Lab Spotlight: Murphy Lab

simplyblood.org/2020/05/lab-spotlight-murphy-lab.html

ISEH Headquarters May 21, 2020

simply blood

Deconstructing Blood Cell Research
Building the Hematology Community

Each month, Simply Blood spotlights a lab focused on the research of basic hematology, immunology, stem cell research, cell and gene therapy, and other related aspects. Get to know these different labs around the world! This month, we are featuring the Murphy Lab at the Baker Heart and Diabetes Institute in Melbourne, Australia.

How long have you had your lab?
4 years

How many members make up your lab? Students/postdocs?
We currently have 3 postdocs, 5 Ph.D. students, and 2 Honours students.

What is the major research theme of your lab?
My lab focuses on how chronic inflammatory disorders promote the enhanced production of myeloid cells. This is largely in the context of cardiovascular disease (CVD) and the associated co-morbidities and dietary risk-factors. This is important as we and others have shown over the past 5-10 years that enhanced production of myeloid cells directly influences CVD. Thus, understanding the different mechanisms each risk-factor utilizes to communicate with the hematopoietic system is critical in identifying how and why specific therapies could be used to limit or return myeloid cell production back to normal.

What is the most exciting project in your lab right now?
My laboratory has a number of areas we are exploring. These include novel modulators of the hematopoietic stem cell niche to either mobilise or retain HSCs in the marrow. We have a large program exploring how high salt diets alter hematopoiesis. We also have a number of projects on lipid metabolism not only in hematopoietic stem and progenitor cells, but also in monocytes and macrophages particularly in the context of CVD.

What's your best approach to mentoring students in the lab?
I like the approach of getting students in the lab to have the mindset that this is the start of their career and what they put in, they get out. However, I do believe it is critical to train

students properly in laboratory techniques and ensure they fully understand the purpose and fundamental reason of every step of the protocol. Doing this, allows them to learn and troubleshoot any problems easily. Then project-wise, I like to pair them up with a postdoc but make sure they are working on a project that they really engage with and can have ownership of as that is when their creativity and passion comes out and they begin to excel. The other important point I try to make is that everyone is equal and will be given the same opportunities throughout their PhD.

What's the biggest accomplishment your lab has had recently?
My senior postdoc, Dr Graeme Lancaster, was successful in obtaining a 3 year project grant from our national funding body, the National Health and Medical Research Council of Australia, where the success rates are only 11%.

What is the key to running a successful lab?
The most important thing is to keep a good working environment and culture. Making sure everyone is happy and then the work ethic will follow. Encouraging creativity, critical thinking and following the data. What drives us all is the thrill of discovery. It is also important to have great collaborators, I was lucky to establish a great friendship and collaboration with Dr. Prabhakara Nagareddy (Ohio State) when we were post-docs at Columbia University, which has yielded numerous publications, frequent (almost weekly) skype calls to discuss current and new projects so we can use the strengths of both our laboratories to make discoveries. Good mentors are also important to draw advice from.

What facilities or equipment does your lab absolutely depend on?
We have a motto in my lab, ‘If you can do it by flow, then give it a go’… so yes, we live on the flow cytometers. Most of our models are in vivo, so we rely on genetics to test hypotheses. More recently, we have been utilizing single cell RNA sequencing which my group set up at the Baker. We have also recently purchased a Zeiss multiphoton microscope with two tuneable lasers, this will dramatically boost our in vivo and deep ex vivo imaging capabilities which we are very excited about!

What has been your greatest challenge in managing your lab?
Managing people, making sure everyone gets along so we can collectively achieve our goals. Making sure the environment and culture is enjoyable, while keeping a good and creative work ethic. Otherwise, it has been making sure the lab is well funded, which in the Australian funding environment where success rates in some categories have fallen below 10% is hard. I have been fortunate enough to maintain independent funding for myself and my group since 2013, when I returned to Australia following my postdoc at Columbia University in New York.

Does your lab attend the ISEH annual meeting?
We have only just started attending ISEH in recent years as our research focus has moved

more and more into the area of hematology. We have really enjoyed them and have taken away a lot from them. These meetings will be a regular for us. This year we will be joining virtually and hopefully we are all clear to travel to the New York meeting in 2021.

How do members of your lab celebrate accomplishments?
For grants, as soon as we find out, no matter what time it is we have a whisky. But generally, we have champagne for papers, cake for birthdays, and go to some amazing local bars. At the Baker, we also have monthly research prizes for the top paper published as determined by impact factor along with the best paper of the year, which we have won a few times. So, by the end of the year we generally have enough prize money that we put towards our laboratory Christmas party to celebrate the collective year's achievements. At the end of 2019 we hired a boat and cruised down the Yarra River drinking and eating and playing card games, etc (remember its summer down here!).