GLYCOLYSIS

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Glycolysis = breakdown of sugars; glycogen, glucose, fructose

Where in body?

Where in cell?

What are the inputs?

What are the outcomes?

Oxygen required?

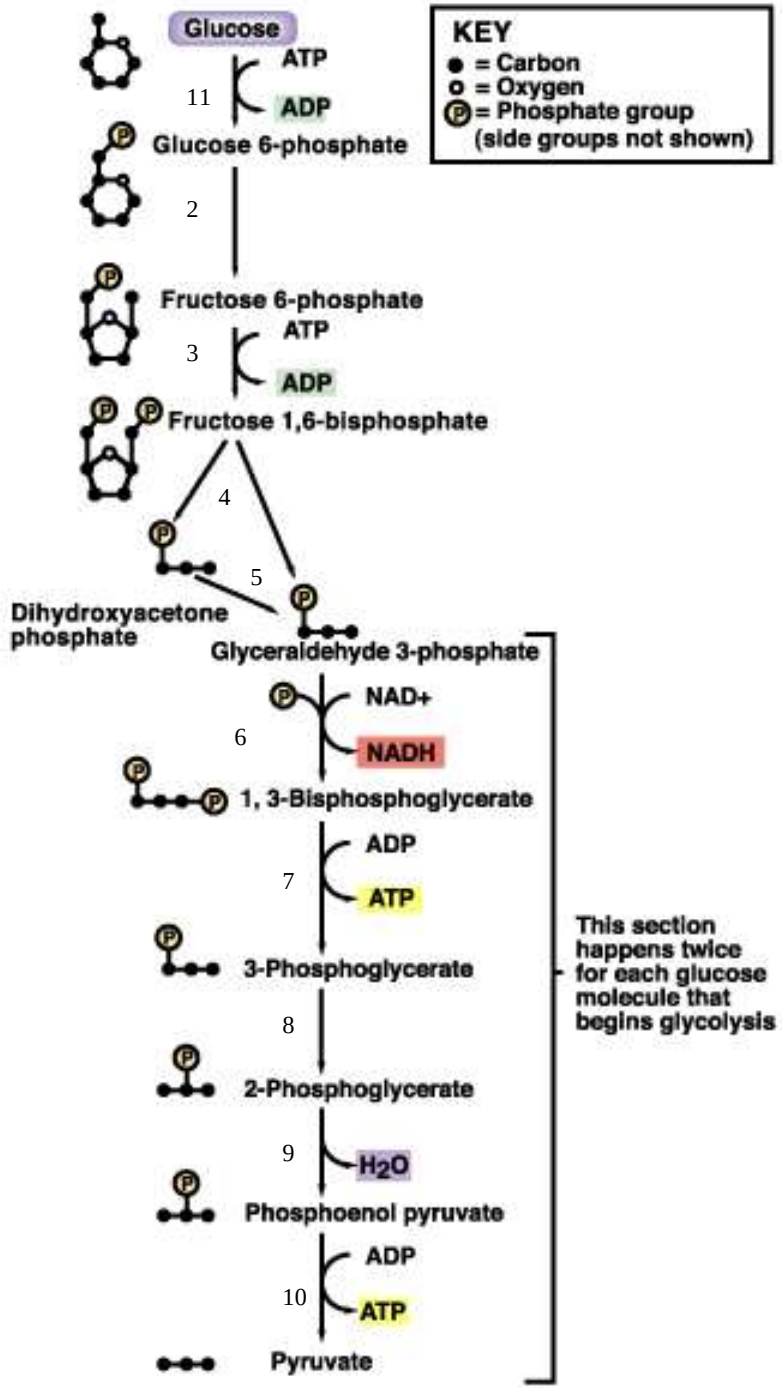
endergonic rxns

exergonic rxns

coupled reactions

oxidation/reduction rxns

transfer reactions



When do we use glycolysis?

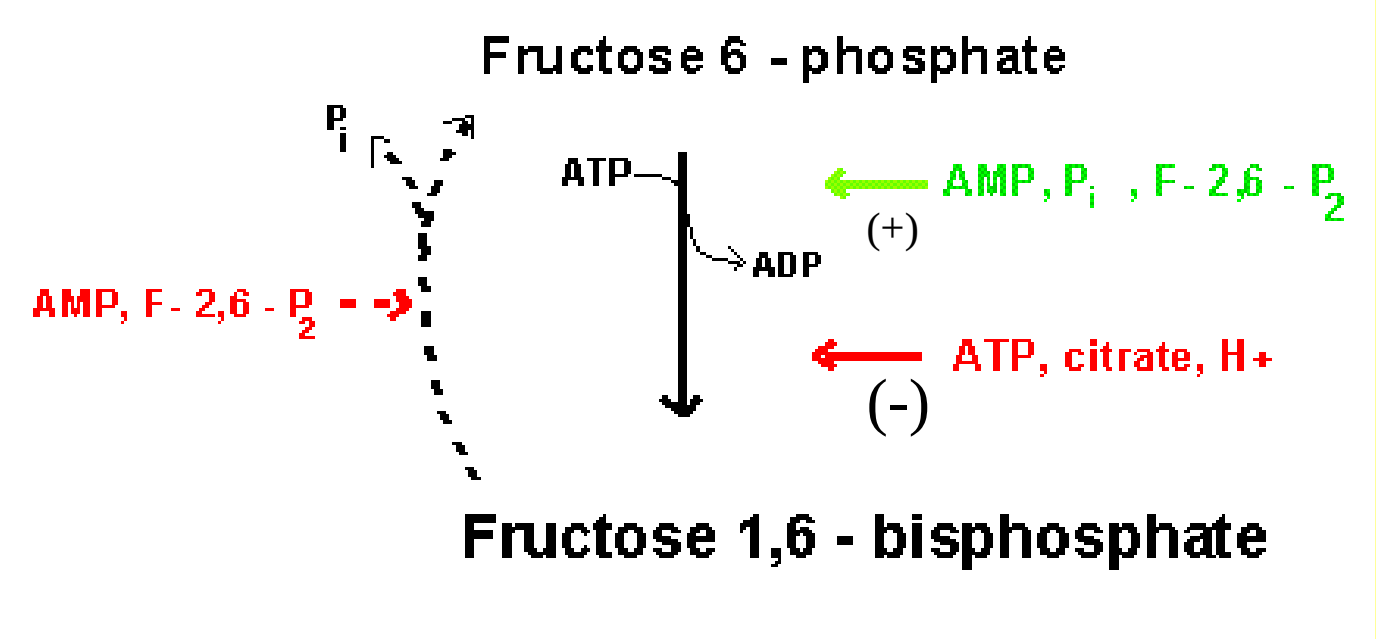
What are the advantages of using glycolysis for energy supply?

What are the disadvantages?

How is glycolysis regulated?

Hexokinase inhibited by glucose –6-phosphate; also there are several isoforms; lowest Km in liver

Phosphofructokinase (PFK)



Pyruvate kinase inhibited by ATP and acetylCoA; activated by fructose 1,6 bisphosphate

Where do the intermediates in glycolysis go?

- G-6-P goes off to make the ribose for nucleotides
- F-6-P -amino sugars-glycolipids and glycoproteins
- G-3-P/DHAP-lipids
- 3PG-serine
- PEP-aromatic amino acids, pyrimidines, asp and asn
- Pyruvate-alanine

This pathway not only important in glucose metabolism--generates intermediates for other important building blocks

G-6-P = glucose 6 phosphate, F-6-P = fructose 6 phosphate, G-3-P = glyceraldehyde 3 phosphate, DHAP = dihydryoxacetonephosphate, 3PG = phosphoglyceraldehyde, Pyr = pyruvate

What are the possible fates of pyruvate?

- Ethanol (fermentation)
- Acetyl coA (mammals and others)
  - TCA/Krebs cycle
- Oxaloacetate - gluconeogenesis
- Lactate (mammals and others)
  - End product of anaerobic glycolysis
  - Gluconeogenesis in liver via the Cori cycle

Energy Balance Sheet for the Oxydation of Glucose via Glycolysis

Gains:

4 ATP

2 pyruvate

2 NADH + H+

Mitochondria for further oxidation via the TCA/Krebs cycle

Net Gain:

+ 2 ATP

Losses:

2ATP

Glucose

Phosphate

NAD+ (recycled)

Thank You