

Medical Electives Scheme Report

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I am honoured to have been the recipient of the RCPATH/Pathological Society of Great Britain and Ireland small elective grant. I conducted my elective in Aberdeen at the Foresterhill Health Campus.

From my perspective, an elective represents an excellent opportunity to explore an area of medicine not commonly discussed in medical school. I've long held an interest in cell biology and the applications of cell imaging in medicine. This passion is what motivated me to complete an intercalated MSc in stem cell engineering as well as undertake this project for my elective.



The key aims of my project were to compare three methods of tissue clearing to determine the most optimal method for human skin, as well as determine whether samples previously embedded in paraffin wax were viable for clearing and imaging via light sheet microscopy. Due to the wide array and variability between tissue clearing methods I was afforded a great deal of responsibility and autonomy in designing the protocols as well as selecting the appropriate primary and secondary antibodies in consultation with the pathology and microscopy departments. After a period of approximately eight weeks of lengthy clearing protocols interspersed with clinics and departmental shadowing, it was immensely satisfying to see the sample turn transparent following immersion in clearing solution – signalling that the samples were ready for light sheet microscopy.

I was incredibly fortunate to utilise a ZIESS Light Sheet 7 Microscope, recently purchased by the microscopy department at the Institute of Medical Science, Aberdeen. This is an incredibly advanced and highly expensive piece of equipment that I was incredibly fortunate to be allowed to use for my elective research project in immunofluorescence of cleared human skin biopsies. While the majority of microscopes require the use of thin sections of tissue, a light sheet microscope is able to image large samples in three-dimensions. This allows for an almost unprecedented view of tissue structure without causing photobleaching of tissue or potentially distorting structures by sectioning tissue. The light sheet microscope was a wonderful piece of technology to work with, but also a little scary due to how delicate many of the components – with the setup costing approximately £1,000,000.

Perhaps due to the equipment I was able to work with, there was considerable interest in the project from several departments. The Aberdeen Royal Infirmary Pathology and Plastic Surgery departments played a significant role in the supervision of my project as well as

allowing me the opportunity to attend clinical placements during experiment downtime. Furthermore, the staff in the microscopy department were instrumental in ensuring the success and fluidity of the experiments I undertook. Finally, the Grampian Biorepository were kindly able to provide tissue samples to work with. While the number of different departments and people were initially a little overwhelming to coordinate between, everyone was incredibly supportive and helpful – allowing me to adjust quickly.

My Learning

During the course of my elective, I found myself gaining skills across an array of areas. For one, it was amazing to be able to balance the nitty, gritty academic lab work alongside the clinical environment – allowing me to experience the present and potential future avenues of clinical practice at the same time. I also found great success in balancing the expectations of different people from multiple departments – a skill I am sure to greatly benefit from developing. Finally, the opportunity to work on such a fascinating project with access to the light sheet microscope illustrate to me the sheer breadth of experiences available to a medical student undertaking an elective.

I would like to take this opportunity to once again thank the Royal College of Pathologists and British Society for the Pathological Society of Great Britain and Ireland for making this feasible with the small elective grant.

Next Steps

I seek to present and publish the results of my elective as I hope that it will aid others in selecting the most appropriate method for tissue clearing in future. As I begin foundation training in 2025, I seek to continue the work started with this project. Both the Pathology and Plastic Surgery Departments have expressed interest in working with cleared keloid scar tissue to better understand the condition and how it may differ paediatric and adult cases. Looking farther beyond, I would like to complete a PhD alongside specialty training in order to further myself and my ability in both domains of medicine.