

Christian Kirk Summer Project Report: An Exploration of Protists: From the Pond to the Tadpole

As part of Merton's Summer Project Scheme, I joined the lab of Professor Thomas Richard's, an expert in protists. Protists, also referred to as 'protozoan', make up a large proportion of diversity of life on the earth. However, many people are unsure of what this group of organisms really is. In short, this is a group of mainly single cellular organisms which possess a nucleus (the control centre of the cell that houses DNA); this is in contrast to bacteria or viruses, which do not contain a nucleus and keeps its DNA loose within its cell. The more famous members of this group include brown and red algae, slime mould and diatoms, as well as the causative agents of malaria (*Plasmodium spp.*) and sleeping sickness (*Trypanosoma brucei*).

My research at the Richard's lab focussed on two main areas: Developing diagnostic tools for a protist parasite of tadpoles and assisting in the sorting and characterisation of various algae and amoebae for the Darwin Tree of Life project.

Protists in the genus 'Perkinsis', a group closely related to that which cause malaria, has been known to infect frogs in the Americas for some time now. However, recently it has begun to be noticed in frogs within the U.K.. Researcher's in the Richard's lab have been investigating the pathogen causing this, trying to determine its presence in different tadpole specimens sent in by breeders and citizen scientists (<http://tadpole-doctor.co.uk/>). As part of my summer project, I was assisting a senior researcher in their attempts to optimise the process of determining the presence of the perkinsis pathogen. This involved extracting DNA from the livers of dissected tadpoles, amplifying it to create lots of copies, and then sequencing the genetic code of that DNA to see if it matches that of perkinsis. Additionally, different sequences from the samples are compared to determine an evolutionary tree, to determine if there has been any genetic changes while infecting hosts in the U.K.

The other strand of research I was engaged in was sorting and characterising cells using a technique known as 'flow cytometry'. This technique utilises lasers to detect and sort out single cells from large cultures or environmental samples. Samples specific species of protists, such as algae and amoebas, were concentrated in order to be sent off for sequencing as part of the Darwin Tree of Life project: a multi-institution collaboration to sequence the genomes of all 70,000 eukaryotic species in the U.K. and Ireland. This same technique is also being deployed in the lab to analyse the host-parasite interactions of chytrid fungal parasites of diatom algae.

Overall, it was an amazing experience to be part of such ground-breaking experience! I was able to learn, practice and effectively utilise a variety of essential laboratory skill that I will be able to take forward into the future; I am incredibly thankful for Thomas Richards, the members of his lab, and Merton College for allowing this experience to happen.