Lecture notes for Friday October 18, 2002

Outline

• Cardiovascular system
• Blood
• Plasma
• Red blood cells (RBCs)
• White blood cells (WBCs)

Cardiovascular system

• Blood + heart + blood vessels
• Cardio = heart
• Vascular = blood vessels
• Hem or hemat = blood
• Blood = connective tissue

Functions of blood

• Transportation
• Regulation
• Protection

Blood characteristics

• Density: viscous
• Temperature: 38 C
• pH: slightly alkaline
• Volume: 8% total body weight
  - 5-6 liters males
  - 4-5 liters females

Blood components

• Plasma = 55%
• Formed elements = 45%

**Plasma**
• 92% water
• 7% solutes
• Main transporting medium
• Maintains blood osmotic pressure

**Formed Elements**
• RBCs, WBCs, platelets
• 99% = RBCs = HEMATOCRIT normal ranges:
  40-54% males; 38-46% females
• 1% = WBCs + platelets = BUFFY COAT

**Formation of blood cells**
= hemopoiesis
= hematopoiesis
• In red bone marrow

**Erythrocytes = RBCs**
• Biconcave => increases surface area
• No nucleus
• Life span = 120 days
• Hemoglobin (Hb)
• Transports O2

**Hemoglobin**
• 1 globin molecule contains 4 heme structures, each containing 1 iron ion
• Heme combines reversibly with O2 to form oxyhemoglobin
• 98% of O2 is transported as oxyhemoglobin
• Hb also combines with CO2 but only 23% is transported by RBCs, the rest is in plasma

• Normal range:
  14-18 g/100 ml males
  12-16 g/100 ml females

• Carbon monoxide poisoning - CO has a stronger affinity for Hb than O2
  • O2 carrying capacity = anemia

Anemia
• Low hemoglobin &/or hematocrit
• Symptoms: fatigue & intolerance to cold
• Iron deficiency anemia
• Pernicious anemia
• Hemorrhagic anemia