RESEARCH IN ATHEROSCLEROSIS

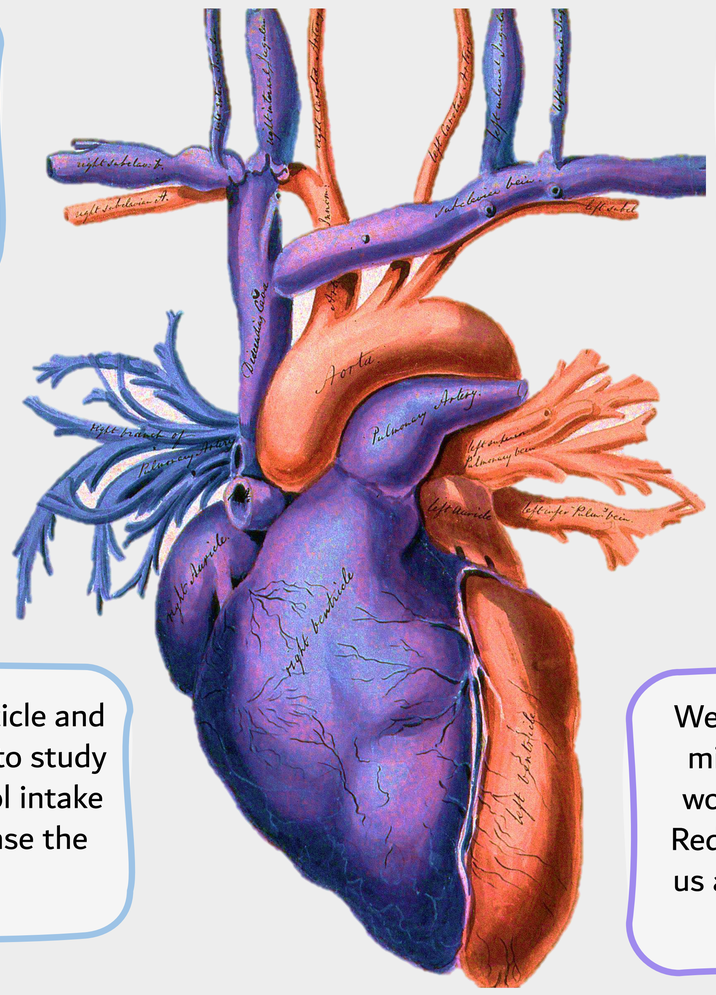
Supervised by: Dipak Ramji

Program Overview

Cardiff university's online summer program was delivered over three weeks, tackling cardiovascular diseases. During the first two weeks, we attended lectures where Professor Dipak explained aspects related to atherosclerosis including its pathogenesis, clinical manifestation, prevention methods, and experimental designs used to understand and treat the disease.

To enhance our understanding of atherosclerosis, Professor Dipak Ramji sent us relevant research papers that he and his colleagues wrote. We spent our time reading about the role of inflammatory cytokines in atherosclerosis, the positive effect of catechin on atherogenesis in vitro and in LDL receptor deficient mice, and the CANTOS trial.

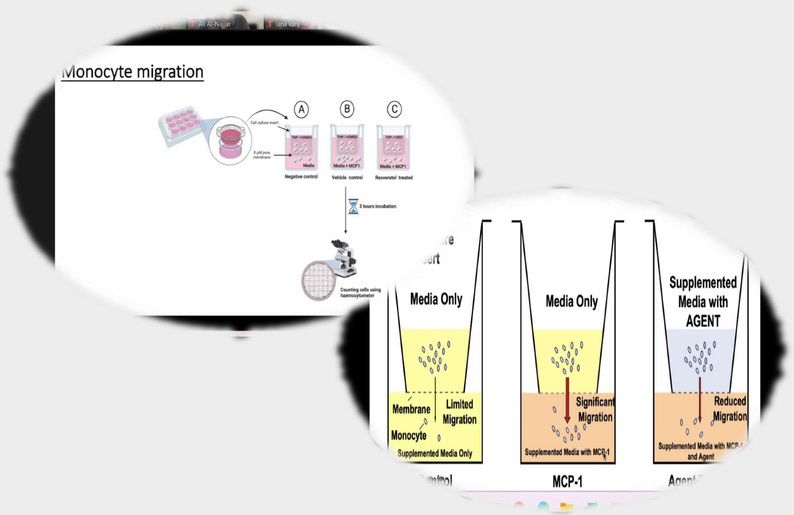
In addition , each of us was assigned to read one newspaper article and research paper about a certain issue related to atherosclerosis to study how the style of writing varies . We explored how cocoa flavanol intake improves endothelial function, how artificial sweeteners increase the risk of cardiovascular diseases, and



We had the opportunity to meet the PhD students who were working with Prof. Dipak on atherosclerosis . They explained to us how they carried out in-vivo and in vitro experiments in the laboratory and how they used immunofluorescence along with other procedures to study the results.

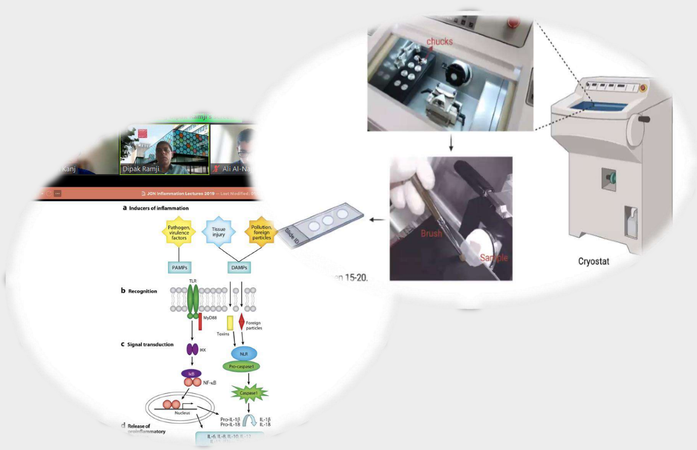
During the third week, we designed various experimental approaches to achieve the objectives of studies about atherosclerosis. We used critical analysis to weigh out the pros and cons of using one research method over the other. For example, we were asked to demonstrate that HepG2123, an agent that decreases intracellular cholesterol in hepatocyte HepG2 cell line, reduces plaque burden.

We decided that the best experiment would be on LDLr knockout mice fed on high fat diet and HepG2123 for 12 weeks Then, we would sacrifice the mice, dissect their aorta, and stain it with Oil Red O to measure the plaque and lumen size. This exercise taught us a lot about experimental designs, control group establishment, animal model selection, and data collection techniques.

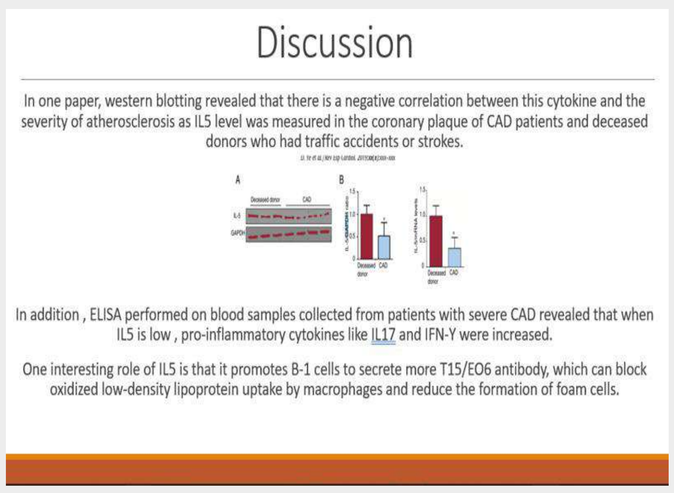


Critical Analysis Skills:

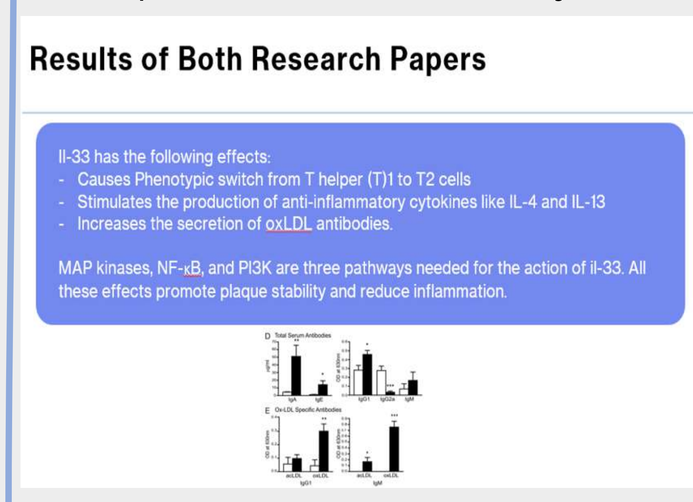
One aspect we focused on was to read and critically analyse research papers to improve our writing skills and differentiate between bad and good manuscripts. We evaluated the arrangement of the paragraphs, experimental design applied, accuracy of graphs drawn, and the statistical analysis presented. In our final week, we were asked to read research papers about a cytokine of interest and critically analyse them.



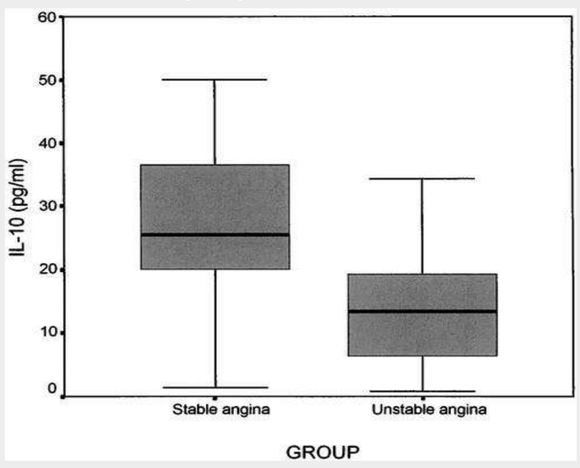
I researched about the effect of IL5 on atherosclerosis to better understand the intricate relationship between cytokines and this disease. Due to the abundant research papers published, I felt a sense of responsibility towards choosing the most accurate details for my presentation. I picked those that provided a clear , logical methodology and established various effects of IL5. This experience allowed me to appreciate the importance of recombinant IL-5 as a possible treatment for atherosclerosis due to the negative correlation between this cytokine and the severity of atherosclerosis.



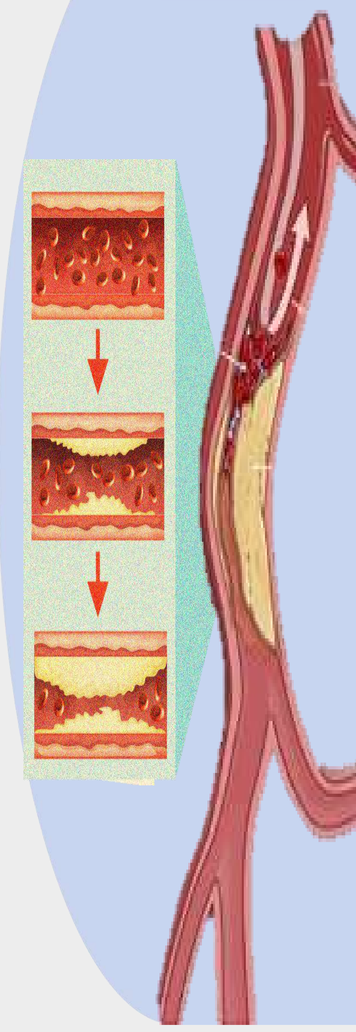
I read and critically analysed two research papers that discuss the role of interleukin-33 in atherosclerosis. Exploring an anti-atherogenic agent drove my enthusiasm as I have always read about pro-atherogenic factors. I also criticized some aspects of the research papers such as presenting inconsistent information, not providing details about the methodology of some experiments, and stating results that are not supported by statistical analysis. This project has illuminated my understanding not only of il-33 and atherosclerosis, but also of critical scientific analysis, which intensified my passion for scientific discovery.



Knowing that IL-10 is implicated in several autoimmune and inflammatory diseases like psoriasis, I was interested in researching the correlation between IL-10 levels and atherosclerosis progression. I therefore did a literature review along with critical analysis to look for papers that discussed this relationship. Of interest to me was one study which showed that IL-10 levels were significantly lower in patients with unstable angina, compared to those with stable angina. Since unstable angina is more likely to be associated with unstable atherosclerotic plaques, it can be concluded that higher IL-10 levels are associated with more stable plaques (Smith et al., 2001).



Final Week : Research



Lana Kanj

Sarah Kanj

Ali Al-Najjar

MBRU