

Overview:

Cardiovascular Unit Checklist:

Please study the following topics in preparing you for the **unit** test

- Compare the characteristics of blood components
 - Red blood cells, white blood cells, platelets and plasma
- Blood groups
 - ABO blood groups and Rh Factor
 - What makes up the various blood groups?
- Blood typing
 - Know the techniques and identify what is needed in typing someone's blood
- Blood transfusion
 - Understand the requirements for a successful blood transfusion (know what antigens and antibodies are present in the recipient's blood stream).
- Blood diseases
 - Know the basic blood diseases associated with the various blood components
- Compare and contrast the characteristics of the structure and function of blood vessels
 - Diameter, elasticity, muscle layers, valves, and what they transport
- Heart components
 - Be able to correctly label a heart diagram
 - Know what happens when the heart pumps and the 'lub' 'dub' sounds.
- Blood flow around the body
 - Be able to correctly provide the pathway around body and the heart
- Describe the cardiac cycle
 - Be able to describe the cycle in terms of systole and diastole
 - Be able to understand the use of the pacemaker
 - Be able to identify different sections of a EKG
- Be able to explain how blood pressure works and taken
 - Explain the mechanism of how blood pressure is taken
- Identify factors that affect blood pressure
 - Exercise, caffeine, shock, nicotine, hormones etc...
- Heart diseases
 - Atherosclerosis, Hypertension, Heart attack etc...

Notes 1: Circulatory System overview:

What is the purpose of the circulatory system?

Every cell in a living organism must have _____ access to its nutrient supply

- _____ celled organisms
 - rely on simple _____ to move materials into the cell
- _____ organisms
 - require _____ type of system

Functions of the circulatory system:

- Carries _____ and _____ to and from cells
- Carries _____ messages between different cells
- Distributes _____ throughout the body
- Maintains _____ levels in the body
- _____ against invading organisms

Key parts of the circulatory system:





1. Blood

- _____ Plasma
- _____ Formed Elements
 - Cells
 - _____ blood cells
 - _____ blood cells
 - Platelets
 - (_____) cell fragments
- Humans have _____ of blood

2. Vessels

- _____, _____ and _____
- 2. _____
- 3. _____
- _____
- _____
- _____
- Lungs

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FORMED ELEMENTS	Function and Description	Source
<p>Red Blood Cells (erythrocytes)</p>  <p>4 million–6 million per mm³ blood</p>	<p>Transport O₂ and help transport CO₂</p> <p>7–8 μm in diameter Bright-red to dark-purple biconcave disks without nuclei</p>	Red bone marrow
<p>White Blood Cells (leukocytes) 5,000–11,000 per mm³ blood</p> <p><i>Granular leukocytes</i></p> <ul style="list-style-type: none"> • Neutrophils  <p>40–70%</p> <ul style="list-style-type: none"> • Eosinophils  <p>1–4%</p> <ul style="list-style-type: none"> • Basophils  <p>0–1%</p>	<p>Fight infection</p> <p>10–14 μm in diameter Spherical cells with multilobed nuclei; fine, pink granules in cytoplasm; phagocytize pathogens</p> <p>10–14 μm in diameter Spherical cells with bilobed nuclei; coarse, deep-red, uniformly sized granules in cytoplasm; phagocytize antigen-antibody complexes and allergens</p> <p>10–12 μm in diameter Spherical cells with lobed nuclei; large, irregularly shaped, deep-blue granules in cytoplasm; release histamine, which promotes blood flow to injured tissues</p>	Red bone marrow



Plasma:

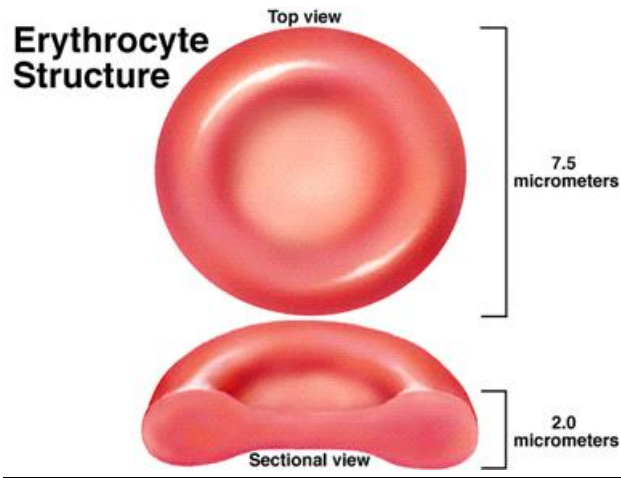
- _____ portion of the blood
- Contains _____ water
- Other _____ dissolved substances
- Contains dissolved materials
 - gases, _____, _____, ions and _____.
 - wastes and _____.
- Soluble proteins
 - _____
 - _____ and carrier/transport proteins
 - _____
 - aid in _____ clotting

Red Blood Cells:

- _____ per mm^3 (ml) of whole blood
- Function to _____ around the body

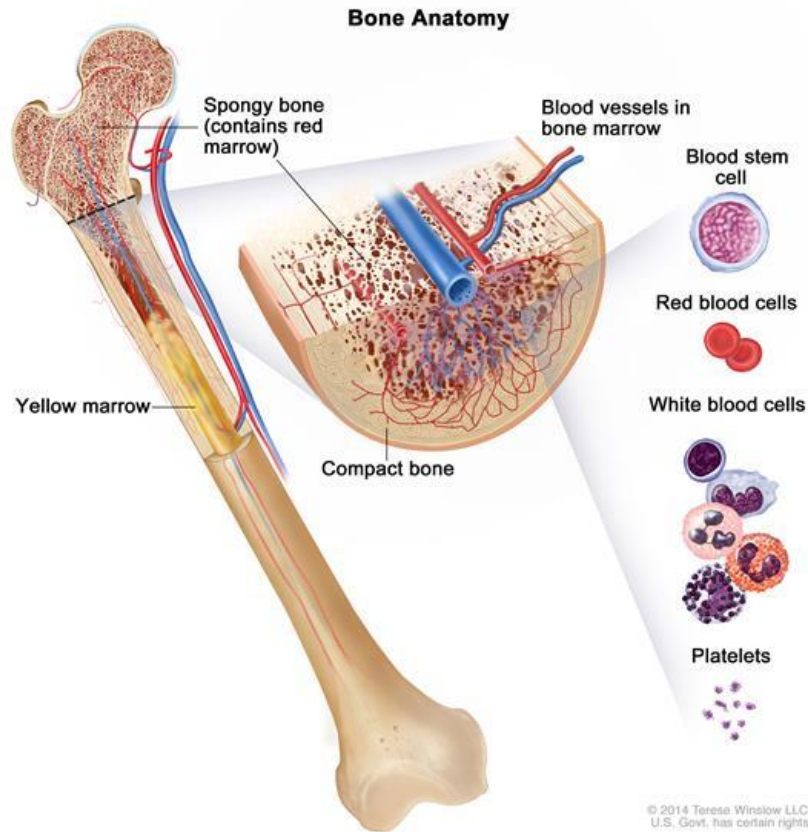
Structure

- _____ disks,
 - _____, Increases _____ to exchange gas



- Have _____ at maturity
 - Increased _____ for hemoglobin, increases _____ to carry oxygen
- proteins in _____ determine blood type

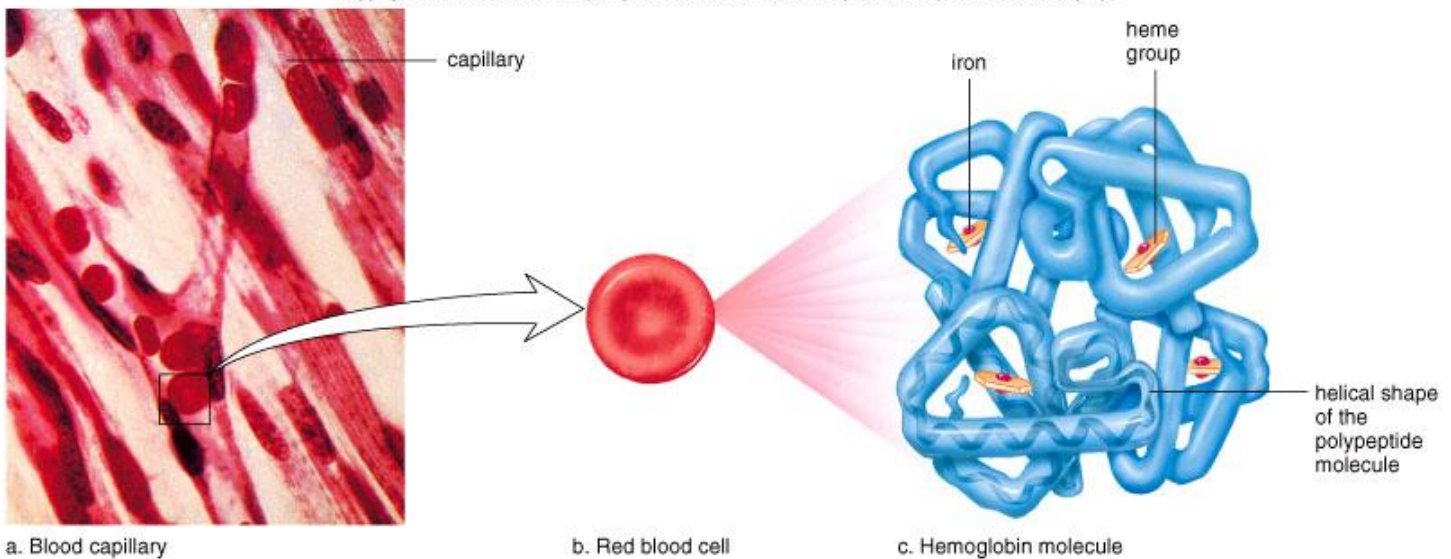
- _____ produced in _____
- Mainly in _____ bones
 - the skull, ribs, vertebrae, and ends of the long bones.



- Production of red blood cells is stimulated by _____
 - From _____
 - In response to _____ oxygen in blood

- Contain _____
 - Red iron containing pigment
 - _____ portion of molecule forms an _____, reversible bond with oxygen.
 - Carries 20 ml oxygen per 100 ml of blood
 - Oxygenated state = _____
 - Bright red
 - Reduced state = _____
 - purple-blue.

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Lifespan- 120 days

- Destroyed in _____ by fixed macrophages
 - Hemoglobin is broken down
 - Iron is recycled-taken to bone marrow
 - Heme portion is degraded and excreted as bile pigments

Possible disorders on RBC:

_____ - _____ red blood cells

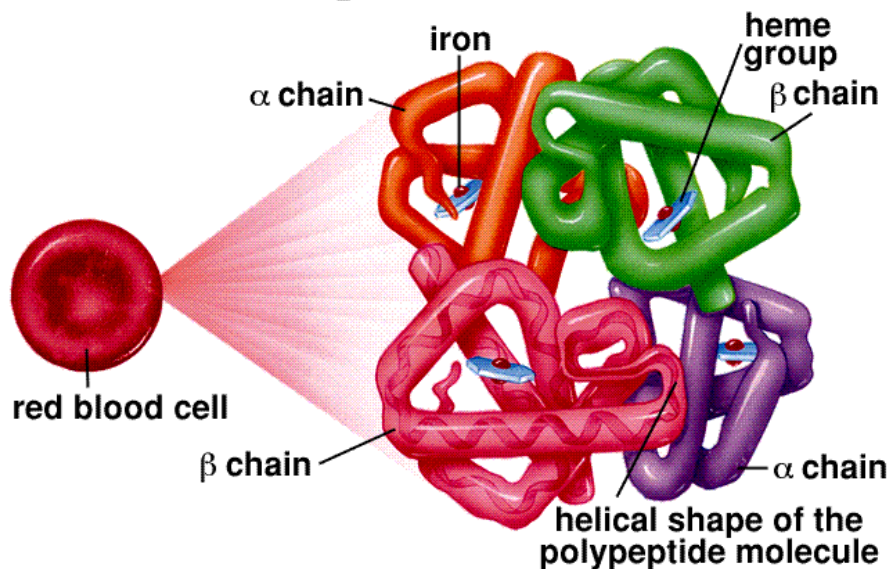
- Most common type comes from iron deficiency

_____ poisoning

- Carbon monoxide binds at _____ sites more strongly than _____.

Sylvia S. Mader, Inquiry into Life, 8th edition. Copyright © 1997 The McGraw-Hill Companies, Inc. All rights reserved.

Hemoglobin Molecule



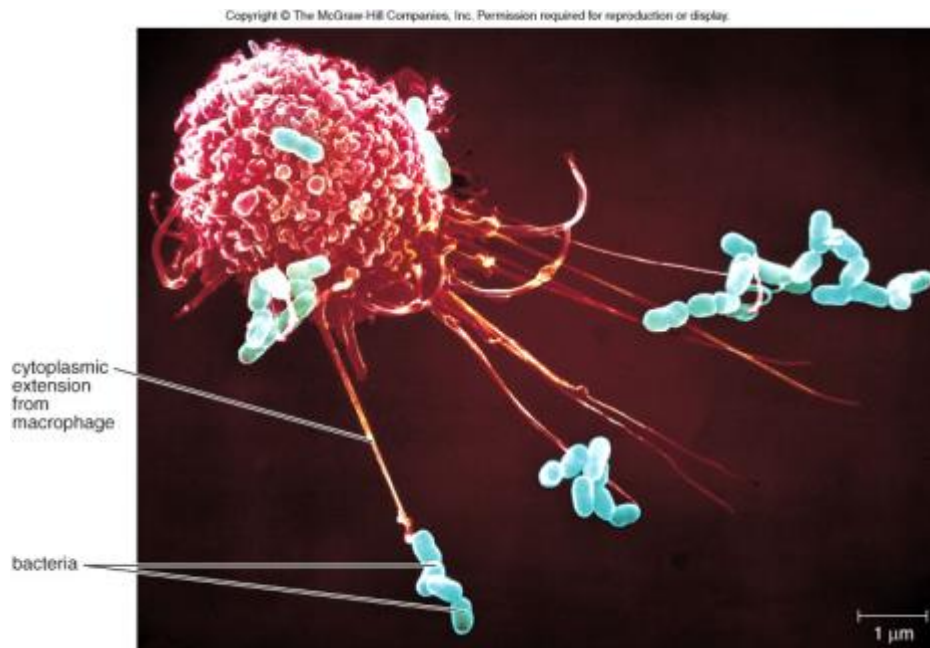
White Blood Cells:

- White blood cells (WBCs)
 - General term for a variety of cells _____ hemoglobin
 - _____ numerous than RBC's- 4000-11000 per mm^3 (ml) of whole blood
 - _____ cells, _____

- Important part of the immune system.
 - able to _____ fluids _____ tissues to _____ - infection
 - Blood stream is _____ - a means of transport to location of infection.

Fighting Infections

- _____ infection by _____ pathogens
- Other _____ will also clean up the mess!
- _____ is composed of dead invaders and leukocyte fragments



Lifespan

- Different types live _____ lengths of time
- Some live only a _____ days-die combating invading pathogens

- Some live _____ or years

Disorders:

- Change in numbers may indicate _____
 - Infectious _____
 - Due to _____ virus
 - Increased number of _____ lymphocytes
 - AIDS
 - HIV - Human Immunodeficiency Virus
 - _____ number of T lymphocytes
 - Leukemia
 - Blood cancer
 - _____ numbers of WBC's

Platelets

- _____ of large cells called megakaryocytes
- 150,000-300,000 per mm^3 of whole blood
- _____ cells that play important role in _____.

Blood clotting

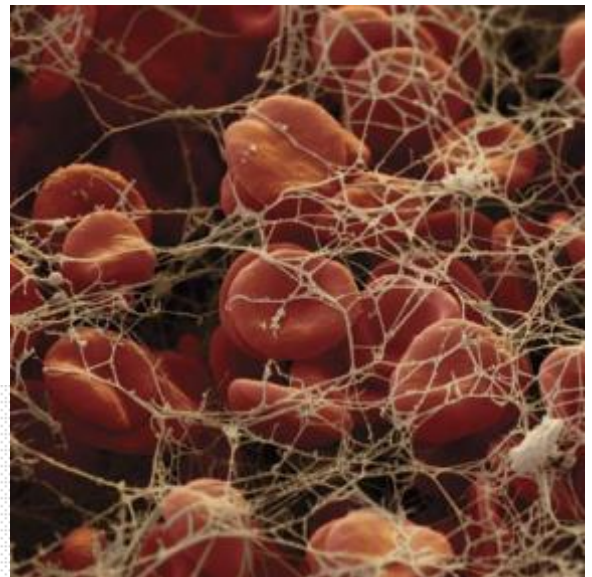
- Platelets form a plug for immediate stoppage of bleeding

Steps:

- _____ contain the starter enzyme for blood clotting to occur.
- Platelets releases _____ and converts prothrombin to _____.
- Thrombin joins with fibrinogen to form _____.
- Fibrin _____ red blood cells and clots.

<https://www.youtube.com/watch?v=--bZUeb83uU>

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Clotting factors

1. Released from platelets and injured tissue
2. Plasma proteins synthesized in liver and circulating in inactive form

Prothrombin
circulating
in plasma

Thrombin

Fibrinogen circulating
in plasma

Fibrin

