**Cells and Metabolism** (Chapters 3 and 4)

Cell

 The smallest living units of the body

 • Cell (plasma) membrane = The outer “skin” of the cell

 √ Composed of phospholipids and some cholesterol

 √ Receptors and membrane transport proteins are found in the

 membrane

 • Cytoplasm = The fluid that fills the cell

 √ Mostly water with dissolved ions and molecules

 √ Organelles (tiny functional structures that keep the cell alive)

 float in the cytoplasm

 • Nucleus = The location of the DNA (the cell’s genetic material)

 √ The nucleus is enclosed in its own a membrane

 √ Chromosomes = Long pieces of DNA in the nucleus

Figs 1.3, 3.2, and 3.3

Metabolism

 The sum of all chemical reactions occurring inside an organism

 • All metabolic reactions are carried out by enzymes

• Catabolic reactions = Metabolic reactions in which larger molecules

 are broken down into smaller molecules.

• Anabolic reactions = Metabolic reactions in which smaller

 molecules are joined to form larger molecules.

 • ATP supplies the energy for metabolism

Fig 4.7

Cellular aerobic respiration

##  A process by which cells obtain energy (to recharge their ATP) by

## using oxygen to break down glucose

• Cells import O2 and glucose from the blood

• The glucose is broken down into carbon dioxide and water

 using the O2

 C6H12O6 + 6O2  6CO2 + 6H2O (+energy)

 (glucose)

• Recharges 32 ATP per glucose molecule

 √ Fats and amino acids can also be broken down for energy

• CO2 and other cellular wastes are exported from the cell into the

 blood

Figs 8.10 and 4.9

Cellular anaerobic respiration

 A process by which certain cells can obtain energy (to recharge their

ATP) by breaking down glucose **without using oxygen**

• Each glucose is broken down into two molecules of lactic acid

 C6H12O6  2C3H6­O3 (+energy)

 (glucose) (lactic acid)

• Recharges only 2 ATP per glucose molecule

 √ Much less energy efficient that aerobic respiration

Fig 8.10