**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