**23. Biochemical Energy Production.**

**23.1 Metabolism.**

**23.2 Metabolism and Cell Structure.**

**23.3 Important Intermediate Compounds in Metabolic Pathways.**

**23.4 High-Energy Phosphate Compounds.**

**23.5 An Overview of Biochemical Energy Production.**

**23.6 The Citric Acid Cycle.**

**CHEMISTRY AT A GLANCE: Summary of the Reactions of the Citric Acid Cycle. The Electron Transport Chain.**

**CHEMISTRY AT A GLANCE: Summary of the Flow of Electrons**

**23.7 Through the Four Complexes of the Electron Transport Chain.**

**23.8 Oxidative Phosphorylation.**

**CHEMISTRY AT A GLANCE: Summary of the Common Metabolic Pathway.**

**23.9 ATP Production for the Common Metabolic Pathway.**

**23.10 The Importance of ATP.**

**23.11 Non-ETC Oxygen-Consuming Reactions.**

**CHEMICAL CONNECTIONS: Cyanide Poisoning; Brown Fat, Newborn Babies, and Hibernating Animals; Flavonoids: An Important Class of Dietary Antioxidants.**

**23.1 Metabolism.**

The energy consumed by various active animals is generated by numerous

sequences of biochemical reactions that occur within their bodies.

This chapter decribes the biochemical reactions that occur in a living organism during energy production using: carbohydrates, lipids, and proteins. Preceeding three chapters are focued on the biochemical reactions associated uniquely with 1) carbohydrate 2) lipid, and 3) protein, respectively.

Metabolism refers to all the biochemical reactions that break down of three food groups that take place with in a living organism. Human metabolism is quite remarkable. Metabloism requires enzymes, vitamins and water just as an automobile requires gasoline and cooling water to make it energize and move from one place to another. All our bodily activities sucn as breathing, exercise, or work require energy provided by metabolism . At more molecular level, even the simplest living cell is continually need energy for

the biochemical processes such as protein synthesis, DNA replication, RNA transcription, and transport materials across membranes.

**Anabolism**

Metabolic involes building up new complex biomolecules from the simple: The synthesis of proteins from amino acids.

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**Catabolism**

Complex molecules such as carbohydrates sugars are broken down ino smaller molecules Catabolic reactions usually release energy: The reactions durinh the oxidation D-glucose to CO2 and H2O are catabolic.