

Doctors in Training Grant

FINAL REPORT

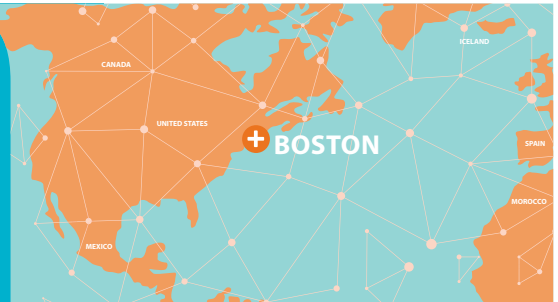


A casual jog past the White House

Dr Mark Dowling

Research project – **Neurological complications in recipients of bone marrow transplants**

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My time at the Massachusetts General Hospital (MGH) in Boston, United States of America, passed by very quickly but I gained a lot from it. With the support of an MIGA Doctors in Training Grant, I travelled to the MGH from May to July 2016 to work with the leukemia and bone marrow transplant service on a clinical research project studying neurological complications after bone marrow transplantation. I also used the time in Boston to learn more about areas of medicine of interest to me as a future career, in particular immunotherapy for haematological malignancies.

As described in my Preliminary Report, my project focused on neurological complications in patients undergoing bone marrow transplantation for haematological malignancies, with the aim of identifying risk factors such as demographics, the conditioning regimen, stem cell source and graft-versus-host disease prophylaxis. I completed a retrospective review of all consecutive allogeneic transplants performed at MGH between 2000 and 2010. Our results confirmed some of the previous studies in this area, as well as provided further data on the risk factors for neurological complication and its impact on progression-free and overall survival. Future work will focus on strategies to reduce neurologic complications. This study is currently being prepared for publication.

After completing the majority of the data collection for my project, I used some of my remaining time in Boston to learn more about current approaches to cancer immunotherapy.

I have a background in basic immunology, and was a postdoctoral fellow in immunology at the Walter and Eliza Hall Institute of Medical Research (WEHI) prior to studying medicine. I am interested in using my immunology training in my future career, and cancer immunotherapy is an area that I have followed with interest as there have been great developments in recent years.

In late June, I attended the Federation of Clinical Immunology Societies (FOCIS) meeting, which happened to be held in Boston. This is an international meeting attended by clinicians and scientists from all over the world. Cancer immunotherapy was a prominent theme, with presentations of cutting-edge research in therapies such as checkpoint inhibition, adoptive cell therapy (for example, chimeric antigen receptor T cells – CAR-T cells), monoclonal antibodies, Bi-specific T cell Engagers (BiTEs) and cancer vaccines, as well as other exciting areas of clinical immunology such as autoimmunity. I was also able to attend a one day computational immunology course prior to the conference, also organised by FOCIS, to learn more about state-of-the-art sequencing techniques (for example, next-generation sequencing) and bioinformatics approaches to analysing large data sets. This was a valuable learning and networking experience and it was fortuitous that this conference coincided with my time in Boston.

I also visited some of the laboratories working on cancer immunotherapy at the MGH research campus at Charlestown Navy Yard, at the Broad Institute of MIT and Harvard, and at the Dana Faber Cancer Institute.

I had the opportunity to present some of my immunology research to the cancer immunology division at the Dana Faber Cancer Institute in a seminar entitled "Quantitative methods for studying the adaptive immune response – insights into signal integration and cell fate choice at the single-cell level". This was a good opportunity to develop collaborations related to my laboratory research in immunology.

Towards the end of my time in Boston I decided to travel down the East coast of the US to visit some other cities and see the other hospitals and institutions that have links and collaborations with the MGH to explore future research opportunities. I travelled to Washington DC and took some time to see the White House, Capitol Hill and National Mall, and visit some of the many free museums such as the Smithsonian. I spent a day visiting the National Institutes of Health (NIH) in Bethesda, Maryland, which is on the subway from DC. The NIH is an impressive institution, quite unique in the US in that it is publically funded – patients may be referred from all over the US and are generally treated on clinical trials at no expense to themselves. Often these are the most challenging and difficult-to-treat cases. The aim is to support early-phase trials and innovative research. After DC I travelled to Baltimore, Maryland, and visited another famous hospital in the history of cancer research, the Johns Hopkins Hospital. Johns Hopkins was one of the first places that successfully grew cancer cells in vitro, establishing cell lines, including the now-famous "HeLa" line (a somewhat controversial story because of the circumstances under which the cells were obtained). I also took some time on the way back to visit New York City for a weekend.

Looking back, I feel like I crammed a lot into those three months. It was a great opportunity to gain some experience in clinical research, while also taking advantages of the rich academic life in Boston to learn about cutting-edge treatments and to meet some of the leaders in the field. I would like to thank MIGA once again for supporting me.



Sitting with Albert Einstein in Washington DC

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