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Laboratory 10 – Electrocardiography

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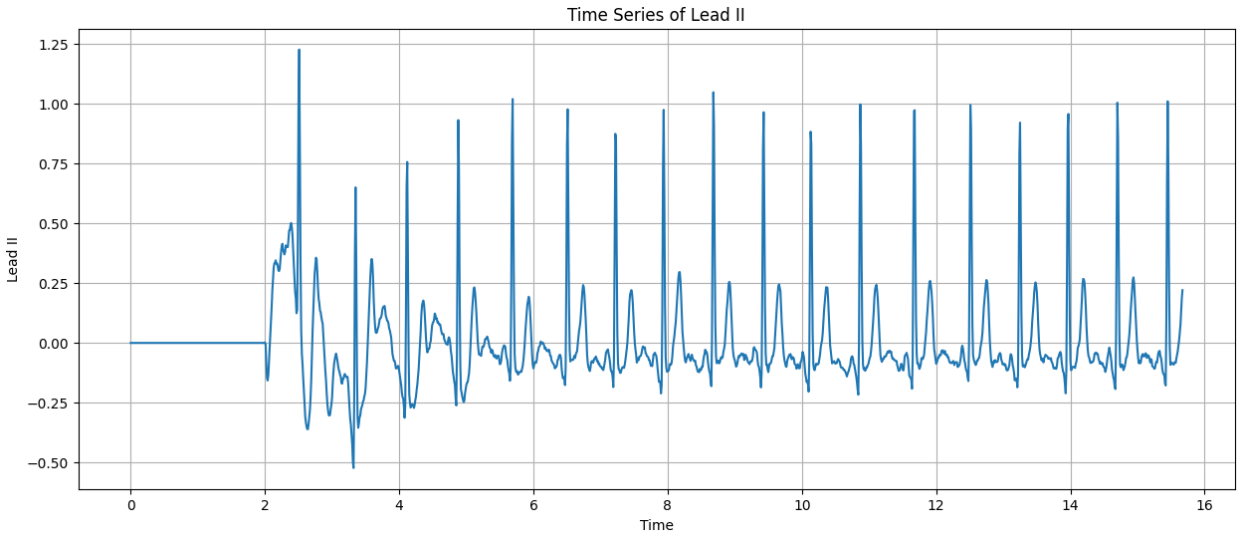
Purpose – Electrocardiography is the study of the electrical activity of the heart. Cardiac muscle cells are the sources of this electrical activity. Electrocardiograms (EKG or ECG) are graphical records that measure the change in the electrical activity of the heart. In this lab we were able to identify and explain each component of the EKG, like, be able to identify and give a function of each instrument used, understand the logic behind Einthoven's Triangle and Law, be able to identify the more common abnormalities of EKG patterns. Electrocardiogram electrodes are attached to a subject in specific arrangements known as leads. Alternating leads can affect the amplitude of the EKG wave components. Einthoven's triangle, named for the "father of electrocardiography", illustrates the three leads that are normally used to record EKGs. Three electrodes are normally attached to obtain an EKG.

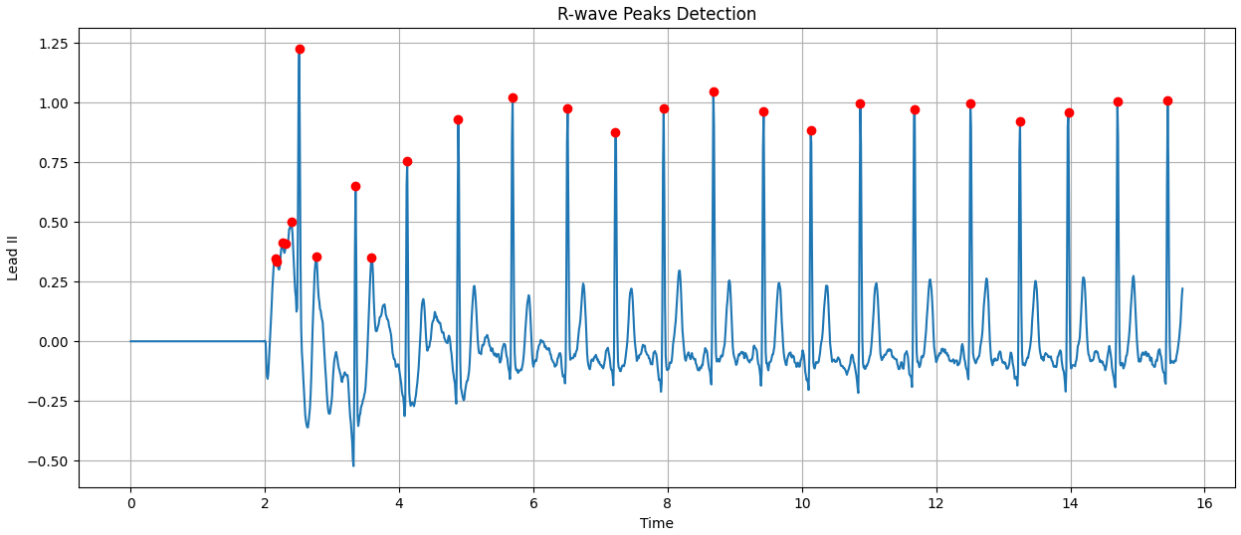
Procedures – For laboratory 10, electrocardiography we started off by having the IWX/214 unit plugged in, and that the IWX/214 unit is connected to the laptop by USB cable. Be sure that theC-AAMI-504 EEG cable is inserted into the isolated inputs of Channels 1 and 2 of the IWX/214. Be sure that the three color-coded lead wires are correctly inserted in the lead pedestal of the C-AAMI-504 EEG cable. Insert the connectors on the red, black, and green electrode lead wires into the color-coded matching sockets on the lead pedestal of the ECG cable. The white and brown lead wires can be removed and neatly placed in the Iworx case, you do not need them for Lab 10, but after the week is over, they will need to be replaced. Once everything is connected, FIRST turn on the laptop and allow it to fully boot up before you turn on the IWX/214 unit. Once the Iworx unit is on, the red indicator light on the Iworx unit should light up and you may hear the USB chime from the laptop if the laptop does not default to mute (many are set to default to mute). Open theLabscribe3program by clicking on theLabscribe3iconon the desktop. As soon as the program opens, you should see a window pop-up that says "Hardware foundIWX214:2008-1-24," click "OK.". In the second from the top row (the row that says "File Edit View Tools Settings Advanced External Devices Help"), click on the "Settings" tab. About one third of the way down the drop-down window should be a tab called "Human Heart." Click on that tab and that should lead you to a tab called "ECG-Heart Sounds." Click on that tab and the main window after you close the pdf file. Since Lab 10 is about ECG only, we can hide the lower "Heart Sounds" row by clicking on theσsymbol to the left of the row label, then clicking on the "Hide" tab, and then "Yes". Remove the disposable ECG electrodes from its envelope and snap the lead wires to the electrodes while the electrodes are still on the plastic shield. Instruct the subject to remove all jewelry from their wrists and ankles. Use an alcohol swab to clean a region of skin on the subject's right wrist, and the inside of both ankles. Let the area dry. Apply the black (-1) electrode to the scrubbed area on the right wrist. Repeat Steps 5and 6for the inside of the left ankle and the inside of the right ankle, so that the following Lead II is arranged, the black (-1) lead is attached to the right wrist, the red (+1) lead is connected to the left ankle, the green (Cor ground) lead is connected to the right ankle. Instruct the subject to sit quietly with their hands in their lap. If the subject moves, the ECG trace will move off the top or bottom of

the screen. If the subject moves any muscles in the arms or upper body, electromyograms (EMGs) from the muscles will appear on the ECG recording as noise. Click on the Record button, located on the upper right side of the Lab Scribe Main window. The signal should begin scrolling across the screen. If the ECG appears upside down in Lead II (upside down P, R and T waves), click on the upside down triangle on the far left of "σA1:ECG 0.3-35Hz," then click on the first option "Invert." This should correct the image of your Lead II ECG to be "right side up," but do this ONLY ONCE. When you have a suitable trace, type <Subject's Name> Lead II in the Mark box to the right of the Mark button. Press the Enter key on the keyboard after the recording has started to attach the comment to the data. Click on the Auto Scale tab the upper margin of the ECG channel (look for the row that says on the left "σA1: ECG 0.3-35Hz" the Auto Scale tab is the second icon after "Hz," it looks like a magnifying glass with a 2symbol on it). Your recording should look like the figure in step #4. If the ECG waves appear too compressed (too close together), consider clicking the tab above the "Mark" tab that looks like a snow-capped pyramid. When the mouse is on top of this tab, it will say "Half Display Time." Clicking this tab will spread out your ECG patterns for step 11. If you overdo that last step, reverse it by clicking on the tab that looks like double pyramids ("Double Display Time") just to the right of the Half Display Time tab. Record for approximately one minute and then click Stop to halt recording. Label one set of the five ECG waves (P, Q, R, S and T). Notice that every cycle is similar but not identical, and the distances between the QRS complexes may alter slightly. We then created our graphs.

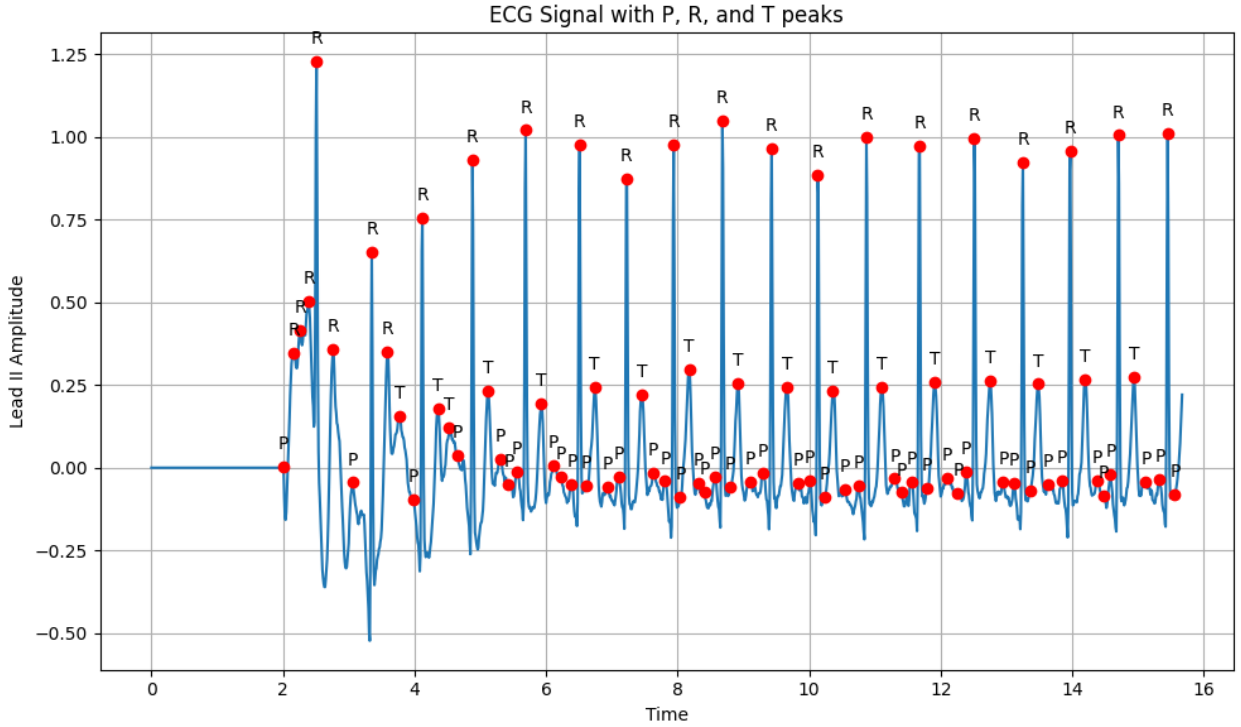
Results –

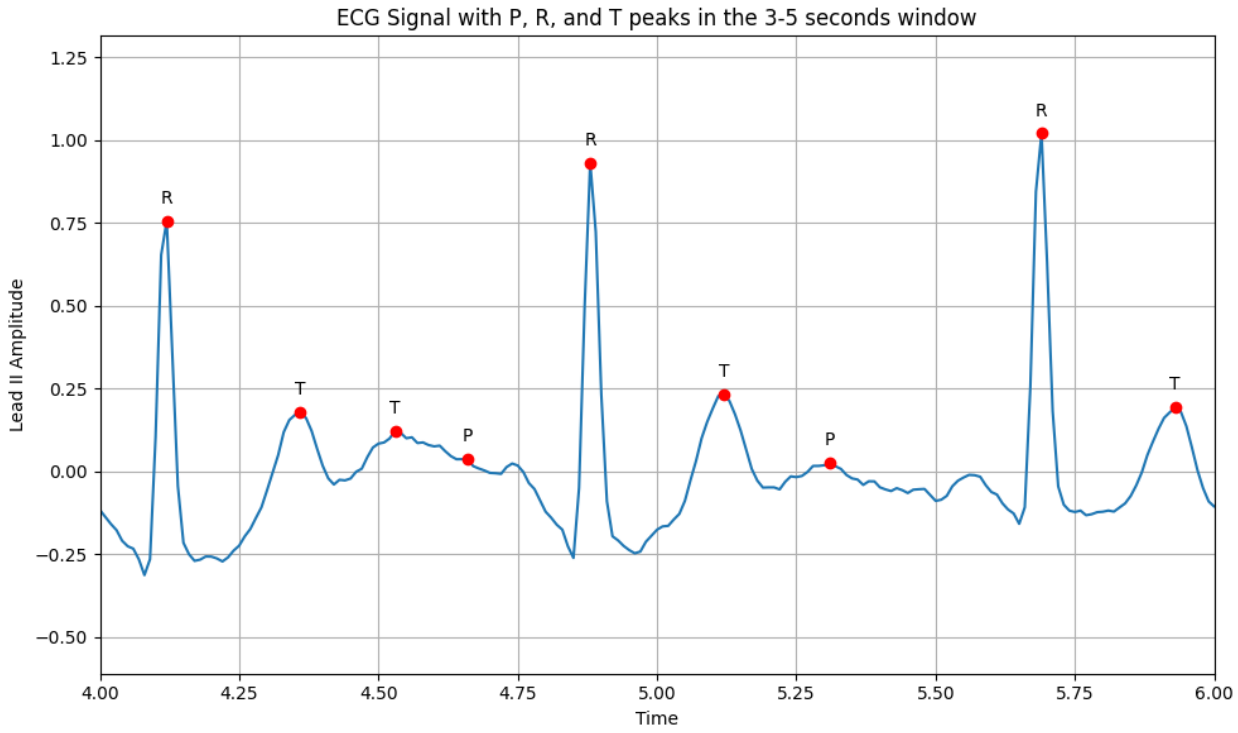
10-A Recording the EKG–Lead II





Average RR interval: 0.55 seconds
Heart rate: 108.35 BPM





Discussion – In laboratory 10 was actually very interesting. I always find the heart interesting because it's the most important thing in your body, without it we would be dead. My heart has always interested me because I usually have a high pulse and it started out of nowhere. I could be sitting down and doing nothing, and it races up to 170-180 which is scary to me. I have thought of going to a cardiologist but haven't had time. I just had an ultrasound of my heart done just yesterday and it was extremely cool because I got to see it in different angles and all 4 chambers and how it works. I got to see the left and right side of my heart. I found it cool how she was able to put the probe on my stomach and was able to view my heart that way. Even though it was scary to view my heart due to what I've experienced it was nice. We did our EKG on our lab partner and showed us that her pulse was at 108ish which was high. It was nice seeing how the graphs work and how to do the graphs. I would love to do an EKG of my heart to see how it looks and hoping everything is running just how it should. The section talking about the heart really caught my attention and hopefully we could get more in depth on that subject.

Conclusion – To conclude laboratory 10, electrocardiography, Cardiac muscle cells are the sources of this electrical activity. Electrocardiograms (EKG or ECG) are graphical records that measure the change in the electrical activity of the heart. The results on this EKG were a little confusing to me but as Dr. Oak goes over it more it makes more sense. I enjoy doing these type of labs because we get to use google collab which is one of my favorite sites as well as GitHub because everything saves on there incase you need it in the future.