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A & P 2: Lab #3

#### Activity 1: The ECG

1. Label the following EKG wave and give the heart activity taking place.
  - A) P Wave ( atrial depolarization )
  - B) Q wave ( beginning of ventricular depolarization)
  - C) R wave
  - D) S Wave
  - E) T Wave ( repolarization of ventricles )
2. Using the vertical lines showing the following segments and intervals and indicate the heart activity taking place for each.
  - A) **P-R interval:** (A) conduction through the AV node and AV bundle, from the start of the P Wave to the end of it.
  - B) **P-R segment:** (A-B) reflects the time delay between atrial and ventricular activation, from the end of the P Wave to the start of the QRS complex.
  - C) **QRS complex:** (B-D): depolarization of ventricles
  - D) **S-T segment:** (D) between ventricular depolarization and repolarization, from end of the S Wave to the start of the T Wave.
  - E) **S-T interval:** from the end of the S Wave to the end of the T Wave.
  - F) **R-R interval:** is the time between QRS complexes ( can be calculated between any two QRS complexes)
  - G) **Q-T interval:** the time required for ventricles to undergo a single cycle of depolarization and repolarization, from the end of the P Wave to the end of the T Wave.

#### Review Exercise

1. Autorhythmic - the ability of myocytes to contract on their own.
2. Absolute Refractive Period -  $\text{Na}^+$  is responsible for this phase of an action potential.
3. Purkinje Fibers - located in the interventricular septum.
4. Depolarization - Responsible for the plateau phase seen in cardiac action potential.
5. AV Bundles - connects the bundle branches to the AV node.
6. SA Node - initiates the normal contraction of the heart.
7. Bachmann's Bundle - connects the SA node to the left atrium.
8. Plateau - no action potential can be initiated at this phase

9. EKG - used to diagnose certain cardiac disorders.
10. Bundle of His - problems with these will directly affect the ventricles.
11. Calcium - seen in cardiac action potential but not in skeletal action potential.
12. Internodal - this connects the SA node with AV node.
13. AV Node - this directs the action potentials to the bundle of his.
14. IV Septum - location of the left and right bundles.
15. Relative Refractive Period - strong stimuli can initiate an action potential during this phase.

### **Heart Diagram**

1. SA node
2. Anterior internodal
3. Middle Internodal
4. Posterior Internodal
5. AV Node
6. Right Atrium
7. Right Ventricle
8. Aortic Arch
9. Bachmann's Bundle
10. Left Atrium
11. AV Bundle (bundle of his)
12. Left Ventricle
13. Bundle of Branches (R+L)
14. Purkinje Fibers

**Research: Select one of the common cardiovascular diseases and, in one paragraph, describe causes, signs and symptoms, diagnosis and treatment.**

- There are many cardiovascular diseases that are very common but one of them is Coronary Artery Disease (CAD). CAD affects the blood to the heart. It is caused by a buildup of plaque in the wall of the arteries that supply blood to the heart and other parts of the body. The buildup of plaques causes the inside of the arteries to narrow overtime, which can partially or totally block the blood flow. Angina, or chest pain is a common symptom of CAD. For a lot of people the first sign of CAD is a heart attack. Symptoms of a heart attack include; chest pain, weakness, lightheadedness, nausea, pain or discomfort in the arms or shoulders, and shortness of breath. When diagnosing CAD there are many options. Your doctor can use many tests to diagnose CAD. Some are EKG, an echocardiogram, exercise stress test, chest X-ray, cardiac catheterization, coronary angiogram, and a coronary artery scan. In regards to treatment there are lifestyle changes that you can make and medication you can take. The lifestyle changes include eating healthy foods, quit smoking, exercise regularly, lose excess weight, and reduce stress levels. The medications you can take are :
  - cholesterol modifying medications: which reduces the primary material that deposits on the coronary artery
  - aspirin: which is a blood thinner that can prevent blood clotting ( it can also help with future heart attacks )

- beta blockers: slow down your heart rate and decrease your blood pressure, which decreases your hearts demand for oxygen, calcium channel blockers can help with chest pain symptoms
- Ranolazine: may help people with angina
- Nitroglycerin: tablets,sprays, and patches can control chest pains by temporarily dilating your coronary arteries and reducing your heart's demand for blood.