CARDIOVASCULAR SYSTEM

BLOOD

Blood-
Average amount of blood in body is 5-6 liters
Average temperature of blood is 38 centigrade(100.4 F)
Average PH range(same as homeostasis) 7.35-7.45

Blood Functions-
I. **Transportation**
a) Transports oxygen from lungs to cells
b)Transports CO_2 from cells to lungs
c) Transports nutrients from digestive system to the cells
d) Transports waste products from the cell to the kidneys, lungs, and sweat glands
e)Transports hormones from endocrine glands to the cells
f)Transports enzymes to the cells

II. **Regulation**
a)Regulates PH through buffer system
b)Regulates body temperature through(vasodilation and vasoconstriction)
c)Regulates water content of cells

III. Prevents loss of body fluid by forming a clot

IV. Protects body against toxins and foreign microorganisms(Produce antibodies)

Notes:
Vaso= blood vessel
Dil= open
Constrict=close

Hematopoiesis- process of blood cell formation
Erythropoiesis- production/formation of red blood cells
Reticuloendothelial cells-located in liver; destroy old red blood cells

Blood is made up of:
Liquid portion(Plasma)
Formed element (cellular portion)[Antibodies are in here]
Platelets

Formed Elements is cellular portion
Cellular Portion has:
Red Blood Cells

Ventricle- pump blood
Right Ventricle- pumps deoxygenated blood to the lungs
Left Ventricle- pumps oxygenated blood into aorta to the tissue

Valves
AV Valves- Tricuspid(btw right atrium/ ventricle)
Bicuspid(btw left atrium/ventricle)

Semilunar- Pulmonary Valve
Aortic Valve at aorta
Veins- there are two veins:
1a. Superior vena cava- brings deoxygenated blood back to the heart from upper parts of the body
1b. Inferior vena cava- brings deoxygenated blood to the heart from lower parts of the body

The way blood flows(diagram was drawn in class… for better explanation look in text book or online)
1-7 deoxygenated blood
8-15 oxygenated blood

1. Superior Vena Cava
2. Inferior Vena Cava
3. Right Atrium
4. Tricuspid Valve
5. Right Ventricle
6. Pulmonary Valve
7. Pulmonary Artery
8. Lungs
9. Pulmonary Veins(back from lungs)
10. Left Atrium
11. Bicuspid Valve(mitrol valve)
12. Left Ventricle
13. Aortic Valve
14. Aorta
15. Tissue(of the body)

Arteries- take blood away from heart
ALL arteries- transport oxygenated blood EXCEPT pulmonary artery

Veins- return blood to heart
ALL Veins- transport deoxygenated blood EXCEPT pulmonary veins

2. Destruction of the AV bundle which may result from arteriosclerosis, myocarditis, coronary infarction, or depression caused by drugs
   Note: Vagus Nerve- major parasympathetic nerve

Flutter + Fibrillation

I. **Atrial Flutter**- defined as a rapid atrial contraction accompanied by 2nd degree AV block. It indicates damage to the myocardium. The heart beat is about 240-360 bpm. May become fibrillation in a few days

II. **Atrial Fibrillation**- asynchronous(not in union) contraction of the atrium muscles causing the atrium to contract faster and irregular. It reduces the effectiveness of the heart by about 50%.
– Both flutter and fibrillation may be caused from: myocardial infarction, or rheumatic fever, grave's disease(hyperthyroidism)

III. **Ventricular Fibrillation**- asynchronous contraction of the ventricle. The nerve impulses travels to different parts of the ventricle at different rate's. May be caused by: coronary occlusion(closing off of the coronary artery)

Conduction System: the nerve supply of the heart

1. The right atrium(SA node)[Pacemaker]- initiates cardiac cycle
2. AV node(Atrioventricular)
3. AV bundle (HIS)
4. R& L bundle branches
5. Purkinje fibers

Electrocardiogram(ECG):(Picture was drawn in class labeling all waves…look in book or web)

P-Wave: indicates atrial depolarization(or contraction); also indicates spread of nerve impulse from SA node all over the atria

QRS- complex: indicates atria repolarization or relaxation

Note: QRS- complex is the most important ventricular depolarization or contraction. Also means that impulses have traveled through the ventricles

T-Wave- indicates ventricular repolarization or relaxation(ventricles now relax/ to be filled again)

P-R interval: takes about 0.02 seconds…time required for the impulse to travel through the atria and AV node

Note: P-R interval is increase in cases of arteriosclerosis, rheumatic fever

Q-Wave: maybe increased(or enlarged) in the case of myocardial infarction

R-Wave: maybe increased in case of ventricles(ventricular hypertrophy)

S-T segment: if it is enlarged or increased it may indicate myocardial infarction or increased potassium(hyperkalemia)

T-Wave: indicates relaxation of the heart

S-T Wave: indicate arteriosclerosis or the heart muscle is receiving too little oxygen(hypoxia)

Angina Pectoris(AP)- due to decrease oxygen to heart muscle caused by a faulty coronary circulation(blockage); AP is due to ischemia of the myocardium due to a blockage.

Myocardial infarction- death of the tissue due to a lack of blood supply…may result from a thrombus, or embolus in the coronary

Shock: may be due to a decrease cardiac output or decrease blood volume; which will cause a decrease blood supply to the tissue especially the brain resulting in shock

Causes: Hemorrhage
Histamine

Symptoms: 1. Skin is pale and clammy
2. You will show signs of cyanosis
3. There is shallow rapid breathing
4. There will be a decrease in blood pressure

Homeostatic Compensation- body will undergo vasoconstriction
(Hemorrhage)

Angiotensin II

1.Decrease in blood vessel…and H_2O retention to increase it
A. Vasopressin(ADH)- an antidiuretic hormone acts on kidney to cause a reabsorption of water
B. Aldosterone- produced by adrenal gland; acts on kidney tubule to cause re-absorption of sodium…water will follow the sodium to increase blood volume to increase blood pressure

NOTE: Vasopressin helps to retain H_2O

2. Decrease Heart rate:
-release epinephrine
-increase heart rate
-increase blood pressure
-to get out of shock

Physiology of Circulation

Aorta(large artery) = 100mmHg

Small arteries= 70mmHg

Arteriole= 30mmHg