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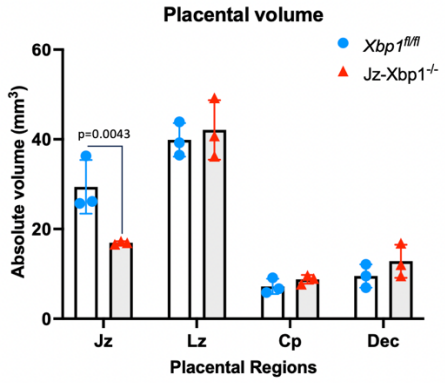
This project involved using a placenta-specific bacteriophage to genetically mutate the stress response pathways of the endoplasmic reticulum in mice. Placentas were then taken from both mutant and wildtype pregnant mice. I then processed and embedded these placentas in wax, sliced them at a width of 7 micrometres using a microtome, and placed them on glass slides. Each slide was then stained using a Haematoxylin and Eosin staining protocol refined for 7um placental tissue. The next stage of the project involved scanning the slides and using a sterology computer program to calculate the relative areas of the junctional, labyrinth, chorionic and decidual zones in each placenta. Finally a statistical analysis was performed on it yielding the following diagram:



The finding was what was expected – that the junctional zone was significantly smaller in mutants compared to wildtype mice. There was also an additional finding, which was that the structure of the labyrinth was also altered and that brown plaques were visible in some cells (we initially wondered if this was artefact, but more detailed analysis of all the samples suggested that these are in fact real plaques). We are planning to publish this data as part of a larger project on the effect of mutations in the endoplasmic reticulum and its pathways on the placenta, and also regarding their effect on women later in life (e.g ability to cause an increased risk of cardiovascular disease and diabetics).

This experience taught me lots about the nature of research, such as the importance of precise and accurate technique in laboratory research. I spent a lot of time with my supervisor Billy trying to perform a PCR, however I never managed to get accurate results due to the challenge of trying to get every step exactly accurate for every well! Other challenges included trying to improve my technique when it came to using the microtome to cut small slices of the placenta, which was very hard to do within the short time frame of my project. I also came to appreciate the challenges involved with working with animals and the protocols involved in doing so.

A very high proportion of this project was histopathology – preparing specimens and examining them under the microscope and using knowledge of different cell structures to analyse the size of the different placental layers. This project showed me the importance of histopathology in medical research in order to pick apart mechanisms of disease at a cellular level, and has led me to better appreciate the work, time and skill that goes into developing our understanding of diseases and treatments through research. I also appreciated the opportunity to speak to both researchers and clinicians about the challenges and rewards of their careers.

Overall, this project was an invaluable opportunity to experience working in a laboratory at the cutting edge of medical research and I will carry the skills I have learnt with me for the rest of my career. I am very grateful to my supervisor Billy Yung and the rest of the lab who spent so much time teaching me, and to the BDIAP for their funding which made this possible.