Glycolysis

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Why does the glycolytic pathway continue in the direction of glucose catabolism?

A. There are essentially three irreversible reactions that act as the driving force for the pathway

B. High levels of ATP keep the pathway going in a forward direction

C. The enzymes of glycolysis only function in one direction

D. Glycolysis occurs in either direction

Glycolytic pathway regulation involves

A. allosteric stimulation by ADP

B. allosteric inhibition by ATP

C. feedback, or product, inhibition by ATP

D. all of the above

During catabolism, only about 40% of the energy available from oxidizing glucose is used to synthesize ATP. Remaining 60%

A. is lost as heat

B. is used to reduce NADP

C. remains in the products of metabolism

D. is stored as fat.

9. The product formed in the first substrate level phosphorylation in glycolysis is

_____

a) Pyruvate

b) 3-phosphoglycerate

c) 1, 3-bisphosphoglycerate

d) 2-phosphoglycerate

3. Whenever the cell's ATP supply is depleted, which of the following enzyme's activity is increased?

a) Hexokinase

b) Pyruvate kinase

c) Glucokinase

d) Phosphofructokinase-1

The released energy obtained by oxidation of glucose is stored as

A. a concentration gradient across a membrane

B. ADP

C. ATP

D. NAD^+

4. Phosphofructokinase, the major flux-controlling enzyme of glycolysis is allosterically inhibited by ___ and activated by ___.

- a) AMP P_i
- b) ADP AMP
- c) citrate ATP
- d) ATP PEP
- e) ATP ADP

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5. The regulation of the glycolytic pathway involves

- a) feedback inhibition by ATP.
- b) allosteric inhibition by ATP.
- c) allosteric stimulation by ADP.
- d) All three are correct.
- e) Only a and b are correct.

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6. Enolase catalyzes

- a) the oxidation of an alkene to an alcohol.
- b) the reduction of an alkene to an alcohol.
- c) the conversion of an alkene to an alcohol.
- d) the conversion of an aldose to a ketose.
- e) none of the above.

7. The major energy generating step during glycolysis is

- a) hexokinase.
- b) phosphofructokinase.
- c) glyceraldehyde-3-P dehydrogenase. → NADH = 2.5 ATP
- d) phosphoglycerate kinase.
- e) pyruvate kinase.

8. If the concentration of the reactants is higher than the equilibrium concentration, then:

- a) More reactants will form.
- b) The Gibbs free energy will be negative.
- c) More product will form.
- d) The Gibbs free energy will be positive.
- e) Both b and c are correct.

Which of the following activates glycolysis?

- a. Glucose-6-phosphate
- b. Fructose-2,6-biphosphate
- c. ATP
- d. Acetyl-CoenzymeA
- e. GTP

The body requires backup stores of reduced carbon. We have two forms, lipids and starch or glycogen. Our immediate source of reduced carbon is glucose, which we access by several pathways such as glycolysis. We normally have about 90 mg of glucose per deciliter of blood but need to have an immediate backup source of glucose. Which of these is the source?

- a. Fats
- b. Proteins
- c. Vitamins
- d. ATP
- e. Glycogen

10. If a person were exercising vigorously and unable to take in sufficient oxygen, his or her tissues would probably accumulate excess amounts of:

- a. Glucose
- b. Fructose-6-phosphate
- c. Pyruvic acid
- d. Citric acid
- e. Lactic acid

As molecules move through metabolism, some are oxidized through glycolysis and several other pathways, but a few may be taken out of the pathways to form special molecules needed for synthesis of other metabolites. To synthesize triglycerides (triacylglycerols, or TAGs, which are esters of fatty acids and the polyhydroxy alcohol glycerol), animals obviously must have a supply of glycerol. Which intermediate in glycolysis would be the best candidate for a starting material for glycerol formation?

- a. Glucose
- b. Pyruvic acid
- c. Fructose-1,6-biphosphate
- d. 3-Phosphoglyceric acid
- e. Glyceraldehyde-3-phosphate

Which of the following decreases the rate of glycolysis in a tissue?

- a. Glucose
- b. Citric acid
- c. Fructose-2,6-biphosphate
- d. Fructose-1,6-biphosphate
- e. Phosphoenolpyruvate

The end product of glycolysis under anaerobic conditions is:

- a. Fructose-6-phosphate
- b. Pyruvic acid
- c. Oxaloacetic acid
- d. Lactic acid
- e. Citric acid

It seems that, if we can convert glucose to pyruvic acid and to other metabolites, we should be able to simply reverse glycolysis and form new glucose from pyruvic acid. What prevents this?

- a. Carbon dioxide is lost in conversion of glucose to pyruvic acid, and we have no mechanism for replacement of the carbon dioxide
- b. There is too much demand for pyruvic acid, and it is rapidly consumed for other purposes
- c. The free energy changes for some of the reactions that lead from glucose to pyruvate are too large and negative for easy reversal
- d. The entropy changes favor formation of fewer, large molecules
- e. The free energy change for some of the reactions that lead from glucose to pyruvic acid are too large and positive for easy reversal

The first step in glycolysis is phosphorylation of glucose to form glucose-6-phosphate. This action serves to:

- a. Oxidize glucose
- b. Reduce glucose
- c. Make glucose less polar so that it can diffuse through cell membranes
- d. Make glucose more polar, locking it within the cell
- e. Cause glucose to polymerize, forming glycogen

Ques. Which is not true for glycolysis?

(a) End product is CO_2, H_2O

(b) Substiate level phosphorylation

(c) Production of ATP

(d) Expenditure of ATP

Ques. What is the other name of glycolysis?

(a) EMP pathway → bacteriology

(b) TCA pathway

(c) HMS pathway

(d) None of the above

Ques. The end product of glycolysis is

(a) Acetyl Co–A

(b) Citric acid

(c) Pyruvic acid

(d) Fumaric acid

Ques. Number of CO_2 molecules evolved in glycolysis is

(a) 2

(b) 1

(c) 3

(d) 0

Q. Glucose enters cells and is committed to glycolysis with the addition of:

answer choices

- PFK Enzymes
- $-PO_4$ from ADP
- $-PO_4$ from ATP
- Electrons from ATP

Ques. The intermediate of glycolysis which undergoes lysis or splitting is

(a) Dihydroxyacetone 3-phosphate

(b) Fructose 1,6-diphosphate

(c) Glyceraldehyde 3-phosphate

(d) Glucose 6-phosphate

Q. If Fructose-1,6-BisPhosphate is put through glycolysis the net result would be:

answer choices

- 2 ATP
- 4 ATP
- 4 NADH
- 2 $FADH_2$

Q. Which enzyme adds a phosphate to F-6-P?

answer choices

- PhosphoFructoKinase
- Hexokinase
- Aldolase
- Pyruvate Kinase

Q. In the final step of glycolysis ATP is made through the process of:

answer choices

- Substrate Level Phosphorylation
- Oxidative Phosphorylation
- Photo-Phosphorylation
- RedOx Reactions

Q. NADH is produced by the oxidation of:

answer choices

- G3P
- DHAP
- PEP
- 1,3 BPG

2. Glycolysis, the proccess of creating new ATP requires what?

A. A six-carbon sugar

B. Two three carbon sugars

C. NADH

D. Oxygen

3. What is the overall end product of the proccess of glycolysis?

A. Two extra ATP

B. Oxygen

C. Two extra PGAL molecules

D. Extra ADP

4. From where is the energy required for glycolysis derived?

A. From the ATP molecules

B. From the breaking apart of glucose

C. From the making carbon-carbon bonds.

D. From proccess of converting ATP to ADP

Which of the following enzymes is the enzyme used to catalyse stage 10 of glycolysis? (1 mark)

- Hexokinase
- Pyruvate Kinase
- Lactate Dehydrogenase
- Phosphofructokinase

Q. Which molecule is an isomer of Glyceraldehyde-3-Phosphate (G3P)?

answer choices

- DHAP
- PEP
- Pyruvic Acid
- 1,3 BPG

The high concentration of glucose 6-phosphate inhibits

- A. Hexokinase
- B. Kinase
- C. Pentokinase
- D. Glucokinase