Excitation of the Heart

(Text Pg 111 – 112)

The Heart Conduction System

The cardiac muscle cells that make up the myocardium are excitable, meaning that with electrical stimulation they will contract, leading to the contraction of the heart and pumping of blood. There are 6 specialized tissues/areas that regulate and coordinate the contraction of the heart

1. Sinoatrial (SA) node "pacemaker"

- In the wall of the right atrium
- Initiates the electrical signal in the heart (sets our heart rate)
- Regulated by the autonomic nervous system

2. Internodal pathways

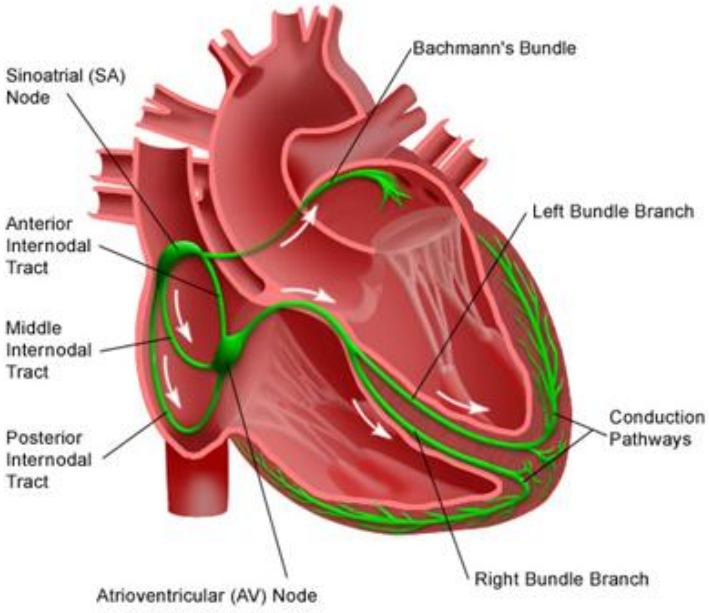
- Spreads electrical signal through both atria
- Atria will contract "Top-to-bottom"

3. Atrioventricular (AV) node

- Passes the electrical signal from the atria to the ventricles and to the Bundle of HIS

4. Bundle of HIS (atrioventricular bundle)

- Carries the electrical signal down the interventricular septum



5. Right and left bundle branches

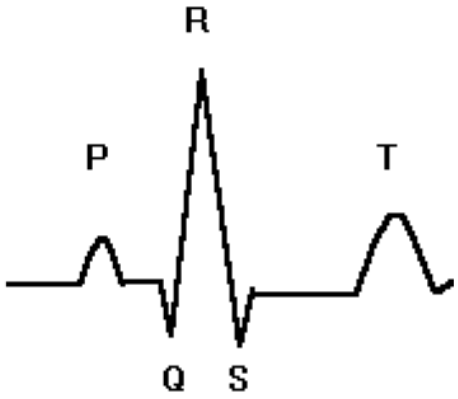
- Pass the signal to the purkinjie fibres

6. Purkinje fibres

- Spreads the electrical signal throughout the ventricles
- Ventricles will contract "Bottom-to-top"

The Electrocardiogram (ECG)

- A graphical representation of the electrical activity (sequence of events) of the heart.
- It has a very distinct pattern, and each wave has a name.



• ***P Wave:*** depolarization of atria (*spreading of the electrical signal to contract through the atria*)
• ***QRS complex:*** depolarization of the ventricles (*masks the repolarization or resetting of the atria*)
• ***T wave:*** re-polarization of ventricles

***What is the Purpose of an ECG?*:**

- Basic:
  - Used to determine heart rate.

- Advanced:
  - A measure of the proper electrical heart function.
  - Used for diagnosis of heart health and disorders.
  - e.g. ST segment depression = low O_2 (Cardiac ischemia)
  - e.g. Long QT syndrome = Congenital defect leading to sudden death.