

Helen Cossar- Summer Internship

Five weeks of my Summer was spent in Andre Furger's genetics lab in the Biochemistry department of the University of Oxford. I worked alongside two PhD students, Harriet Lester and Alistair Louis, and though I did not carry out an independent research project, I found working with more experienced members of team greatly enhanced my practical lab capabilities as well as my understanding of the theory behind my work.

The majority of my time was spent on a complicated and novel cellular fractionation technique, that had been developed in the lab in order to distinguish between nuclear and cytoplasmic RNA. This separation allowed the gene expression effects of changing stimuli to be compared in each region, so that a more accurate conclusion could be drawn from the change in the number of RNA isoform reads. For example, the influenza viral protein NS1, induces several pathways in an infected cell that affect gene expression, and of interest to us was the altering of the cleavage and polyadenylation site to give a more, or less, stable mRNA transcript. The rate of decay of this transcript will alter the final concentration of corresponding protein in the cell. By looking at the number of RNA reads in each compartment the mechanistic pathway of NS1 action on gene expression can be classified as a nuclear or cytoplasmic event. In recent literature, the lab had gone on to define nuclear RNA PolyA regulation as 'active' and cytoplasmic as 'passive' owing to their differing origin. By studying the RNA changes in this way, a greater resolution can be observed when analysing changes in RNA level than solely by looking at the whole cell RNA extract.

Once I had completed this protocol a few times, we set about tweaking steps in order to maximise yield of our final RNA products. This, I found most engaging as it was the first time I had really thought about the steps I was carrying out during lab work, and how the theoretical learning I had so far covered in my course could be directly applied a protocol. Being able to collaborate during this process was invaluable, as the protocol was extremely detailed and specific as to precision, and I found my understanding of basic lab technique improved greatly as a result.

In addition to working on fractionation, I was able to partake in cell culture, western and northern blotting, procedures I had learnt about throughout my course but never attempted. Having now successfully run samples in these gels

and observed the difference in their creation I am much better equipped to return to my course.

In short, my time in this lab has brought me skills that will assist in my remaining time here at Oxford, as well as into the future. I have found it intensely rewarding and motivating to be able to work amongst academics and still be given the freedom to schedule my experiments and alter my work to my needs. The opportunity to be involved with live experiments, and observe the day in workings of the lab has been enlightening and I hope very much to be able to experience this environment again.