



Dear Newnham US Alumnae,

Hello again! After three very eventful months, my belongings have once again arrived in Old Hall. A large bottle of maple syrup and an odd, three-ring folder of scientific papers have joined the shelves, as well as a hefty gigabyte or so of lab data, on my desktop – all souvenirs from Ottawa, Canada.

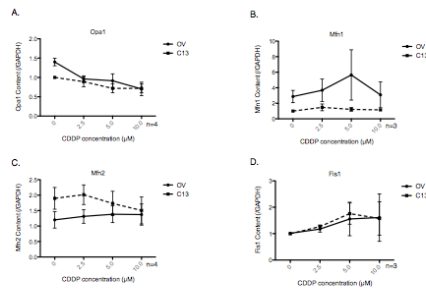
And although it is certainly nice to be back, I was reluctant to say goodbye to many things in Canada! In my time there, I had become very close with my fellow lab-mates, gotten to know two wonderful Newnham alumnae, reunited with childhood friends, and had only just begun to bask in the completion of my cancer project before I was whisked away to Cambridge. In many ways, I feel that my summer was the type of experience that snowballs over time, getting better and better, and just as things were really picking up speed, I had to say my farewells!

That said though, such an experience (research, traveling, meeting new people) could have happily gone on for years and years, and three months was probably the perfect length of time for all the intents and purposes of any undergraduate. In my case, these intents and purposes were: to get a taste of what life might be like in this field, to learn to think through research questions, and of course, to pick up some useful tips and tricks to put to good use in my Part II Genetics project. I hadn't been entirely sure of what to expect, and thought it a little naïve to expand on this list too much, but as it turned out, I did indeed manage all of the above and more! I had successfully immersed myself in lab-life (to the point that the once politely-distant lab-mates had fully initiated me as one of their own), worked with Dr Tsang to intellectually attack my research question from all directions, and quietly digested various pointers, coveted protocol secrets, record-keeping tips, and insider knowledge ("Don't order antibodies from that company,") that my wiser and more knowledgeable laboratory-seniors were kind enough to share with me.

I'd also harboured the tiny hope that, perhaps if things went *really* smoothly, I could attain a set of results that were of some scientific significance or contribution to the lab. In the deep end though, "smooth sailing" is neither a prerequisite nor a consideration for your actions, and with the support of my lab-mates and Dr Tsang, we managed to plough through the complications (there was a rather discouraging period of about two weeks when experiments that took three days to complete would fail, repeatedly), and come out with not one, but *two* sets of experimental results: two separate drug-treatment experiments, each repeated for four proteins, for two different ovarian cancer cell lines (sensitive or resistant to chemotherapy), all of which were carried out between three to five times! We'd chosen the proteins for their involvement in the cell-death signaling pathway (which the chemotherapy drug triggers); we were hoping to see how they responded to chemotherapy drug treatment. In particular, we'd hoped that if they responded in one cell type but not the other (chemoresistant versus chemosensitive), then maybe it could form a new basis of resistance to chemotherapy, which the lab could then pursue! Out of the four, one looked particularly promising – it steadily declined with drug treatment in chemosensitive cells, but not chemoresistant ones, suggesting that they might be

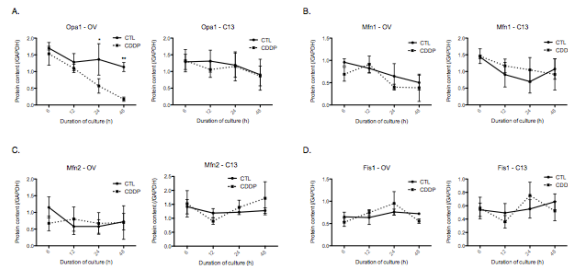
helping to keep the chemoresistant cells alive. The thing about cancer research though, as I've been told, is that the possibilities of interactions are endless, and in a system where everything is connected, it is common to find relationships between two factors if one were to go looking for them – the real difficulty is in finding relationships of causation, and not just association. It's certainly a sober thought, but hopefully something good will come of my contributions!

Figure 1.



**Figure 1. Mitochondrial fission and fusion protein expression in response to 10µM CDDP treatment.**  
 A) Opa1 downregulation is dose-dependent in both chemosensitive (OV2008) and chemoresistant (C13) cells [2-Way ANOVA: CDDP concentration (p<0.005)]  
 B) Mfn1 levels are lower in chemoresistant cells (C13) than in chemosensitive cells (OV2008) [2-way ANOVA: Cell line (p<0.05)]  
 C) Mfn2 levels are lower in chemoresistant cells (C13) than in chemosensitive cells (OV2008) [2-way ANOVA: Cell line (p<0.05)]  
 D) Fis1 levels respond similarly to CDDP treatment in both chemosensitive (OV2008) and chemoresistant cells (C13)  
 Results are expressed as Mean ± SEM.

Figure 2.



**Figure 2. The response of Opa1 to 10µM CDDP treatment is most significant over time.**  
 A) The downregulation of the mitochondrial fusion protein Opa1 is time dependent [3-way ANOVA: Duration of culture (p<0.05)] and is significantly lower in chemosensitive cells (OV2008) but not chemoresistant cells (C13).  
 B) Mfn1 levels respond to CDDP treatment in a cell-line dependent manner [3-way ANOVA: Cell line (p<0.001), (Duration of culture (p<0.058))].  
 C) Mfn2 levels respond to CDDP treatment in a cell-line dependent manner [3-way ANOVA: Cell line (p<0.001), (Duration of culture (p<0.053))].  
 D) Fis1 levels respond to CDDP treatment in a cell-line dependent manner [3-way ANOVA: Cell line (p<0.01)].  
 [p<0.05, \*\*p<0.01 (versus CTL); Bonferroni]  
 Results are expressed as Mean ± SEM (n = 3 replicate experiments).

The figures of my results: “Dose response” experiments on left (showing how the levels of four proteins change with increasing chemotherapy drug doses); “Time Course” experiments on the right (comparing protein level changes in response to a drug over time, in chemosensitive and chemoresistant cell lines).

As the saying goes, some of the best things are unplanned; I am quite certain that had I not gone through the ups and downs of failed experiments, I would have left the lab with the sheltered view that research mostly goes according to plan. Most likely, I wouldn't have become as close to the other students and post-docs in the lab either, and it is those relationships which I've come to cherish the most from this summer!

Another one of the other great experiences that I'd like to share from last summer is my meeting with Jane Buckley and Maggie Norman, fellow Newnhamites in Canada. It was wonderful to swap stories about our lives at Newnham, particularly about relatives who had also attended Newnham to study science, and worked in the Old Labs. Near the end of my summer, Jane also invited me as her guest to a Women in Science Dinner Group dinner, where I had the chance to meet and chat with people who were, once again, far wiser and more knowledgeable than myself. I was met with stories of traveling the world, volunteering in editing and publishing, and dream-careers ranging from working at the WHO, to hand-drawing maps from aerial photographs, back in the day. If anything, my brief encounter with these Women in Science gave me that extra nudge of inspiration to be a little more adventurous, a little less “safe”, and a lot more committed in finding that *something* that I would really love to do.



Myself, Maggie Norman, and Jane Buckley

As of yet, I have no grand, life-altering plans, but I *have* decided to go out on a limb and give a Pudding Seminar in college next month! Members of college are invited to listen to short seminars in Sidgwick Hall once a week, presented by other members of college, accompanied by tea and cake. I'd decided to sign myself up after thoroughly enjoying presenting my project proposal to the Tsang lab meeting; I'm hoping to present my project again, this time with a few results!

This summer has given me the means to pursue a research and the guts to try my hand at scientific communication for the first time (scientific writing has always been a dream of mine!). I owe these experiences to Dr Tsang, the members of the Tsang lab, Jane, Maggie, the Women in Science, and all of the Newnham US Alumni. Thank you all so much, for not just your generous support, but also your faith in my summer project before it had even begun! I was bursting with Newnham pride all the way in Canada after hearing stories of Newnham from Jane and Maggie, and I hope that in some way, this has done the same for you!

Kind regards, and thank you all again!

Ella Fung