

PHOSPHORYLATIONS



= CHEMICAL ENERGY

METABOLISM

B



GLUCOSE



CATABOLIC METABOLISM



ANABOLIC METABOLISM

AEROBIC RESPIRATION



CO₂

WATER

 = CHEMICAL ENERGY

METABOLISM

GLUCOSE

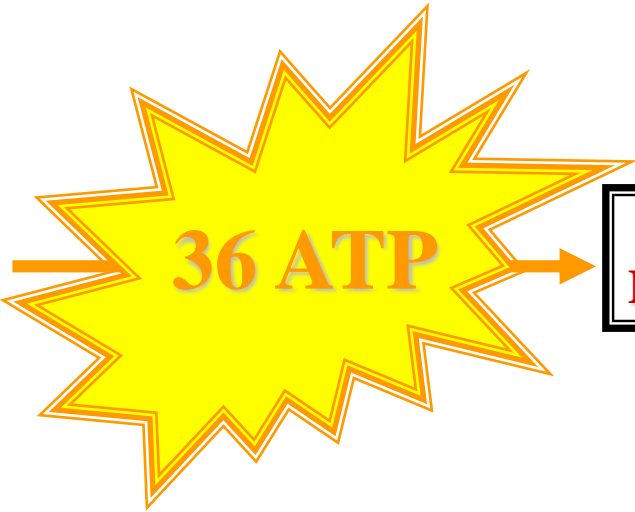


CATABOLIC METABOLISM

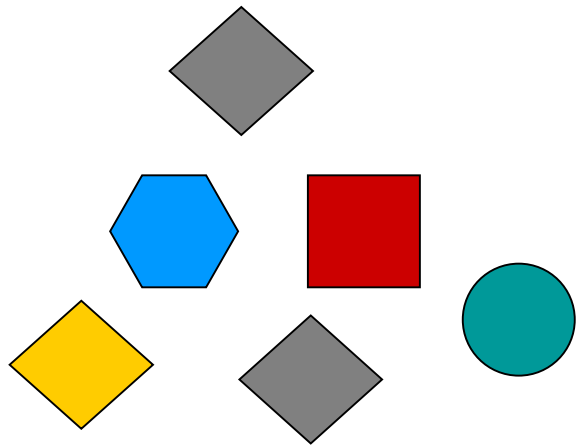
AEROBIC RESPIRATION

CO₂

WATER



ANABOLIC METABOLISM



 = CHEMICAL ENERGY

BUILDING BLOCKS

METABOLISM

GLUCOSE

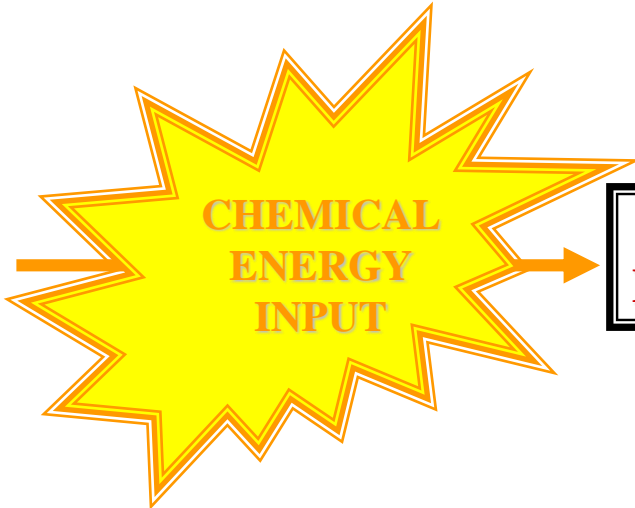


CATABOLIC METABOLISM

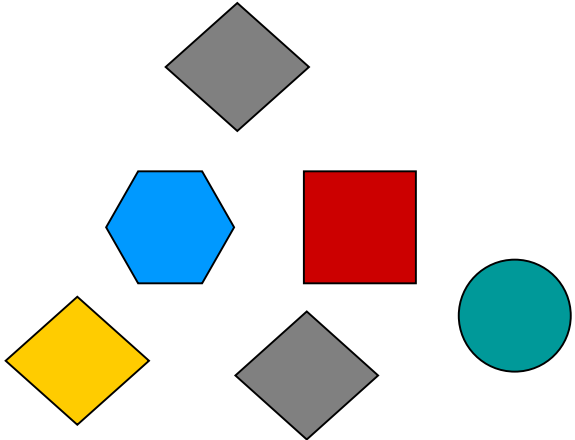
AEROBIC RESPIRATION

CO₂

WATER



ANABOLIC METABOLISM



 = CHEMICAL ENERGY

BUILDING BLOCKS



METABOLISM

GLUCOSE

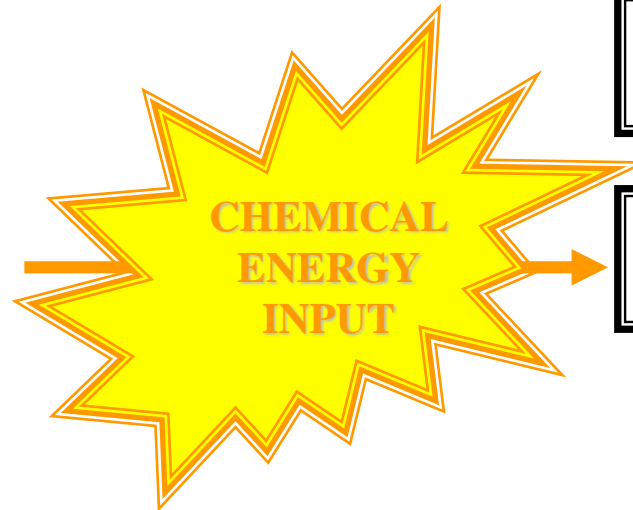
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CATABOLIC METABOLISM

AEROBIC RESPIRATION

CO₂

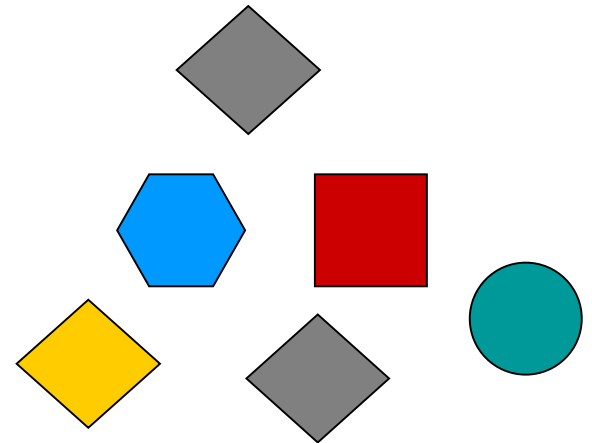
WATER



CHEMICAL ENERGY INPUT

ENDERGONIC REACTIONS

ANABOLIC METABOLISM



BUILDING BLOCKS



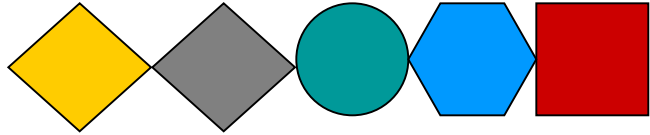
= CHEMICAL ENERGY



METABOLISM

GLUCOSE

COMPLEX BIO-CHEM-CMPS

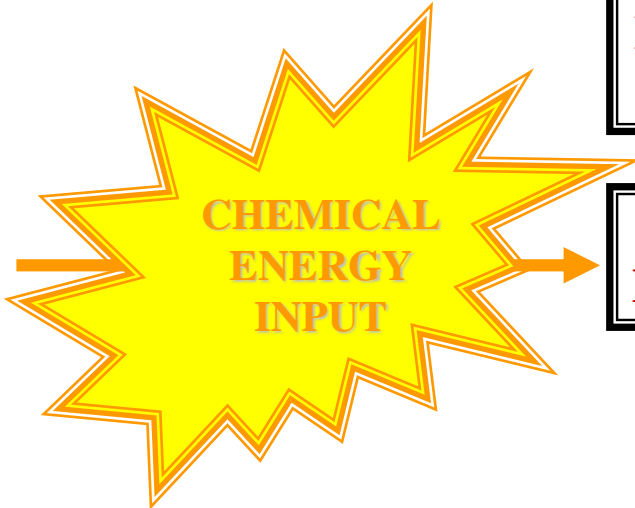


CATABOLIC METABOLISM

AEROBIC RESPIRATION

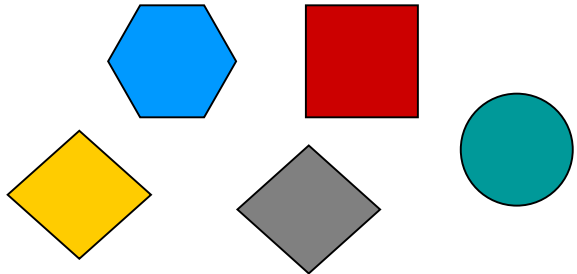
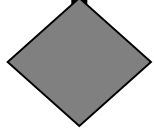
CO₂

WATER



ENDERGONIC REACTIONS

ANABOLIC METABOLISM



 = CHEMICAL ENERGY

BUILDING BLOCKS

***CELL
GROWTH
&
MAINTENANCE***

+

EO

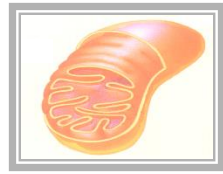
HOMEOSTASIS



AEROBIC RESPIRATION EQUATION



CYTOSOL



MITOCHONDRION

PHOSPHORYLATIONS

AEROBIC RESPIRATION EQUATION

 = CHEM ENERGY

AEROBIC RESPIRATION COMPONENT PATHWAYS

**AEROBIC
RESPIRATION
COMPONENT PATHWAYS**

GLYCOLYSIS

**AEROBIC
RESPIRATION
COMPONENT PATHWAYS**

**AEROBIC
RESPIRATION
COMPONENT PATHWAYS**

**GLYCOLYSIS
KREBS CYCLE**

**AEROBIC
RESPIRATION
COMPONENT PATHWAYS**



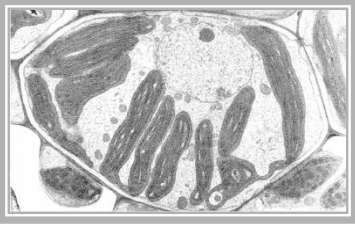
**AEROBIC
RESPIRATION
COMPONENT PATHWAYS**

GLYCOLYSIS

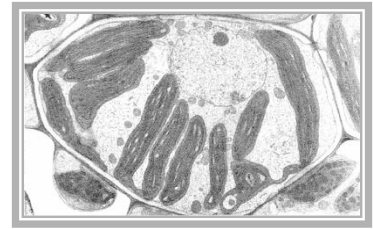
KREBS CYCLE

ELECTRON TRANSPORT CHAIN

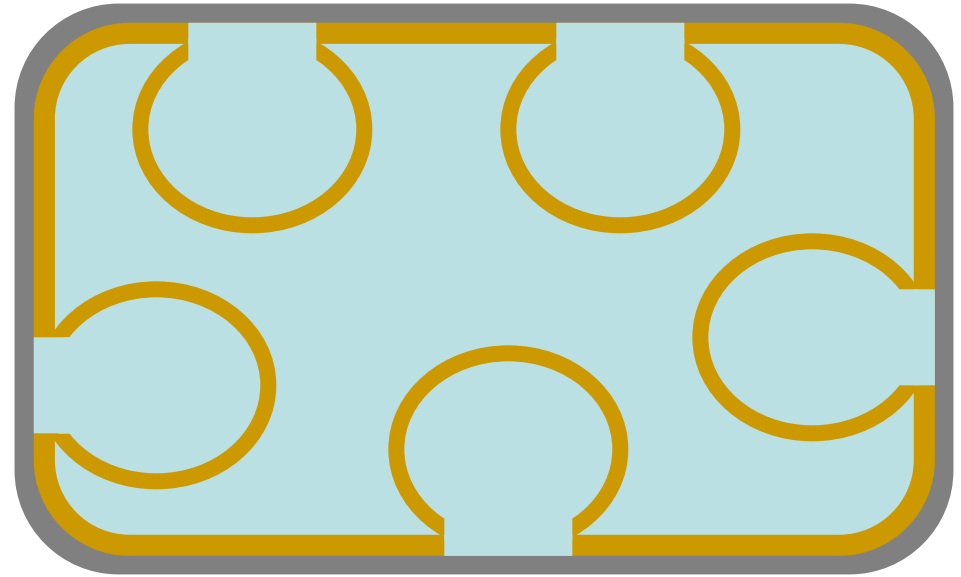
**AEROBIC
RESPIRATION
COMPONENT PATHWAYS**



AEROBIC RESPIRATION



G

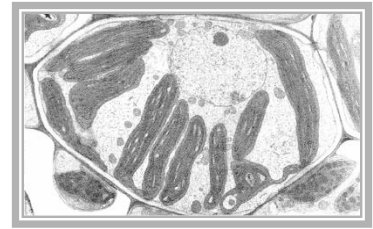


CELL

COMPONENT PATHWAYS



AEROBIC RESPIRATION

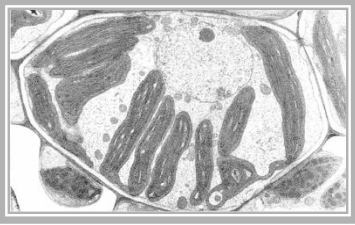


K

GLYCOLYSIS

CELL

COMPONENT PATHWAYS



AEROBIC RESPIRATION



E

GLYCOLYSIS



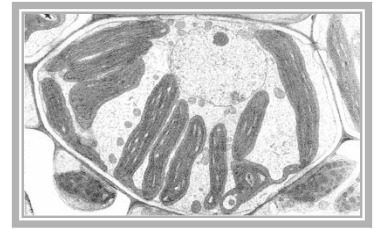
KREBS CYCLE

CELL

COMPONENT PATHWAYS



AEROBIC RESPIRATION



GLYCOLYSIS



KREBS CYCLE



ETC

CELL

COMPONENT PATHWAYS

**AEROBIC
RESPIRATION
GLYCOLYSIS**

GLYCOLYSIS OVERVIEW

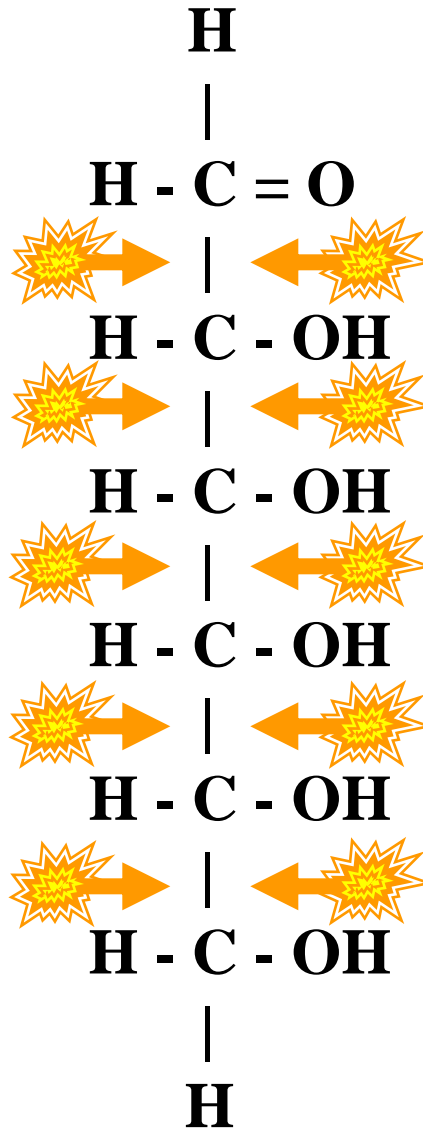
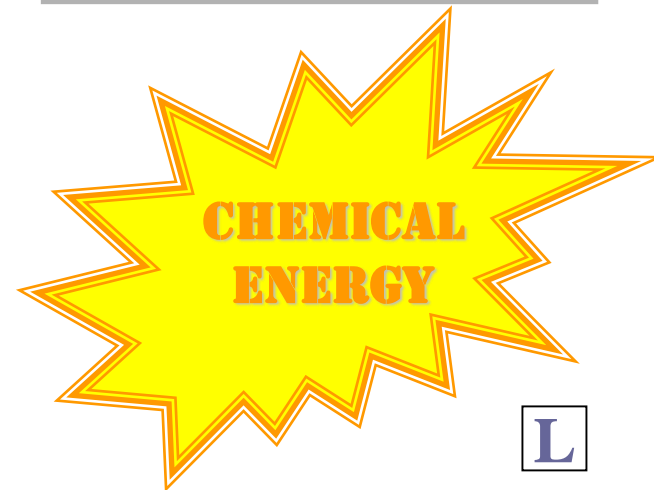
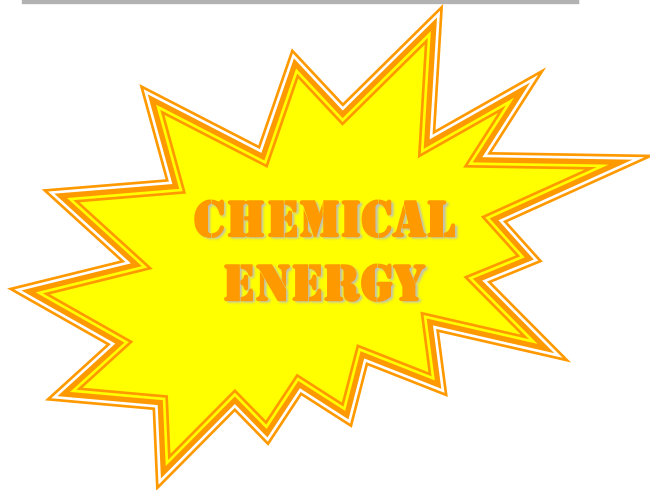
GLYCOLYSIS

GLYCOLYSIS

“SUGAR SPLITTING”

GLYCOLYSIS

GLUCOSE

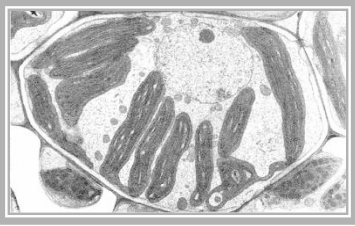


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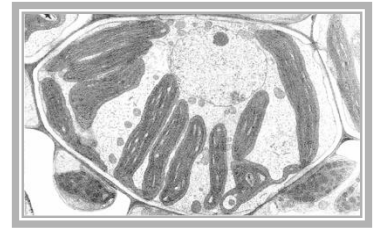


GLYCOLYSIS

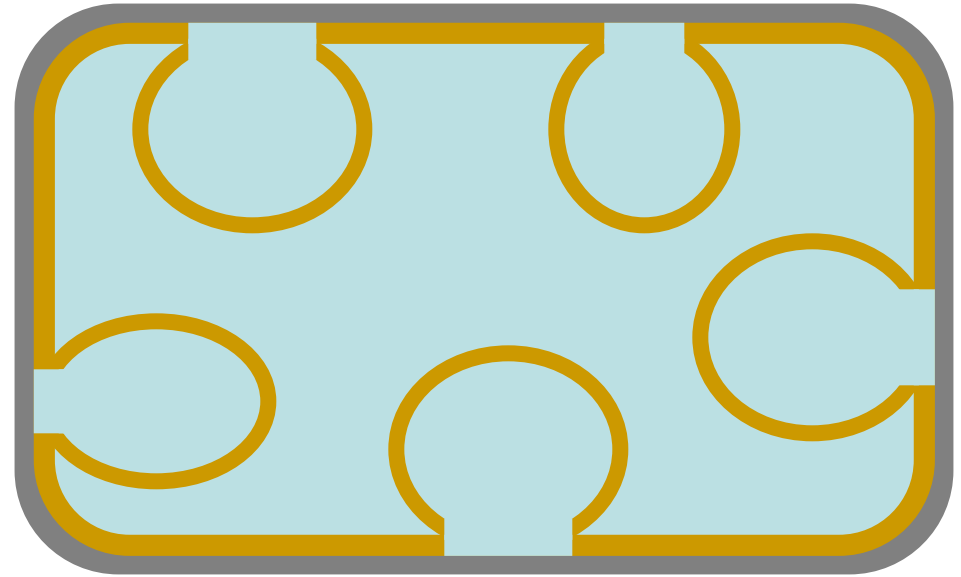
CELL LOCATION



AEROBIC RESPIRATION



C

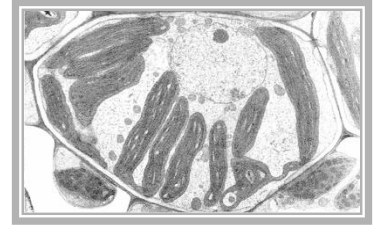


CELL

 = CHEMICAL ENERGY



AEROBIC RESPIRATION

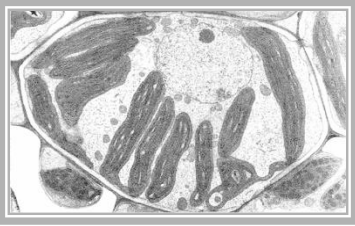


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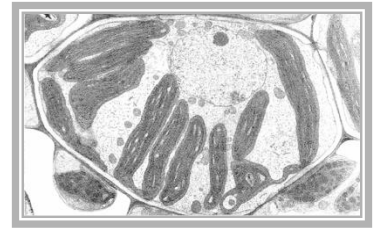
CYTOSOL

CELL

 = CHEMICAL ENERGY



AEROBIC RESPIRATION

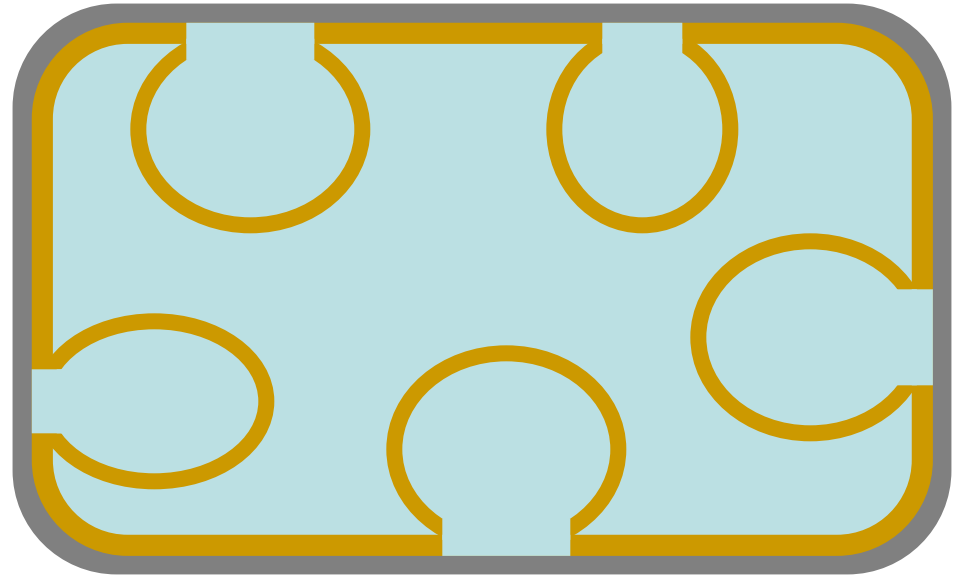


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GLYCOLYSIS

CYTOSOL

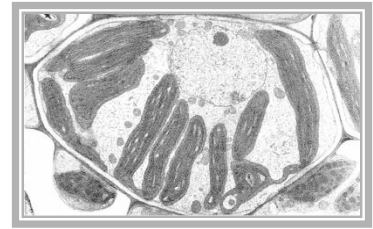
CELL



 = CHEMICAL ENERGY



AEROBIC RESPIRATION



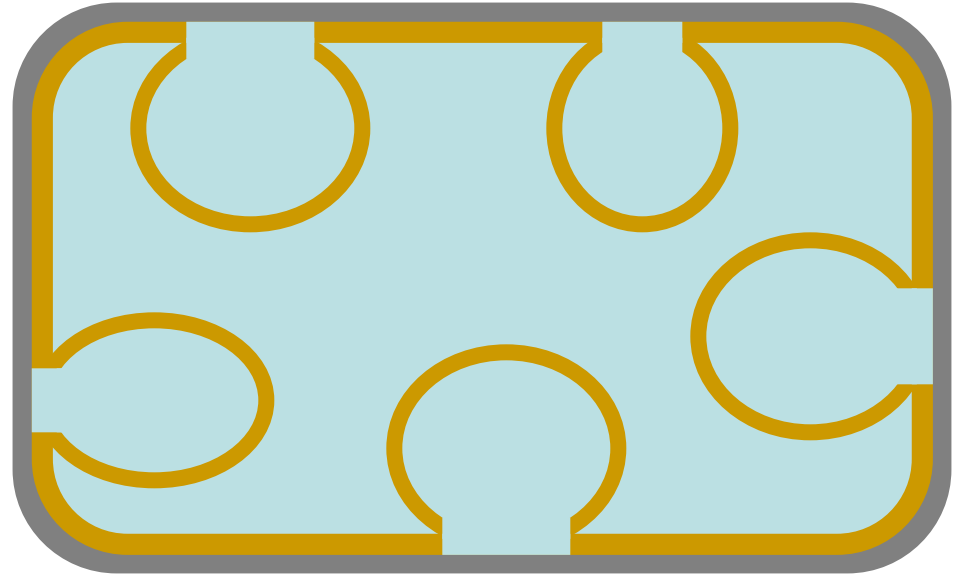
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GLYCOLYSIS

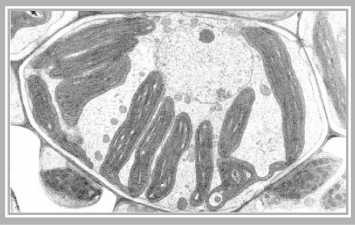
GLUCOSE

CYTOSOL

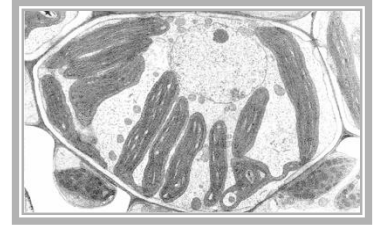
CELL



 = CHEMICAL ENERGY



AEROBIC RESPIRATION



P

GLYCOLYSIS

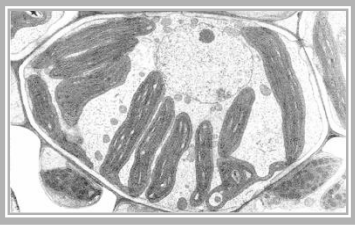
GLUCOSE

SPLIT

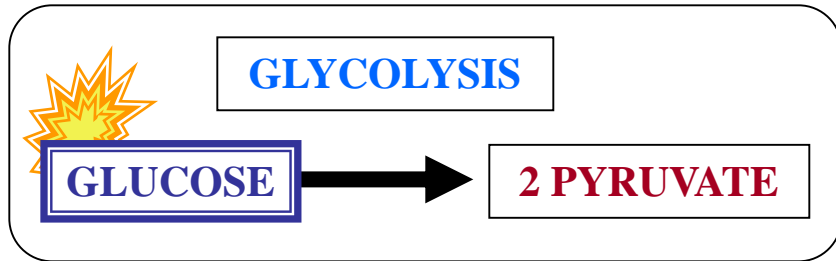
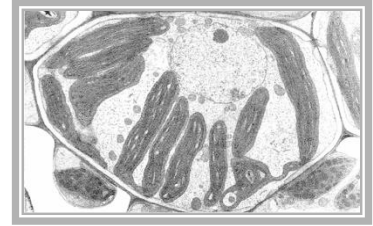
CYTOSOL

CELL

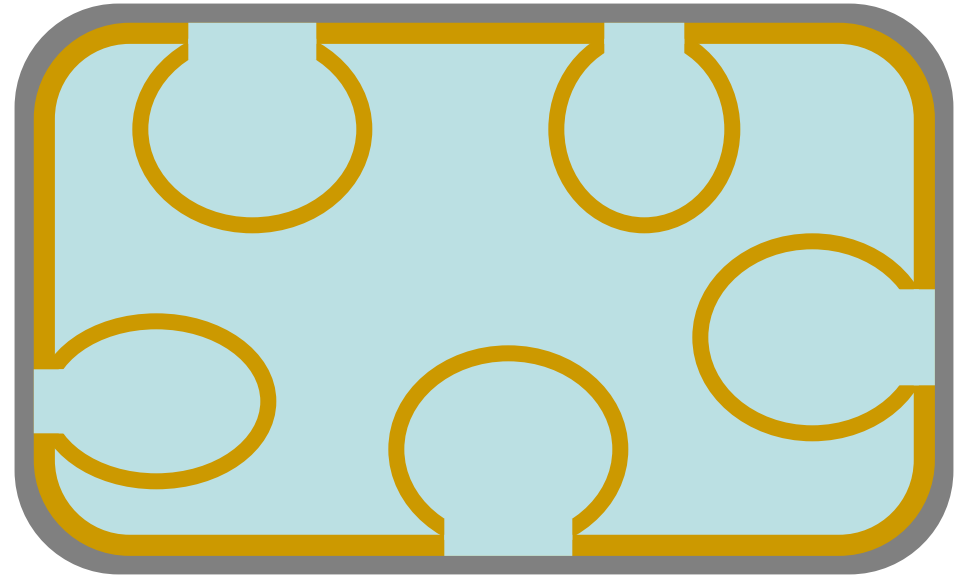
 = CHEMICAL ENERGY



AEROBIC RESPIRATION



CYTOSOL



CELL

 = **CHEMICAL ENERGY**

GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

+

 = CHEM ENERGY

GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

HEXOKINASE

ATP
EXPENDED

EGY

ADP

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

ATP
EXPENDED

EGY

ADP

FRUCTOSE-1-6-BISPHOSPHATE

RED = ENZYME

 = CHEM ENERGY

+

FRUCTOSE-1-6-BISPHOSPHATE

ALDOLASE
ISOMERASE

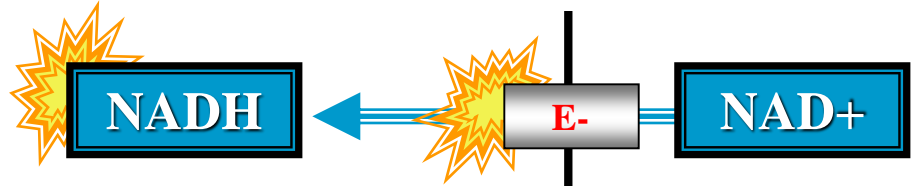
 = CHEM ENERGY

PHOSPHOGLYCERALDEHYDE - PGAL

PHOSPHOGLYCERALDEHYDE - PGAL

TRI-PHOSPHATE DEHYDROGENASE

TRI-PHOSPHATE DEHYDROGENASE



1-3-BISPHOSPHOGLYCERATE

1-3-BISPHOSPHOGLYCERATE

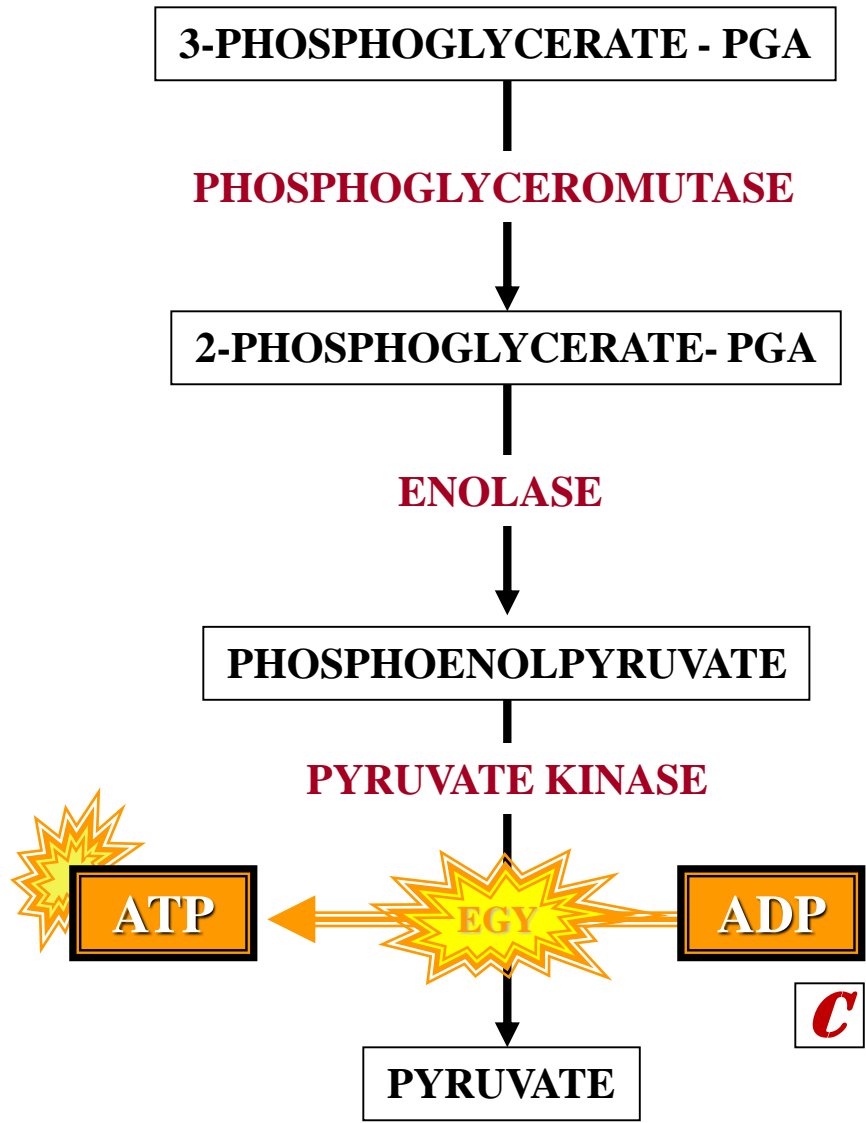
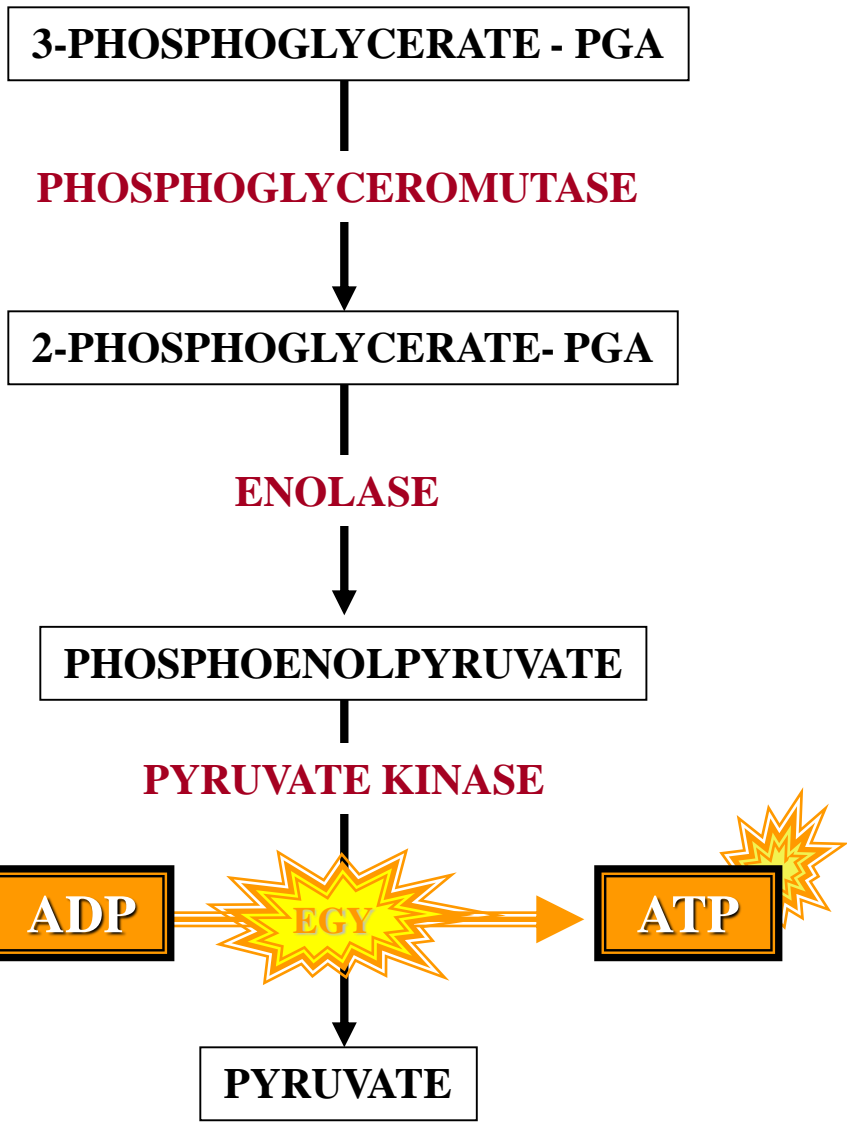
PHOSPHOGLYCEROKINASE

PHOSPHOGLYCEROKINASE



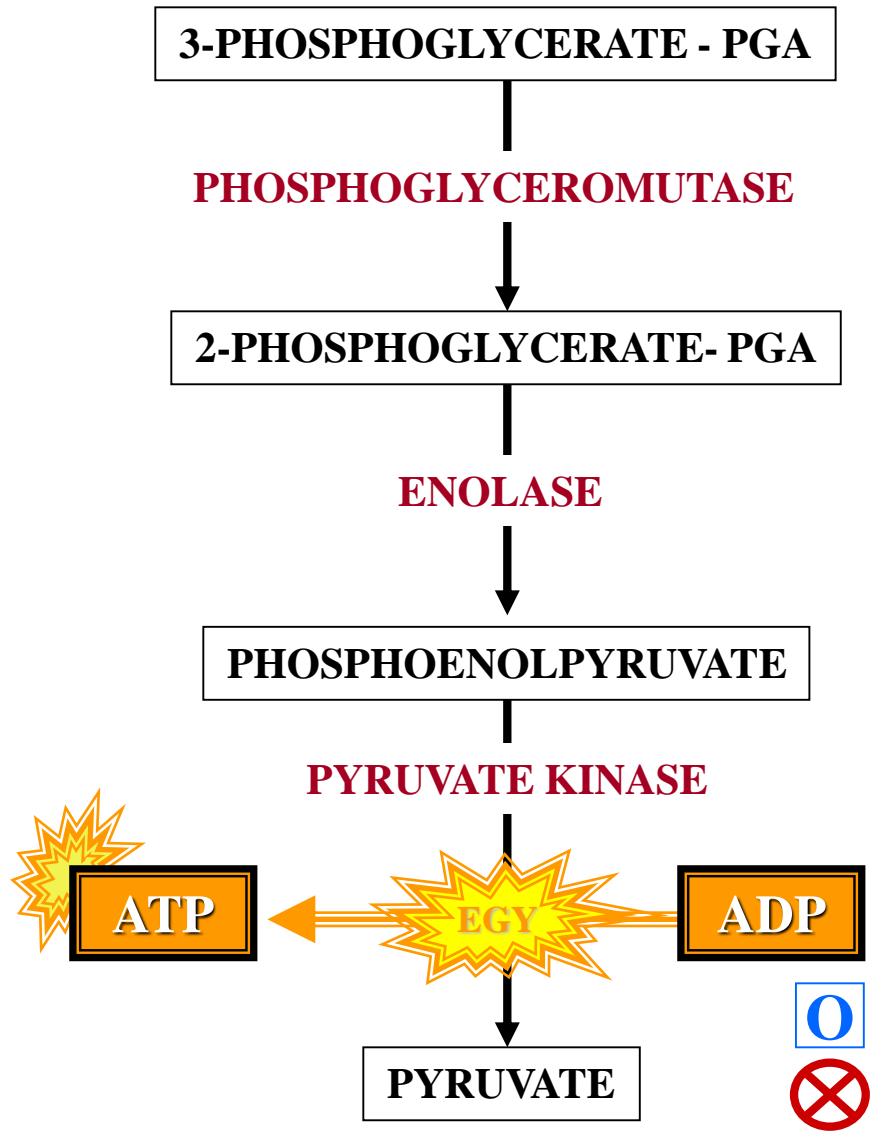
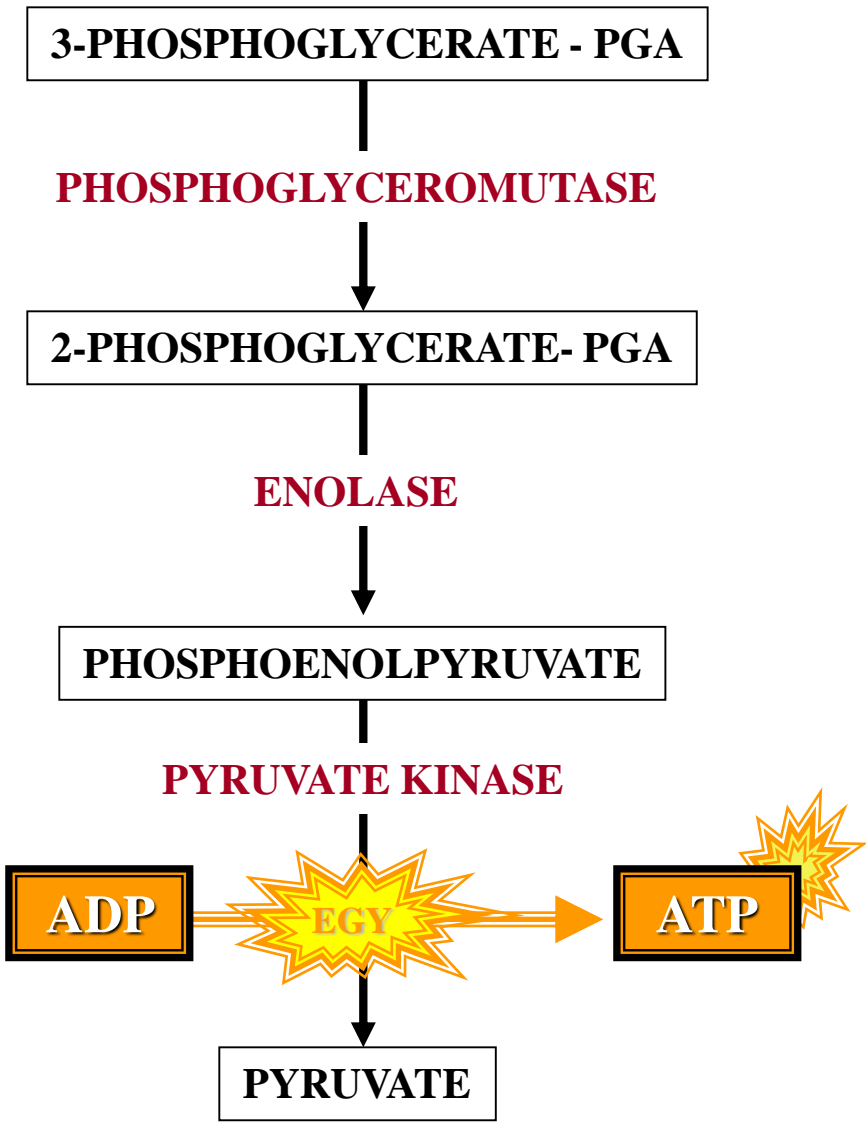
3-PHOSPHOGLYCERATE - PGA

3-PHOSPHOGLYCERATE - PGA

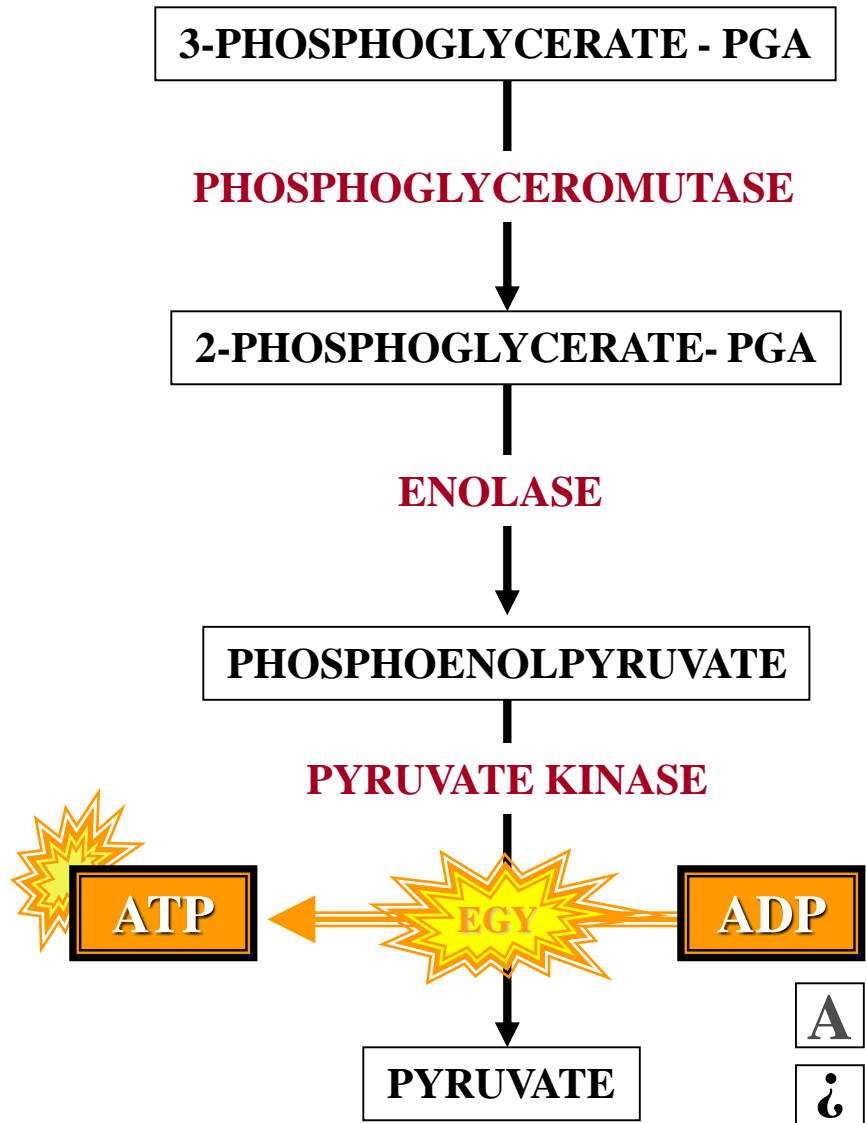
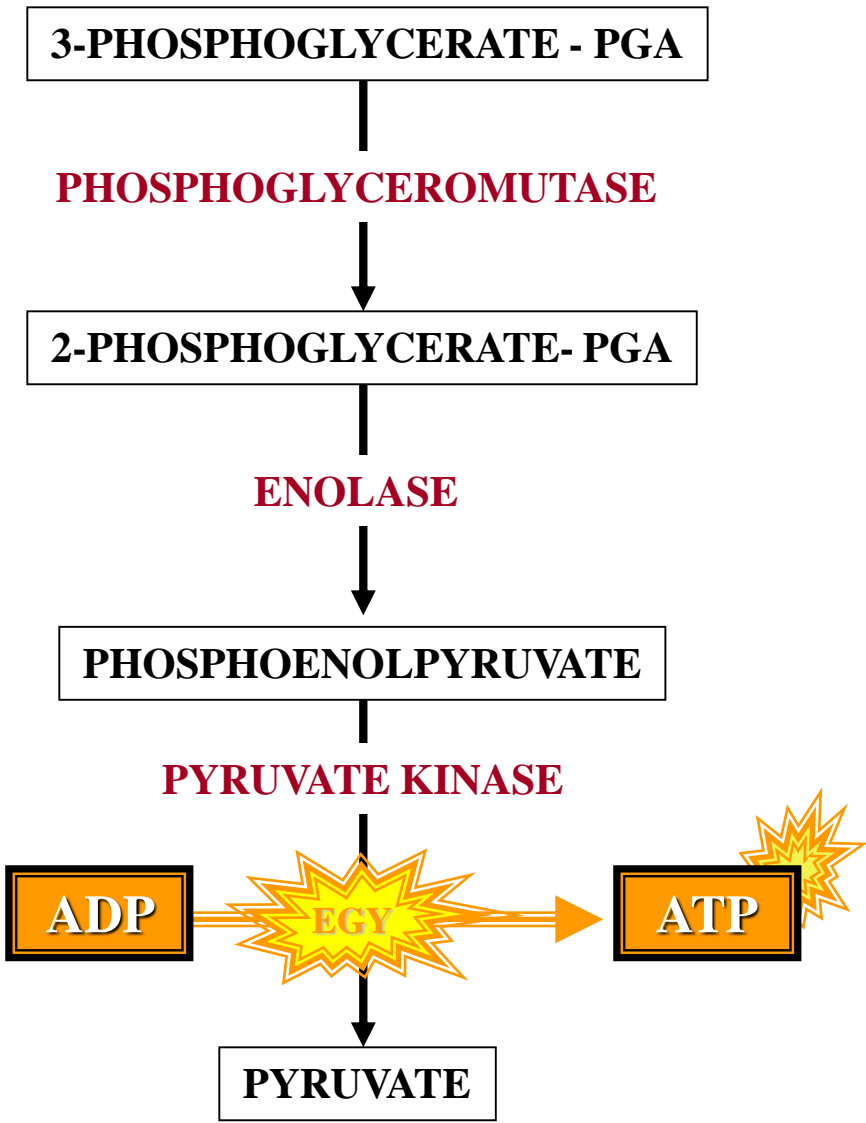


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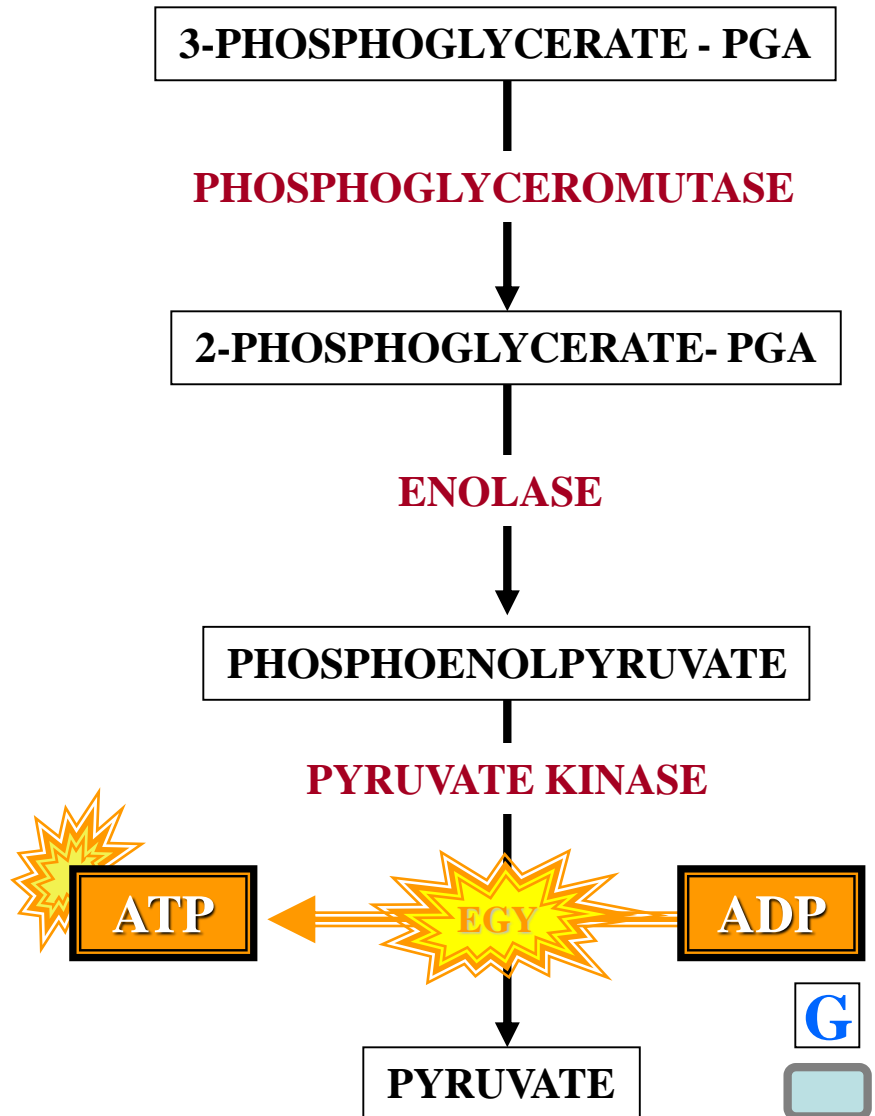
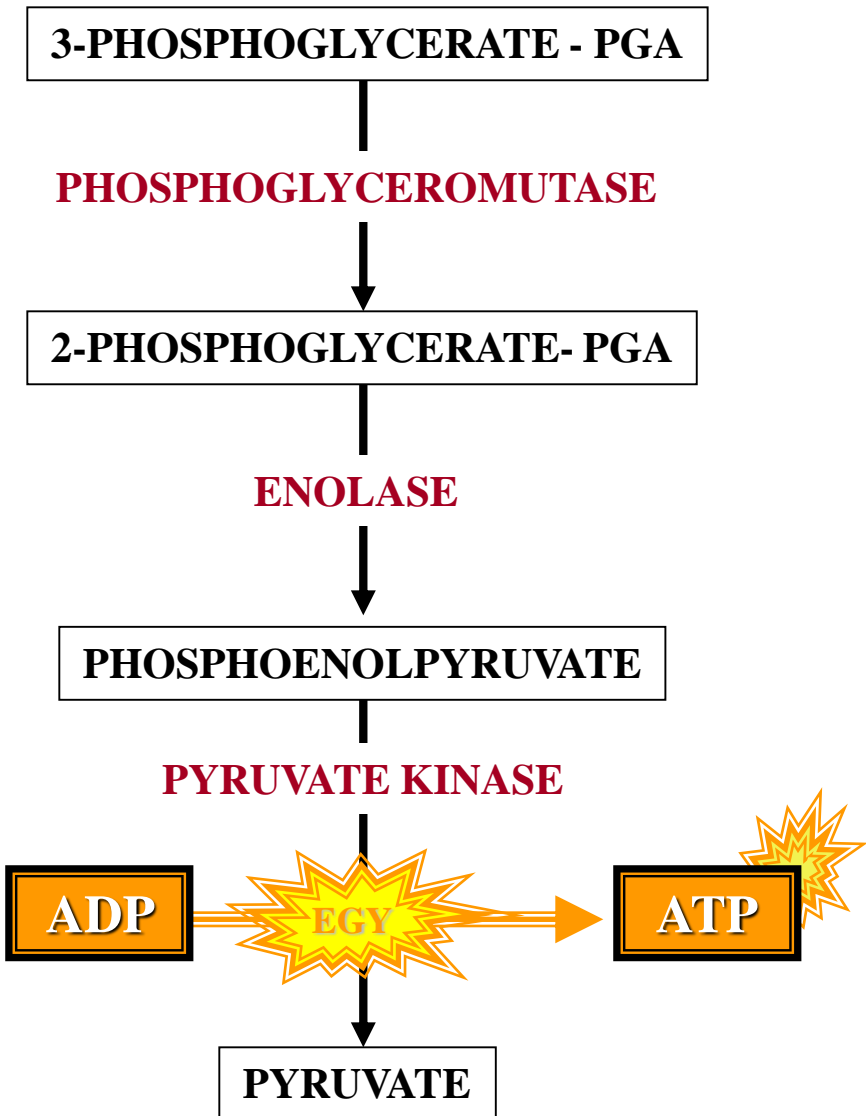
 = CHEM ENERGY



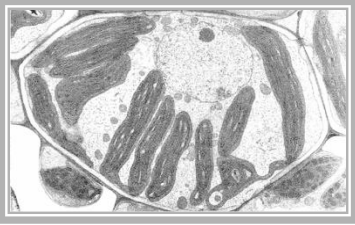
!!!COMPLEX SERIES ENZYMATIC RXTS!!!



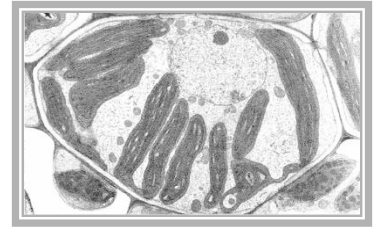
!!!GLYCOLYSIS: DOES NOT REQUIRE O2!!!



!!!GLYCOLYSIS: ANAEROBIC PATHWAY!!!



AEROBIC RESPIRATION



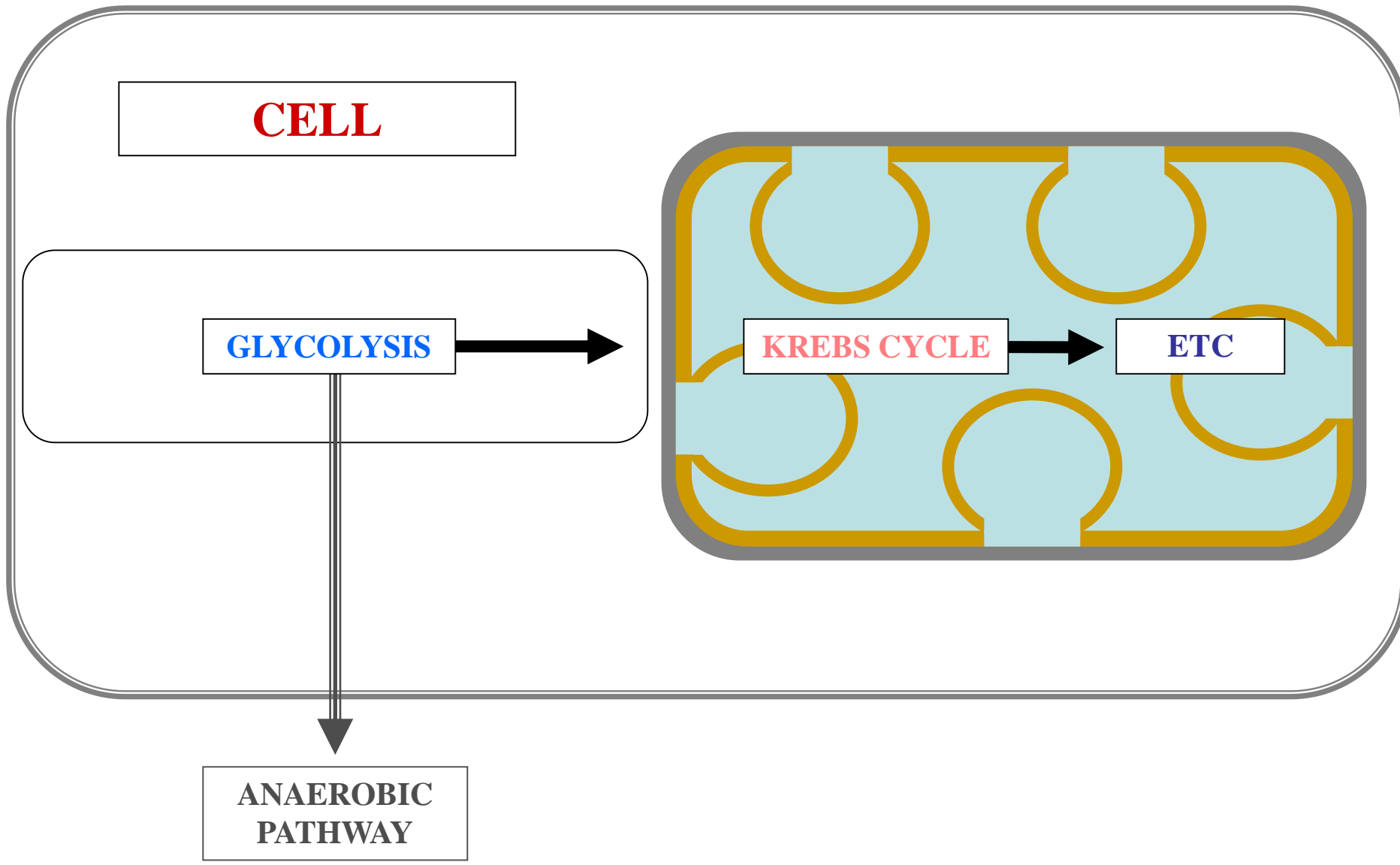
CELL

GLYCOLYSIS

KREBS CYCLE

ETC

**ANAEROBIC
PATHWAY**



GLYCOLYSIS

ACRONYMS

GLYCOLYSIS ACRONYMS

@ = DESTINATION

GLYCOLYSIS ACRONYMS

GLYCOLYSIS ACRONYMS

@ = DESTINATION

CSCR = COMPLEX SERIES CHEM-RXTS

GLYCOLYSIS ACRONYMS

GLYCOLYSIS ACRONYMS

@ = DESTINATION

CSCR = COMPLEX SERIES CHEM-RXTS

PGAL = PHOSPHOGLYCERALDEHYDE

GLYCOLYSIS ACRONYMS

GLYCOLYSIS ACRONYMS

@ = DESTINATION

CSCR = COMPLEX SERIES CHEM-RXTS

PGAL = PHOSPHOGLYCERALDEHYDE

PGA = PHOSPHOGLYCERATE

GLYCOLYSIS ACRONYMS

NADH

NADH



**NICOTINAMIDE ADENINE
DINUCLEOTIDE**

NADH

NADH



**NICOTINAMIDE ADENINE
DINUCLEOTIDE**

ENERGY MOLECULE

NADH

NADH



**NICOTINAMIDE ADENINE
DINUCLEOTIDE**

ENERGY MOLECULE

ETC E- DONOR

NADH



GLYCOLYSIS SPECIFICS

GLYCOLYSIS

?

GLYCOLYSIS

G

GLYCOLYSIS

GLUCOSE

GLYCOLYSIS



+

 = CHEM ENERGY

GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

HEXOKINASE

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

FRUCTOSE-1-6-BISPHOSPHATE

RED = ENZYME

 = **CHEM ENERGY**



GLYCOLYSIS

GLUCOSE

GLYCOLYSIS

HEXOKINASE

REMEBER !

ATP
EXPENDED

EGY

ADP

2

P

+

GLUCOSE-6-PHOSPHATE

PHOSPHOGLUCOISOMERASE

RED = ENZYME

FRUCTOSE-6-PHOSPHATE

PHOSPHOFRUCTOKINASE

REMEBER !

ATP
EXPENDED

EGY

ADP

FRUCTOSE-1-6-BISPHOSPHATE

 = CHEM ENERGY

FRUCTOSE-1-6-BISPHOSPHATE

**ALDOLASE
ISOMERASE**

PHOSPHOGLYCERALDEHYDE - PGAL

PHOSPHOGLYCERALDEHYDE - PGAL



FRUCTOSE-1-6-BISPHOSPHATE

**ALDOLASE
ISOMERASE**



PHOSPHOGLYCERALDEHYDE - PGAL

TRI-PHOSPHATE DEHYDROGENASE

1-3-BISPHOSPHOGLYCERATE

PHOSPHOGLYCEROKINASE

3-PHOSPHOGLYCERATE - PGA

PHOSPHOGLYCERALDEHYDE - PGAL

TRI-PHOSPHATE DEHYDROGENASE

1-3-BISPHOSPHOGLYCERATE

PHOSPHOGLYCEROKINASE

3-PHOSPHOGLYCERATE - PGA

FRUCTOSE-1-6-BISPHOSPHATE

ALDOLASE
ISOMERASE

 = CHEM ENERGY

PHOSPHOGLYCERALDEHYDE - PGAL

PHOSPHOGLYCERALDEHYDE - PGAL

TRI-PHOSPHATE DEHYDROGENASE

TRI-PHOSPHATE DEHYDROGENASE



1-3-BISPHOSPHOGLYCERATE

1-3-BISPHOSPHOGLYCERATE

PHOSPHOGLYCEROKINASE

PHOSPHOGLYCEROKINASE

3-PHOSPHOGLYCERATE - PGA

3-PHOSPHOGLYCERATE - PGA

FRUCTOSE-1-6-BISPHOSPHATE

ALDOLASE
ISOMERASE

 = CHEM ENERGY

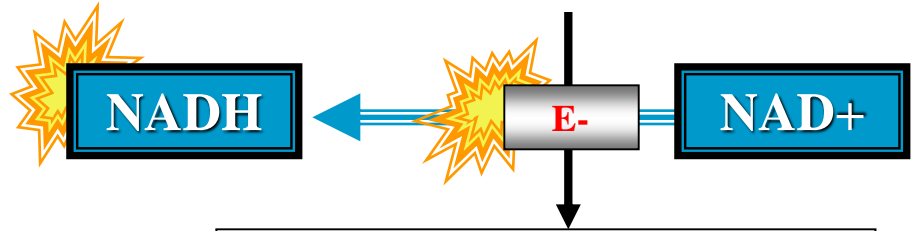
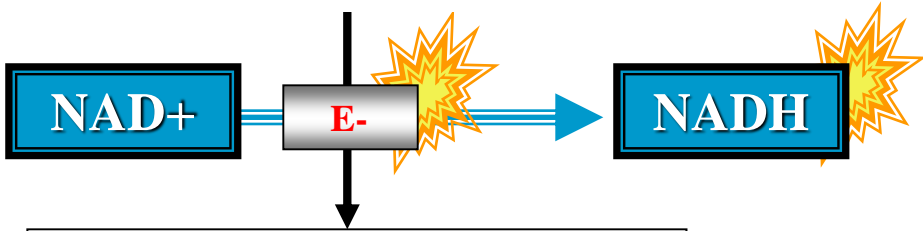
←
→
2
P

PHOSPHOGLYCERALDEHYDE - PGAL

PHOSPHOGLYCERALDEHYDE - PGAL

TRI-PHOSPHATE DEHYDROGENASE

TRI-PHOSPHATE DEHYDROGENASE

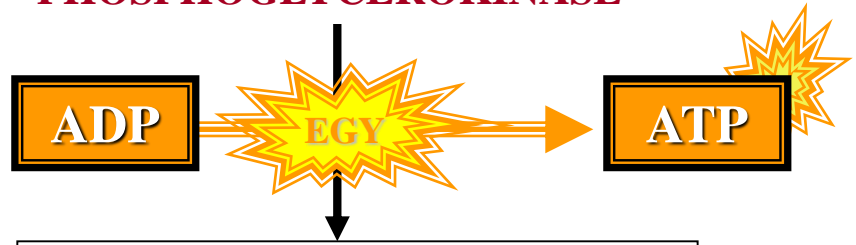


1-3-BISPHOSPHOGLYCERATE

1-3-BISPHOSPHOGLYCERATE

PHOSPHOGLYCEROKINASE

PHOSPHOGLYCEROKINASE



3-PHOSPHOGLYCERATE - PGA

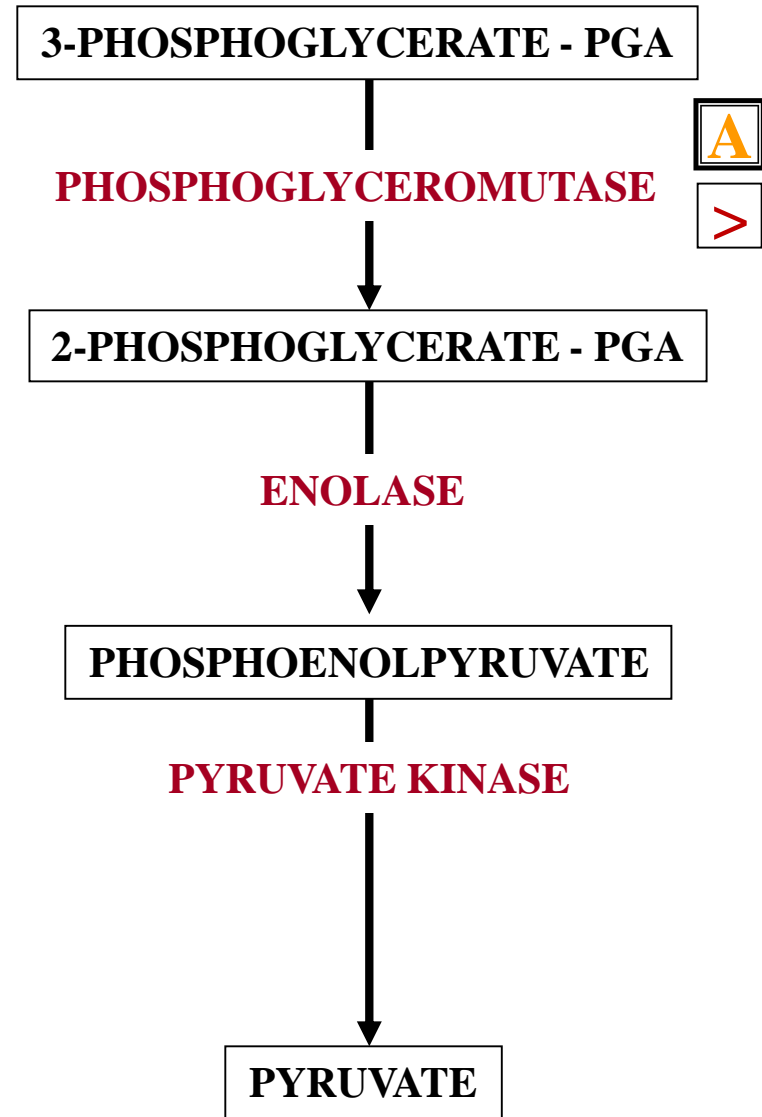
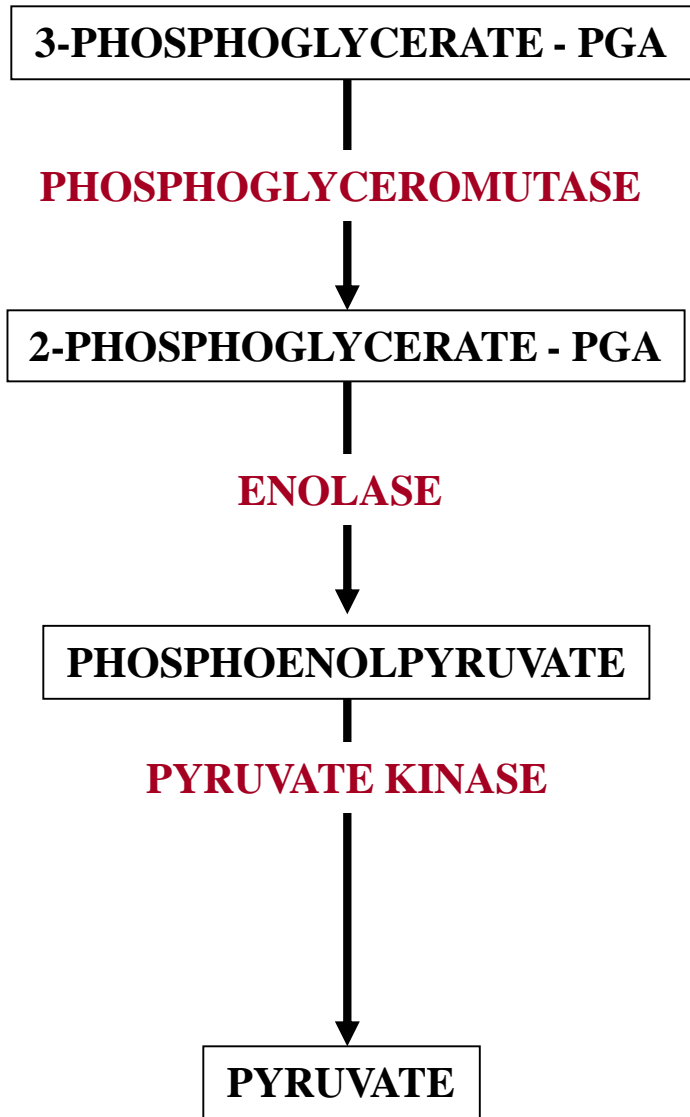
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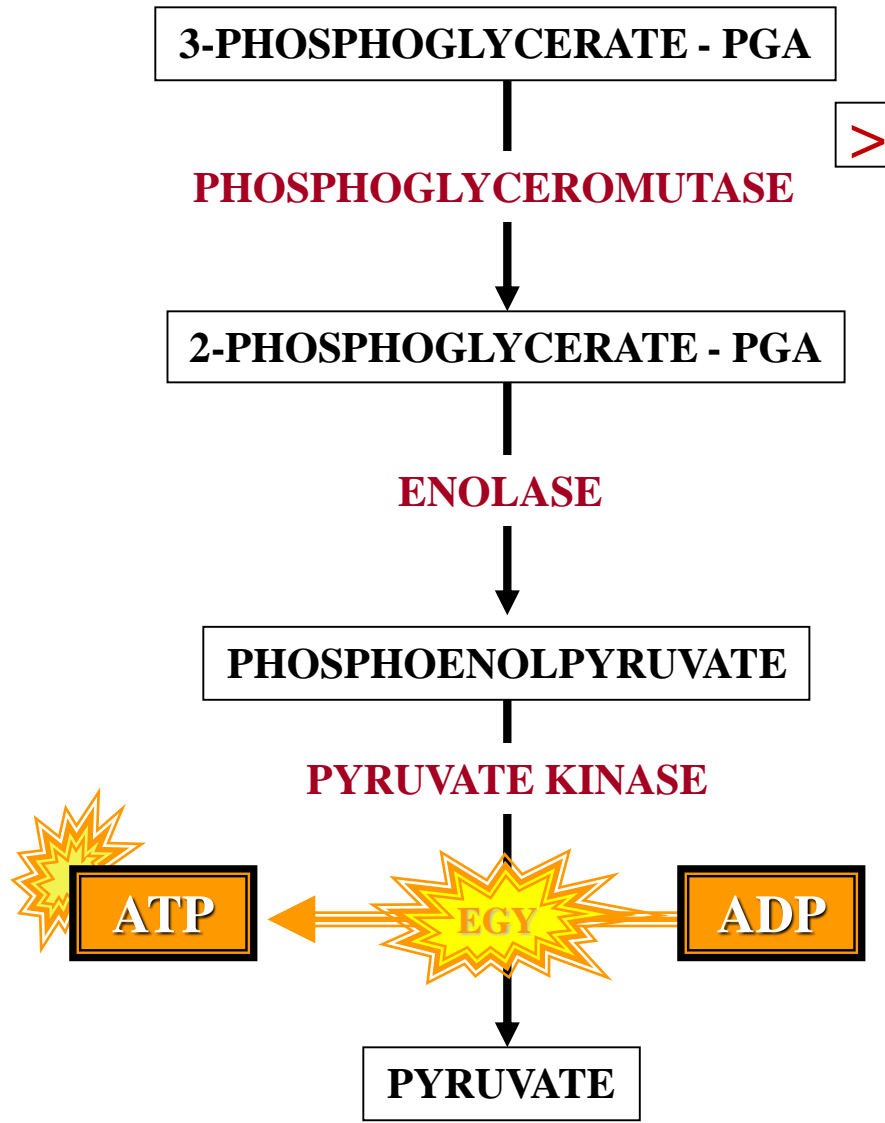
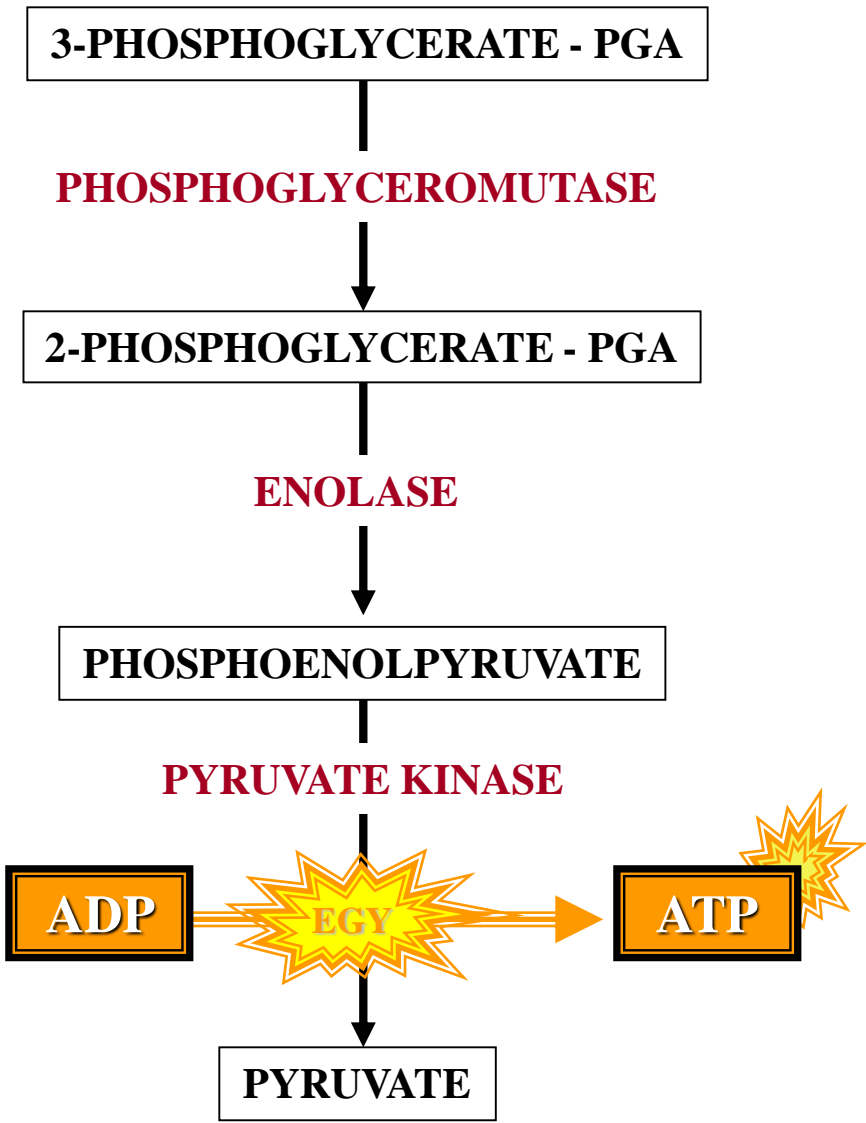
3-PHOSPHOGLYCERATE - PGA

3-PHOSPHOGLYCERATE - PGA

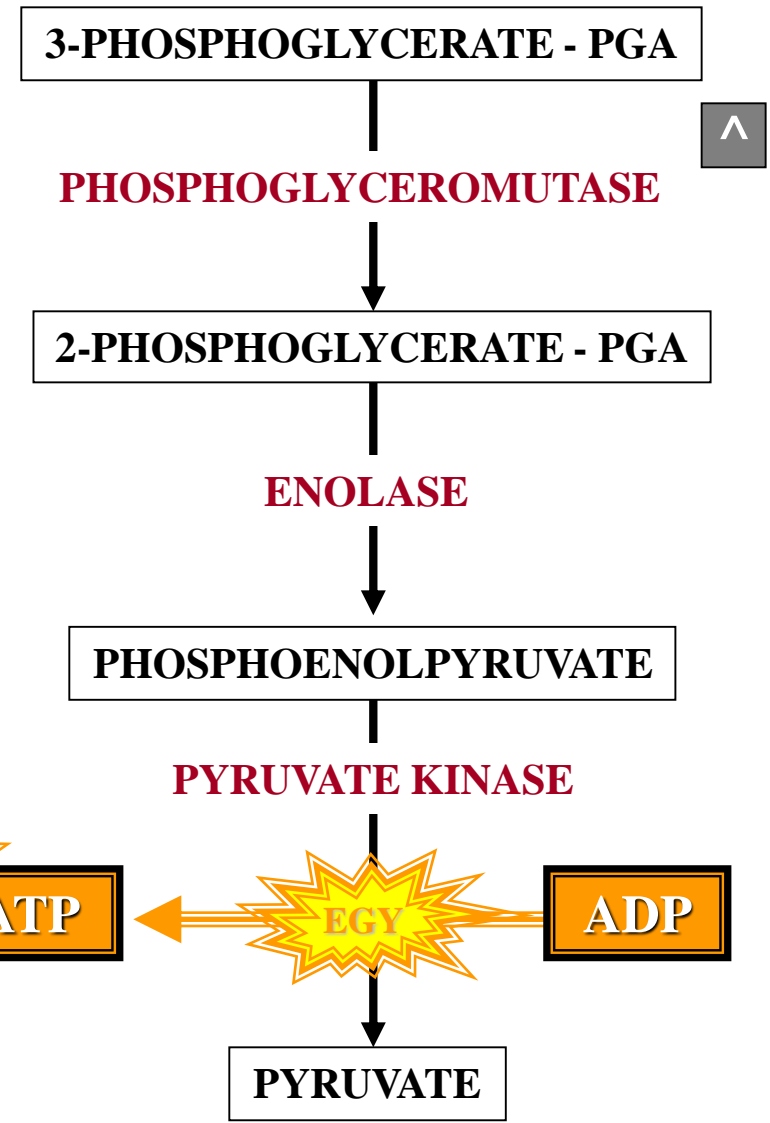
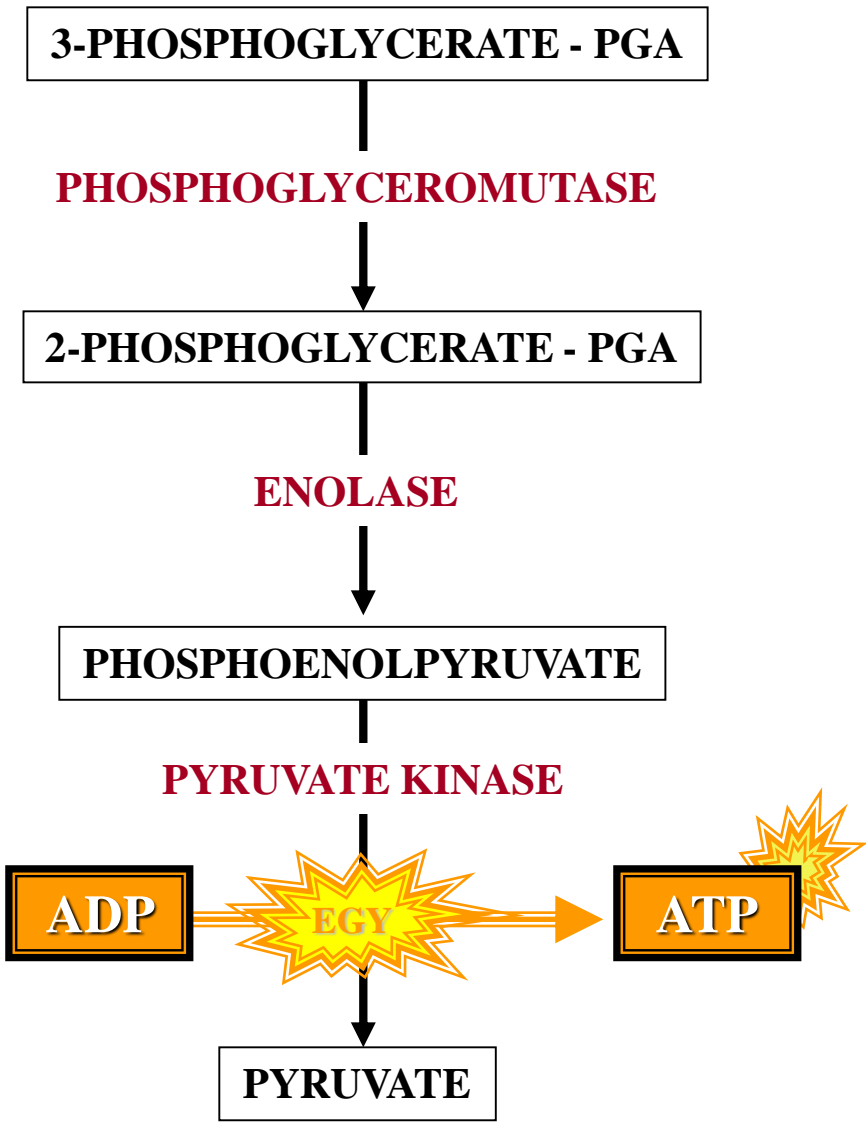


 = **CHEM ENERGY**





!!!GLYCOLYSIS: SUGAR SPLITTING!!!



!!!GLYCOLYSIS: DO NOT MEMORIZE!!!

GLYCOLYSIS OUTCOME

GLYCOLYSIS

OUTCOME

OUTCOME / GLUCOSE:

PYRUVATE:

NADH:

ATP:



PYRUVATE



? PYRUVATE / GLUCOSE