



Electrocardiogram (ECG or EKG)

Medical Measurements Lab 1

Fourth Stage

Supervised by

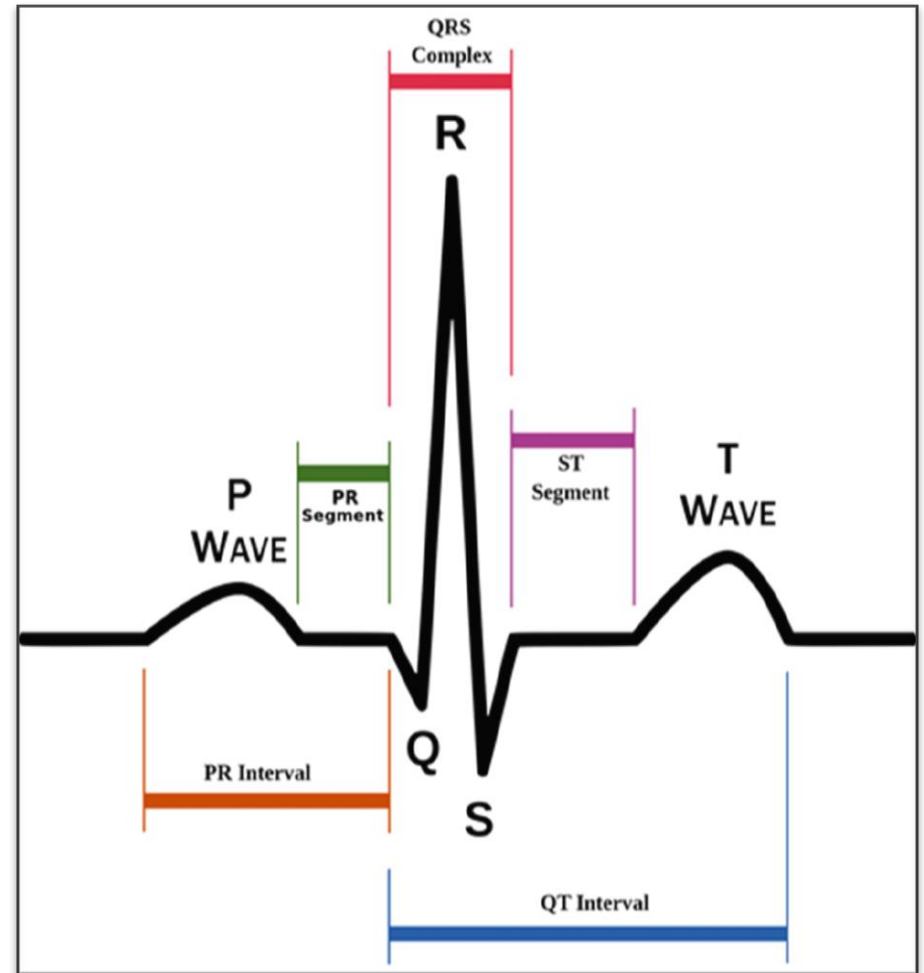
Prof. Dr. Haider.J.Abd

Assistant Lecturer: Reem Salah

2023-2024

Electrocardiography

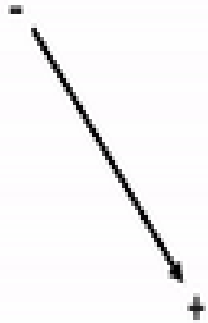
- ❖ ECG or electrocardiography is a test performed by cardiovascular doctors for potential people who may have heart related diseases.
- ❖ A healthy person's heart signal consists of five peaks P, Q, R, S, and T respectively, and is repeated with each heartbeat.
- ❖ Each peak gives specific information about a particular condition of the heart



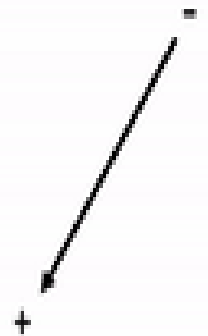
Lead I



Lead II



Lead III



Frame

1

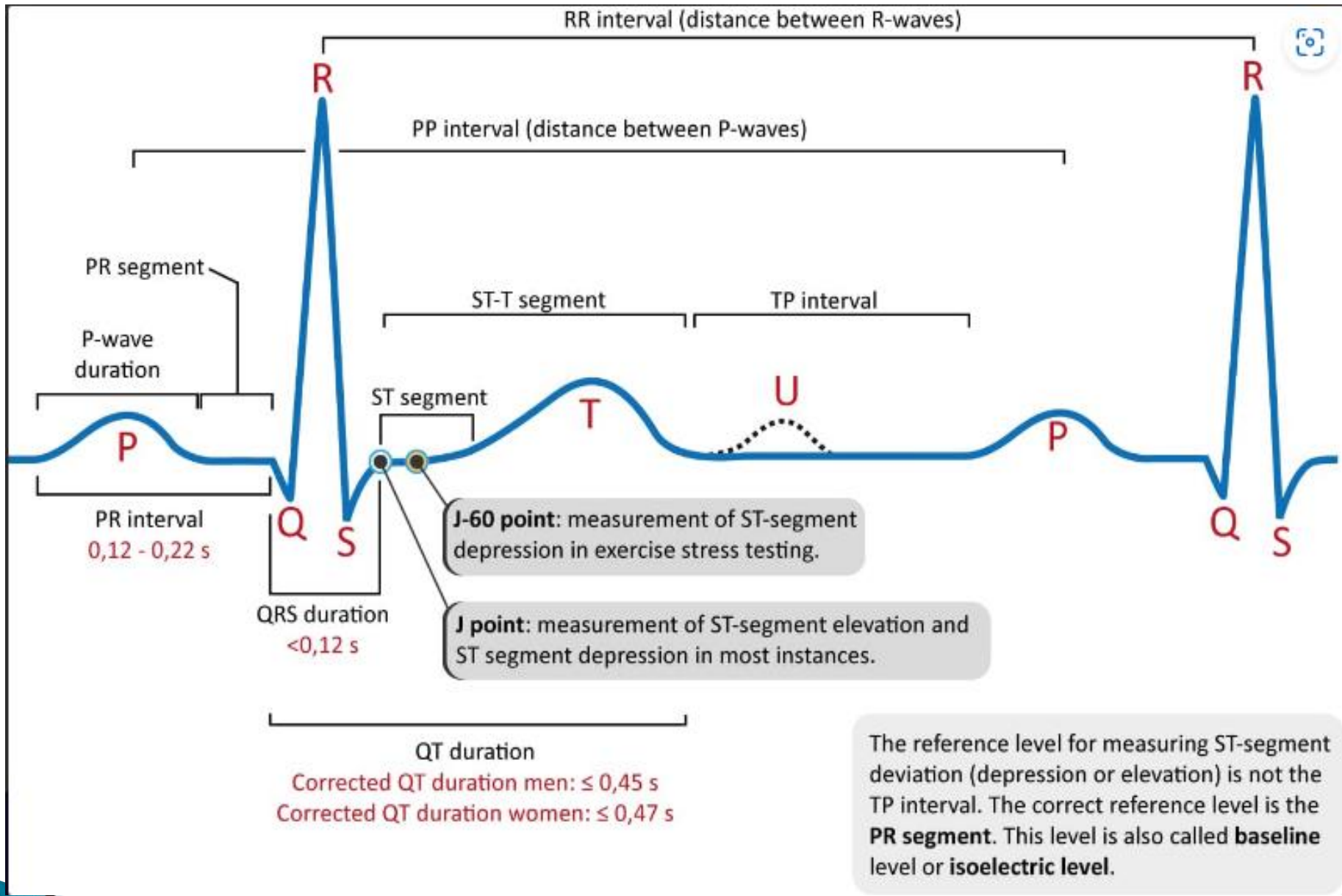
Why to Study ECG ?

- ❖ According to WHO reports, the world's leading cause of death is heart disease, which accounted for 30% of deaths in the world.
- ❖ The reason that researchers are interested in studying these topics is that the success one of research will lead to the development of diagnoses of heart-related diseases as well as treatment for them and thus save human life.
- ❖ The trend in designing rapid technologies that save more time and effort to speed up diagnosis with the possibility of applying them in smart devices.

ECG Intervals

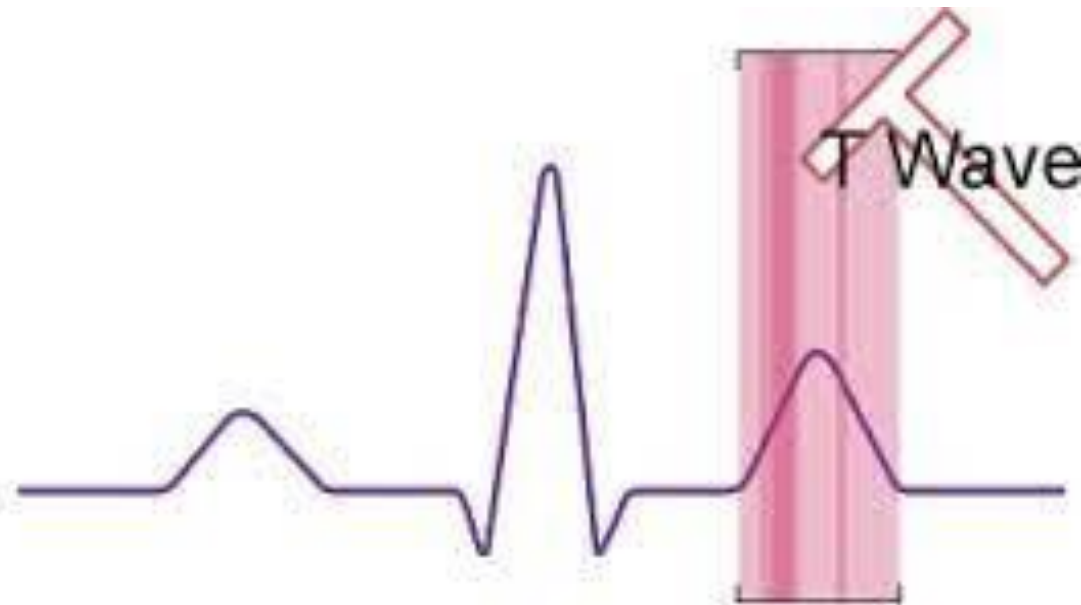
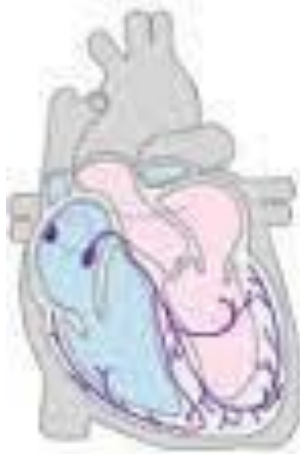
- ❖ ECG interpretation starts with assessment of the P-wave and PR interval.
- ❖ The P-wave is generated by depolarization (activation, contraction) of the atria.
- ❖ The PR interval is the interval between the start of the P-wave and the start of the QRS complex.
- ❖ The PR interval determines whether impulse transmission from atria to ventricles is normal.
- ❖ The isoelectric (flat) line between the end of the P-wave and the start of the QRS complex is called the PR segment.
- ❖ The PR segment is the baseline (also referred to as reference line or isoelectric line) of the ECG curve. Thus, when measuring the amplitude of a wave on the ECG, the PR segment is the baseline. Refer to Figure 1.

ECG Intervals



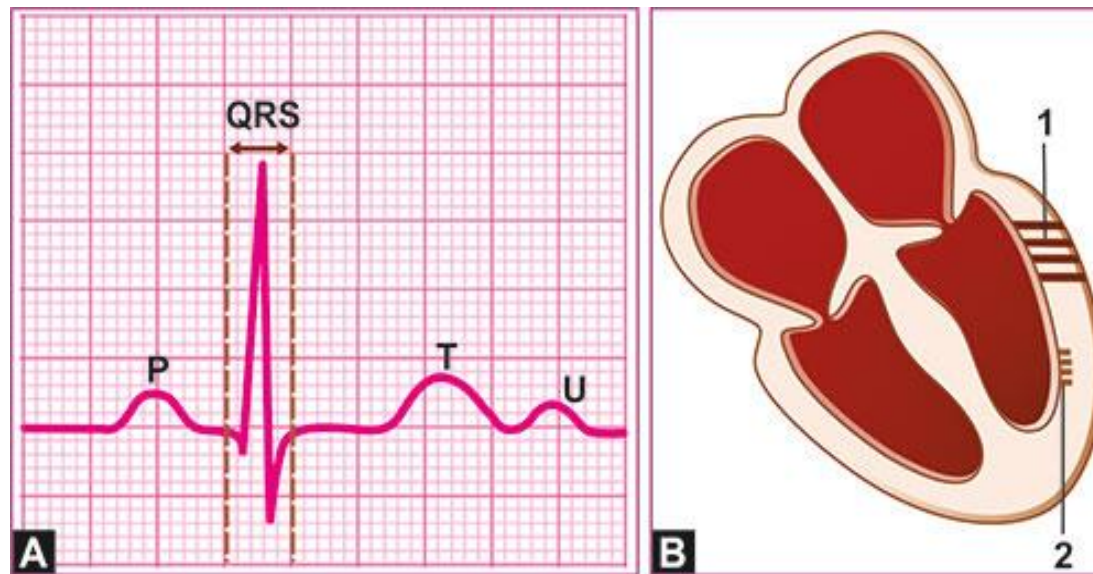
T wave

- ▶ The T-wave reflects the rapid repolarization (recovery) of the myocardium and T-wave changes occur in numerous conditions.
- ▶ T-wave changes are frequently misunderstood. The transition from the ST segment to the T-wave should be smooth.
- ▶ The normal T-wave is somewhat asymmetric, with a steeper downward slope.

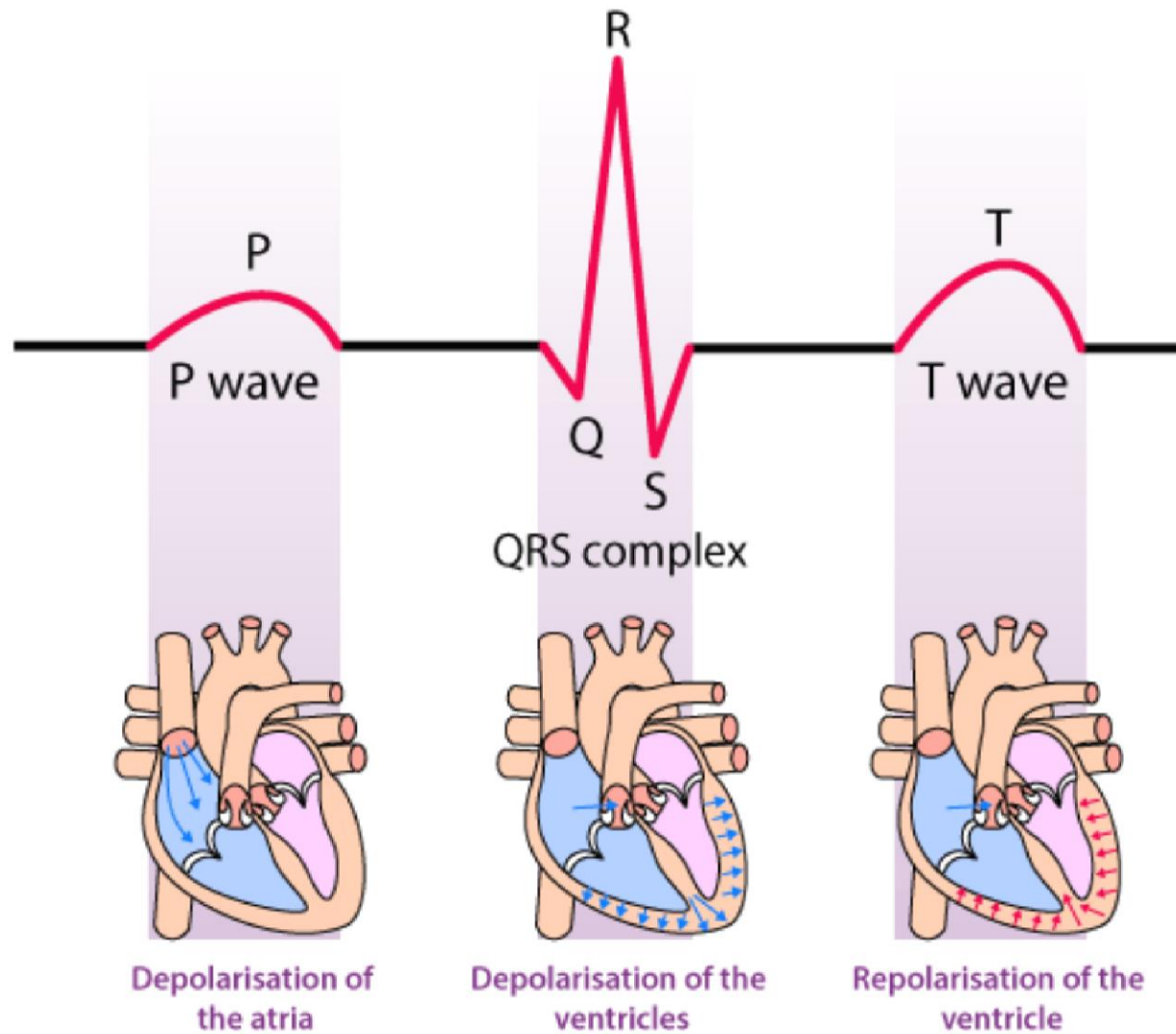


U wave

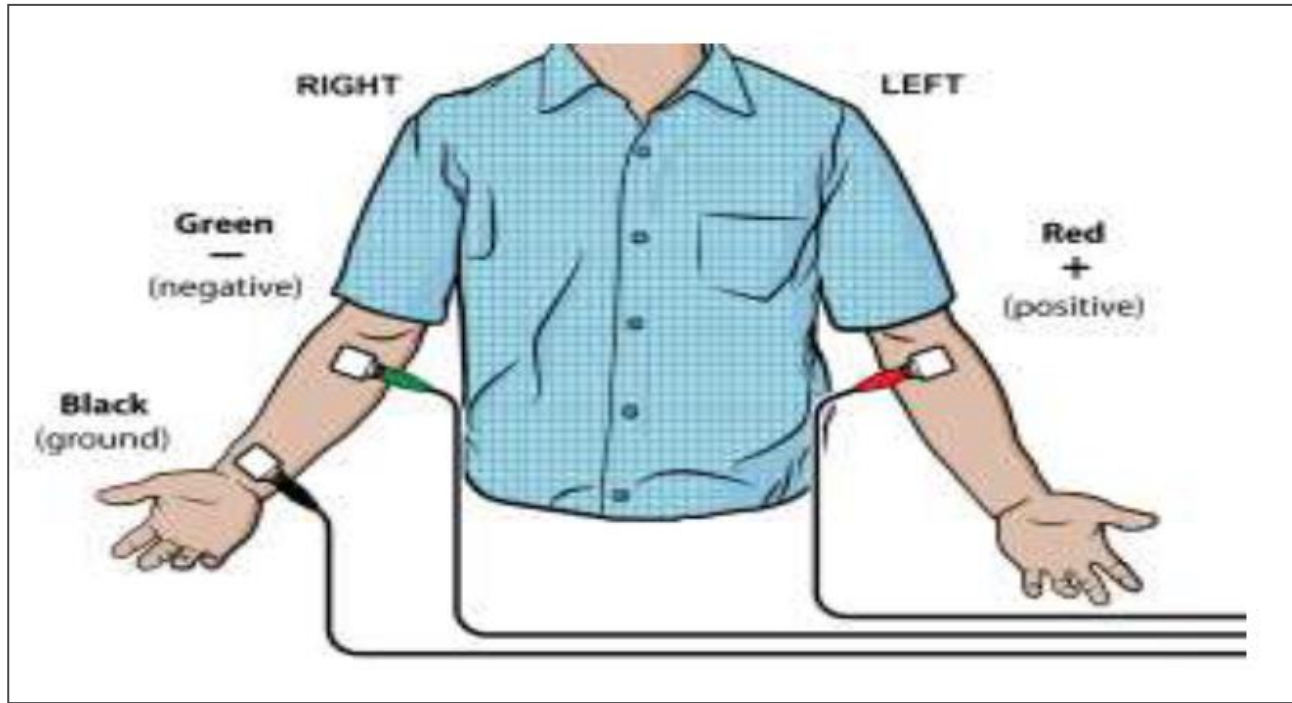
- ▶ The U-wave, which is a positive wave after the T-wave, appears occasionally on the ECG. Its height (amplitude) is approximately one fourth of the amplitude of the T-wave. The U-wave is most often seen in leads V2, V3 and V4. Individuals with prominent T-waves display U-waves more often. Moreover, the U-wave is clearer during slow heart rates (bradycardia). The physiological process that generates the U-wave remain elusive.



ECG waves presentation



Standard limb lead EKG



DATA Procedure

Interval	Beginning time (s)	Ending time (s)	Time (s)
P-R			
QRS			
Q-T			
R-R			

Heart rate (bpm)	
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