

## ***Fermentation & Respiration***

### **A Computer Program**

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#### **MENUS**

- **GLYCOLYSIS** (a form of anaerobic fermentation) & **ALCOHOLIC FERMENTATION** (begins with the same reactions as glycolysis)
    - Hexokinase or Glucokinase Reaction
    - Glucose Phosphate Isomerase Reaction
    - 6-Phosphofruktokinase Reaction
    - Fructose Diphosphate Aldolase Reaction
    - Triosephosphate Isomerase Reaction
    - Glyceraldehydephosphate Dehydrogenase Reaction
    - Phosphoglycerate Kinase Reaction
    - Phosphoglyceromutase Reaction
    - Enolase Reaction
    - Pyruvate Kinase Reaction
    - Selection of Next Reaction(s)
      - Final Reaction in Glycolysis
        - Lactate Dehydrogenase Reaction
      - Next Reactions in Alcoholic Fermentation
        - Pyruvate Decarboxylase Reaction
        - Alcohol Dehydrogenase Reaction
      - Preparatory Reaction for the TCA Cycle
        - Pyruvate Dehydrogenase
- **Complex Reaction**
  - **THE TRICARBOXYLIC ACID [TCA] CYCLE** (with inputs from glycolysis)
    - Citrate Synthase Reaction
    - Aconitase Reaction (in two steps, with enzyme-bound intermediate)
    - Isocitrate Dehydrogenase Reaction (in two steps, with enzyme-bound intermediate)
    - Alpha-Ketoglutarate Dehydrogenase Complex Reaction
      - Succinyl-CoA Synthetase Reaction (with Nucleoside Diphosphate Kinase side-reaction)
      - Succinate Dehydrogenase Reaction
      - Fumarase Reaction
      - Malate Dehydrogenase Reaction
    - Selection of Next Reaction(s)
      - Citrate Synthase Reaction (Another Repetition of the TCA Cycle)
      - First Reaction in Respiratory-Chain Phosphorylation
  - **RESPIRATORY-CHAIN PHOSPHORYLATION** (with inputs from glycolysis and TCA Cycle): Coupled to Mitochondrial Electron Transport
    - Net Reactants
      - 1 Glucose

- 6 Oxygen (gas)
- 36 ADP
- 36 Phosphate
- Net Products
  - 6 Carbon Dioxide
  - 42 Water
  - 36 ATP