Oxidative phosphorylation produces a large amount of ATP as compared to fermentation.

FERMENTATION: an anaerobic biological reaction process in which a reduced organic compound (like glucose) acts as an electron donor and another organic compound acts as an electron acceptor. 

Note: fermentation is extremely inefficient compared to aerobic respiration.

Why?

Cyanide affects virtually all body tissues, attaching itself to ubiquitous metalloenzymes and rendering them inactive.

Principle toxicity probably results from inactivation of cytochrome oxidase and thus oxidative phosphorylation.

Oxygen dependent tissues (highest rate of respiration?) -- brain, heart, liver -- are the most profoundly affected by acute cyanide poisoning.
(A) The reaction of $O_2$ with electrons in cytochrome oxidase
The iron atoms are linked to a heme residue (B)
Heme  Found in what other protein?

Inhibitors of Oxidative Phosphorylation:
Inhibit cytochrome c oxidase by binding to its heme group

cyanide  azide  carbon monoxide
lethal in small doses!

Control of Metabolic Processes in the Cell
(pg. 101-103 in textbook)
  • The cell has an elaborate interlocking system of feedback controls
    that coordinate the rates of glycolysis, fatty acid breakdown, the
    Krebs (citric acid cycle) and electron transport
  • As a result of many control mechanisms, the body oxidizes fats
    and sugars 5-10 times more rapidly during a period of strenuous
    exercise than during a period of rest
  • What strategies could the cell use to control enzyme activity?