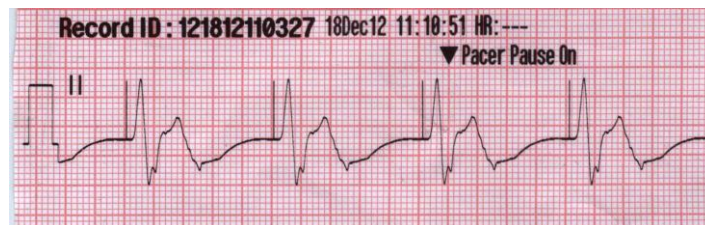


WHAT MAKES YOUR HEART BEAT?

How to influence heart activity

The heart is crucial, irreplaceable for humans because it works tirelessly from birth to death. Its role is essential – heart ensures blood circulation in the bloodstream by contractions and the supply of oxygen to the cells, which is used for energy production and for life at all. The heart works like a regular pump never-ending, with which we can see some phases. These phases correspond to the gradual withdrawal of ventricular fibrillation. As for pumping water, also the heart is influenced by pulse - the rhythmical electrical discharges in the right atrium. Procedure of electrical discharge can be monitored and recorded by electrodes in the electrocardiogram (ECG).



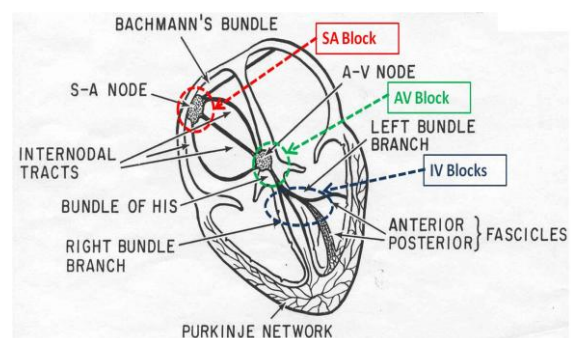
ECG is typical with its regular record and it can also detect non-typical behaviour of the heart. Therefore ECG is basic cardiac examination. It is possible to influence the shape of the ECG to a certain extent, yet it keeps the characteristic features of concrete person.

Find out what variable can influence the ECG curve. What parts of the ECG can we influence? Explain the difference between your normal ECG curve and the curve when you change some condition.

What you might need to know

For understanding the graph of heart activity it is necessary to understand the structure.

The heart consists of the right ventricle and atrium, through which non-oxygenated blood flows from the body to the lungs. Oxygenated blood is then led from the lung into the left ventricle and atrium, from where it is pumped throughout the body. Atria and ventricles are separated by valves that prevent backflow of blood.



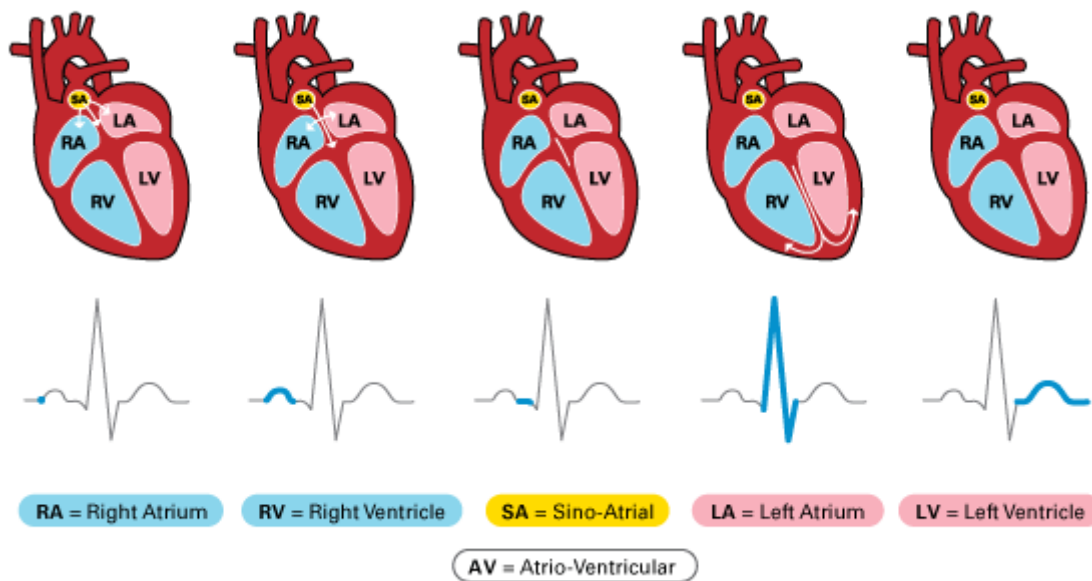
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The activities of both chambers and atriums are synchronized through their own nervous system. The main parts are neural nodes: sinus and atrioventricular (atrioventricular) Hiss's bridge and Purkyně's fibers, which transfer nerve impulses from the nerve junctions to the heart. The electrocardiogram afterwards shows each stage of the nerve impulse heart. Nerve impulses are nothing else but a weak electrical signals of contraction (shrinkage) and relaxation (release) of heart muscle. With this recording (ECG), we can check whether our heart is working properly (if the chambers and the atriums contract and release in the proper order).



Before you start your experiment

Do you think that you can influence the activity of heart? How would you do that? Write down your suggestions what and how can affect heart activity (e.g. physical activity, keeping one's breath, ...):

Affect	How will the affect manifest in electrocardiogram?

Explore the world around

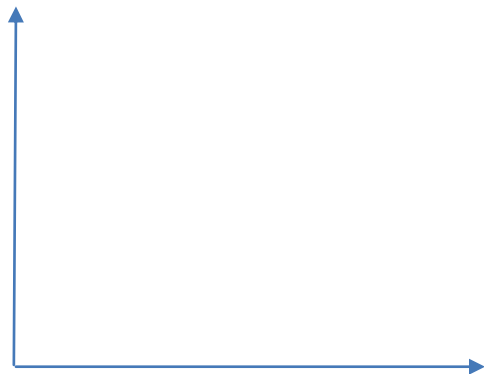
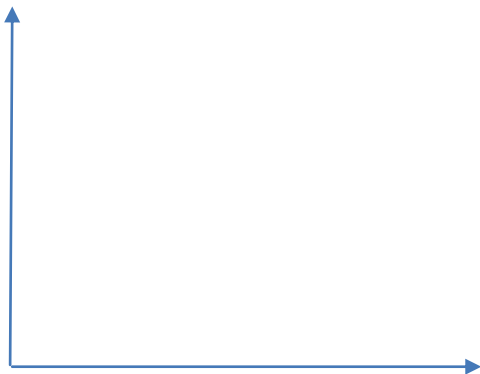
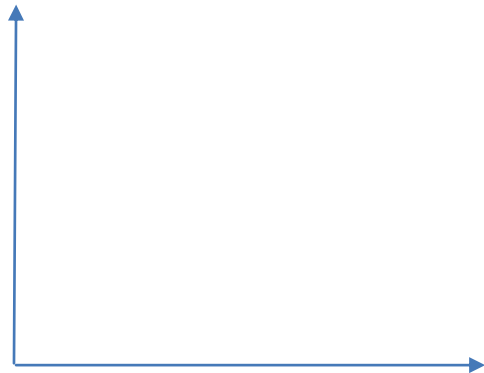
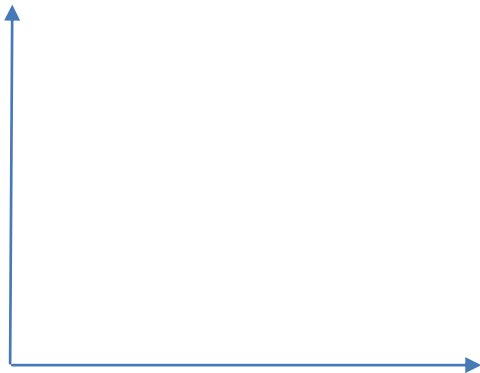
Design your own experiment

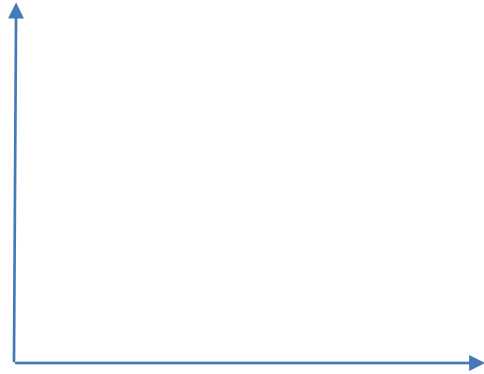
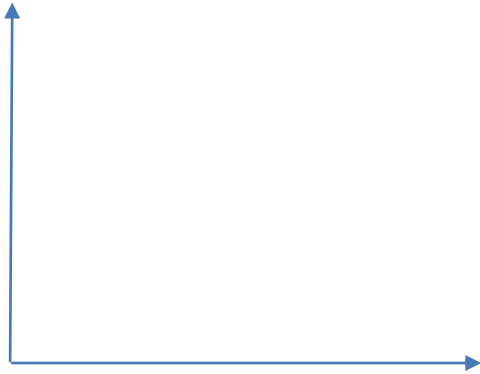
You are going to explore the possibility of influencing the ECG shape. Think about a proper design of the experiment. Write down the operating procedure. ***Do not forget to study the instructional manual before using ECG sensor.***

Description:

Data

Perform the experiment and draw down measured data into graphs. As a next step measure electrocardiograms of members of your group and compare it.





Evaluate the data

Study the measured graphs during different conditions and write down, if and how has the performed influence had effect on heart action. This is to be your data interpretation.

Conclusion

Show your results

You are not sure about the correctness of your conclusions. To confirm your ideas, you are going to write an email to well-known cardiologist in New York, Dr. Robin Freedberg. In your letter, describe the doctor how you have made the experiment, what have you found out and how have you interpreted the data. With deepest respect ask Dr. Freedberg, if he would make comments on your conclusions.
