BDIAP ELECTIVE BURSARY THANK YOU REPORT

Year of award: 2024-2025

Topic of elective: Characterising retinal degeneration in a new animal model of retinitis pigmentosa using immunofluorescence microscopy and histological staining

Department: Biosciences Institute, International Centre for Life, Newcastle upon Tyne, UK

I am incredibly grateful to the BDIAP for their generous elective bursary grant that allowed me to complete my research elective in Ophthalmology. I was based in a retinal laboratory under the supervision of renowned professor of stem cell research Professor Majlinda Lako for the full 8 weeks.

During this time I received instruction in immunofluorescence, histological staining, Axiocam 4 and Axiocam Observer microscopy, and murine retinal dissection to create wholemounts to be stained using immunofluorescence. Thanks to their incredible teaching, by the second month I was able to complete all experiments independently, surrounded by an incredible team of researchers.

I was involved in a full laboratory research project that is externally funded by research grants with hopes to enter Phase 1/Phase 2 clinical trials within the next year. We were predominantly using immunofluorescence microscopy in order to characterise the retinal degradation timeline in an *rd10* mouse model of retinitis pigmentosa to determine peak photoreceptor degeneration. Using the retinal organoid cells that the group is developing in their tissue culture labs, photoreceptor precursor stem cells are then injected into the eyes of immunosuppressed wild-type and varying postnatal day *rd10* mice. Behavioural experiments are then conducted to determine and quantify any visual restoration. My individual project, instructed and supervised by a PhD student, was to determine the peak incidence of photoreceptor death, and to further characterise the degradation of the remaining retinal cellular architecture, to be used in the determination of which postnatal day is most optimum to inject the mice. The hope is that transplanted organoid-derived stem cells are able to be the future of human vision restoration.

I had conducted a laboratory-based undergraduate research project previously and it was a much welcome break post-exams to return to using a completely different part of my brain than is required for rope learning medical examination content. A first for me was being involved in a medical/research team that was female lead and female dominant. As a woman in medicine I think it is incredibly important to see and be involved in these spaces, and I was so grateful to be in the presence of such impeccable leadership. The knowledge held by these professors and doctors, and the way their minds were so in-sync that in weekly project meetings they would ask the most scientifically obscure question to the presenter, with others replying “that was going to be my question as well”, was beyond inspiring. It has completely re-energised me in a way that I didn’t know that I needed.

Further, I was very lucky to be able to observe the animal studies that took place with the mice in a series of tunnels under our medical school – a rumour that had been circulating for

9+ years and that I was fortunate to able to confirm for myself. We spent 2 hours testing for visual responses in a blind postnatal day 200 rd10 mouse through various experiments. Much to my dismay and without my prior knowledge, the mouse I had spent the morning with was to be sacrificed by cervical dislocation immediately after completion of the behavioural experiments during which I felt we had somewhat bonded. In the interest of being earnest, watching it was horrifying, however it was something I decided before that I felt as if I ought to see. My only wish is that I had had this uncomfortable experience earlier on in the placement, before I had worked on any of the murine retinal cryosections or dissected any eyes myself. It is a core memory that I will take with me and has given me a newer, deeper appreciation for all animal and human sacrifice given in the name of medical research.

I had an absolutely incredible time during my elective, again made possible by the generosity of BDIAP. I aim to present my findings at a conference at some point in 2025 and am so fortunate as to having been granted co-authorship by my professor upon publication of the full research paper. I am excited to keep up to date with the group's future work in their clinical trials, and to have met scientists whose lifelong careers I cannot wait to follow.

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