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Principles of ECG

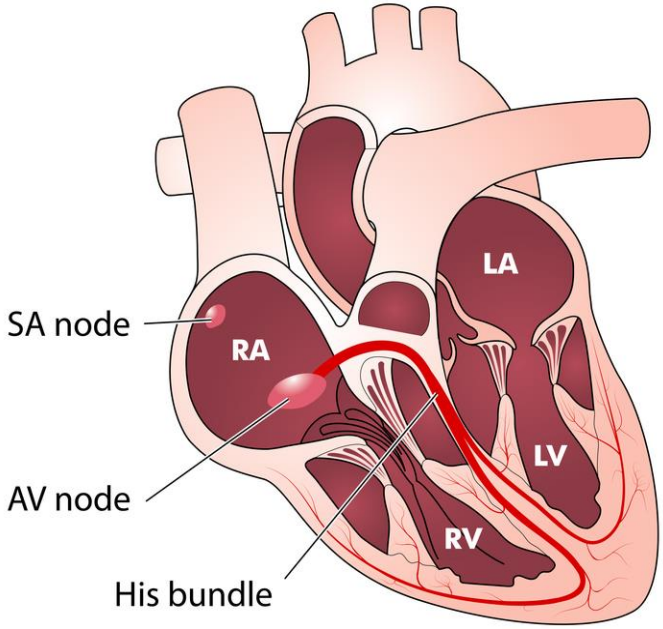
ARROW® VPS G4™ Device

Objectives

- The clinician will:
  - Describe anatomy and electrophysiology of heart
  - Have a working knowledge of how electrocardiograms work

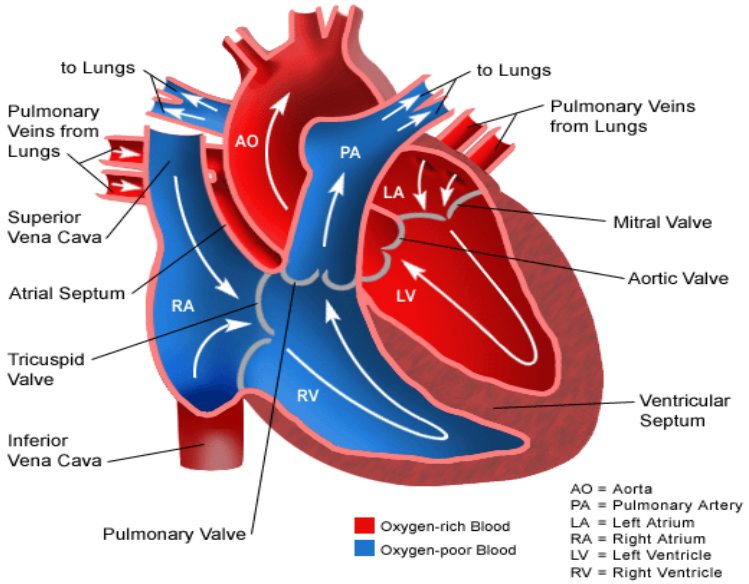
Principles of ECG: Anatomy

- The heart consists of four chambers
- Its function is to deliver deoxygenated blood from the Superior and Inferior Vena Cava to the lungs where carbon dioxide is exchanged for oxygen
- The heart then pumps this oxygenated blood away from the heart and into the body through systemic circulation



Principles of ECG: Anatomy

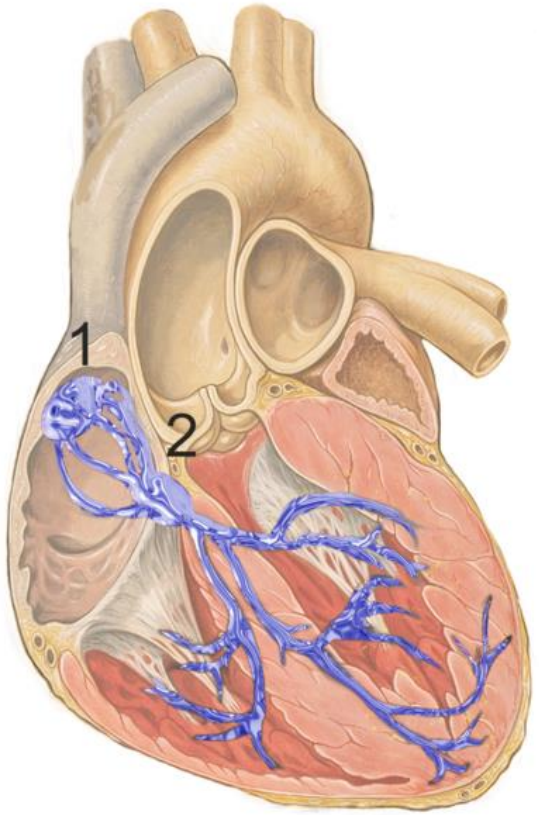
- Blood from body enters the Right Atrium from the anterior and posterior Vena Cava
- Right Atrium contracts and blood flows from the Right Atrium to the Right Ventricle
- Right Ventricle contracts and blood flows into the Pulmonary Arteries leading to the lungs
- Oxygenated blood flows via Pulmonary veins into the Left Atrium
- Left Atrium contracts pushing blood into Left Ventricle
- Left Ventricle contracts and pushes blood to Aorta and to rest of the body
- Both Atria contract at the same time
- Both Ventricles contract at the same time



Principles of ECG: Anatomy

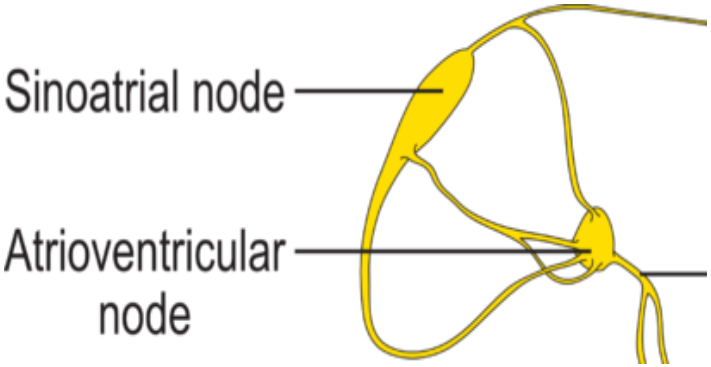
Anatomical and physiological components behind ECG

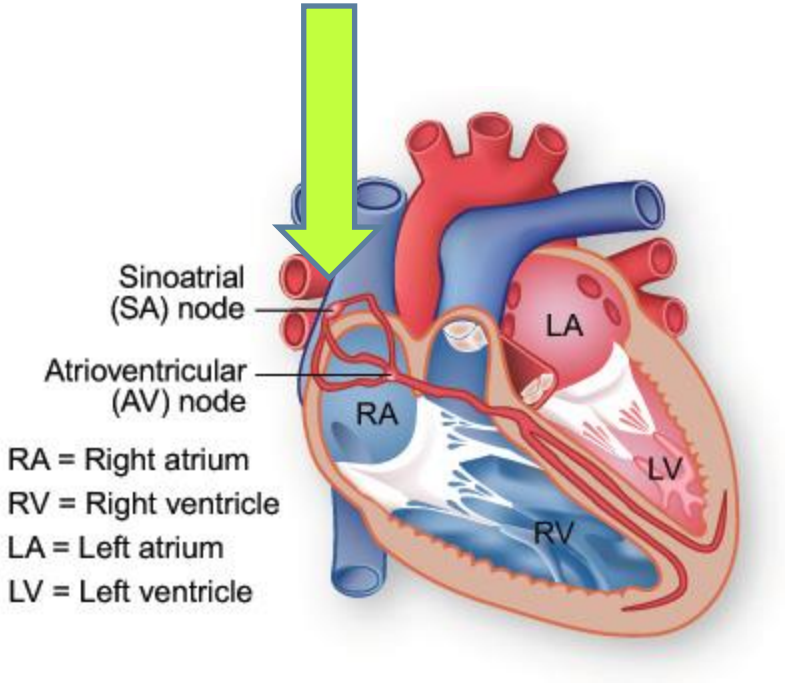
- Pacemakers
  1. SA Node (Sinoatrial)
  2. AV Node (Atrial ventricular)
- Conductive tissue (Blue)
- Myocardium = Heart Muscle



Principles of ECG: Electrophysiology

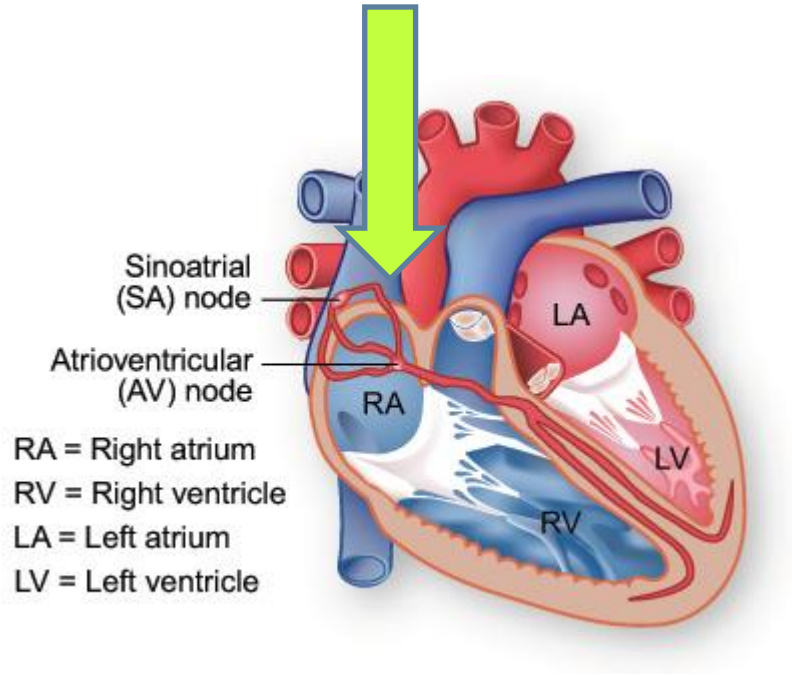
- Electrical impulses begin in the sinoatrial (SA) node
- The SA node is a group of cells located on the wall of the right atrium at the junction of the superior vena cava and the right atrium
- The SA node is sometimes called the heart's 'natural pacemaker'





Principles of ECG: Electrophysiology

- The electrical impulse travels from the SA node to the atrioventricular (AV) node
- In response to the impulse, the atrium contracts, pushing blood into the ventricles
- At the AV node, the electrical impulse is delayed just long enough to allow blood to flow from the atrium and fill the ventricle



Principles of ECG: Electrophysiology

- Electrical impulse is then transmitted through the bundle of His and down the bundle branches terminating in the Purkinje fibers within the myocardium
- Working cells respond to stimulation by contracting
- Frequency of cycle in one minute equals heart rate