Lab Spotlight: The Machlus Lab

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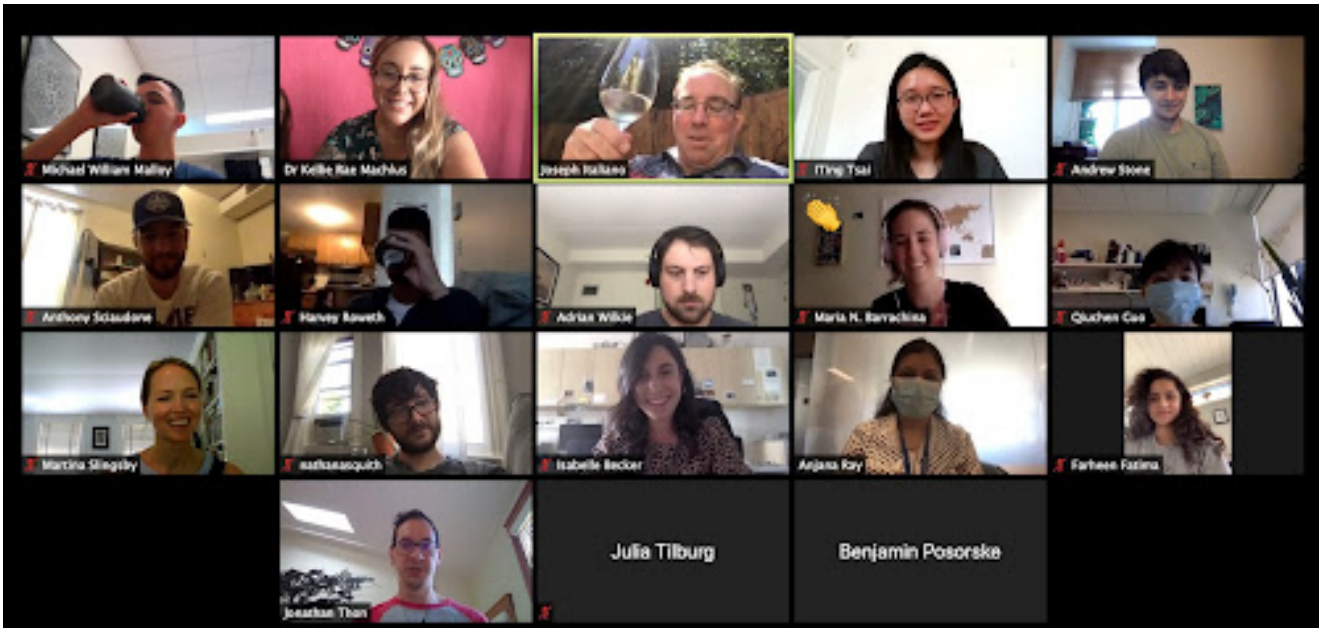
Deconstructing Blood Cell Research
Building the Hematology Community

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 Machlus Lab at Harvard Medical School Brigham and Women's Hospital!



1. How long has your lab been open?
The Machlus Lab has been open for about 2.5 years!

2. What is the current composition of the Machlus lab?
We are still small, with 2 postdocs and 2 research technicians. However, we are part of a larger group- the BWH Platelet Group- with 4 different PIs working on platelets, megakaryocytes, and hematopoiesis. We share space and have lab meetings together, so it feels like one big happy family!

3. What are the overarching research goals of the Machlus Lab?
Ultimately, we aim to determine what triggers megakaryocytes to make platelets in both normal physiology and inflammatory conditions such as autoimmune diseases. If we can understand the basic cell biology of these processes, we can design therapeutics to modify platelets counts so we can 1) increase platelets in patients with thrombocytopenia and 2) alter platelet count and function in inflammatory conditions that lead to pathological thrombosis.

4. What new and exciting projects are underway in your lab?
Oh! So many! We have two main projects and then some exciting side projects in the wings. One of our main projects is looking at how the chemokine CCL5 (RANTES) can modify platelet counts. Keep your eyes open for this one because we think it may be playing a major role in inflammatory hematopoiesis. Also, we have this really cool project which just got published about the role of platelet-derived vesicles in modifying the bone marrow. We found that during inflammation, activated platelets release vesicles that actually return to the bone marrow and bind to CD41+ cells to alter their function. Since platelets are known to take up inflammatory proteins from the plasma, we think that the platelet vesicles may be acting like little couriers, delivering signals from the plasma directly to bone marrow cells. We are excited to look further at how this new player may be modifying the bone marrow in different pathological states!

5. What core facilities and specialized research equipment are necessary to support your science?
Honestly, not much- we are a pretty classic cell biology lab. We rely heavily on flow cytometry, so we need a cytometer that has at least 12 colors. We love doing microscopy to support our quantitative data (seeing is believing!) and have two really nice fluorescent scopes in the lab. We also take advantage of the incredible Nikon Imaging Core at Harvard Medical School run by the incomparable Jennifer Waters.

6. Can you share any recent scientific accomplishments from the Machlus Lab? How did the lab celebrate?
We just had a really exciting milestone; our first Original Research article was published! We usually celebrate by popping champagne the moment we get good news. This time we did a ‘social distance’ celebration on Zoom. I have included that picture here because it was a wonderful moment. I am also so proud of my team for how they have, and continue to, stick together during these last few months. We have had daily check-ins and weekly lab meetings and some aspects of our science have undoubtedly grown stronger from having the time and space to step back and think through our projects. However, my philosophy is also to always celebrate the submission of a paper or grant. No matter the outcome, I think it is important to acknowledge all the hard work that goes into creating and submitting your science. Getting accepted/funded is just a bonus, which obviously requires more celebrating.

7. What is your mentoring philosophy?
I try to meet people where they are. My non-negotiable is a love and passion for science. If you have that, I am committed to helping you achieve your goals (whether it be to lead you own lab, become a medical writer, entrepreneur, etc.). Everyone comes with their own strengths and weaknesses and it is my job to nurture the strengths and identify and help fill in any weaknesses. I want trainees to leave my lab with the confidence that they have all the skills necessary to develop a project, do the science, and communicate their ideas effectively (writing grants/papers and giving presentations).

8. What has been your greatest challenge in leading your lab? What advice would you give to those struggling with a similar challenge?
One of the biggest challenges in starting my lab has been gaining momentum in the first couple of years. The first year or so is incredibly hectic and a lot of things are changing at once, which makes it hard to get into a good experimental groove. This, in turn, can be really anxiety-provoking because you feel like your science isn't making progress. My advice is- this is normal and happens to everyone, so try not to worry! In our third year, we are finally finding our groove and the projects are getting rolling again. With a little patience I could have saved myself many of sleepless nights.

9. How do you work to build an inclusive community of scientists in your lab?
I am so glad that you asked this question- it is something that I think about a lot. The key word here is 'work'. I have realized is that you have to always be actively working to build a diverse and supportive environment in the lab. One of the ways that I try to do this is by having a policy of transparency and openness. My goal in doing this is to keep the lines of communication very much open so that we can have honest conversations about people's mental health, lab culture, racism/sexism in science, and the ways in which these things may be affecting each lab member. Since everyone is unique, tacking these issues may look very different for each person. However, it is my job to ensure that everyone feels safe and part of a supportive team.

10. The Blood and Bone seminar series that you established has been incredibly successful in bringing hematology research to scientists at an international level during quarantine. How do you envision Blood and Bone evolving as labs begin to re-open?
The Blood and Bone seminar series has definitely been more successful than I ever could have imagined. One of the best parts of this for me is bringing incredibly impactful science to communities around the world that is free and easy to access. For that reason, I am committed to keeping this running as a platform to help enhance diversity and equity in our field. So, we don't want to stop, but understand that people may have less time as they return to work. So, for the foreseeable future (at least until October), we are moving to two sessions per week (Tues/Thurs, 1pm EDT). I am really excited about this new format

because we will now have 2, 30 min talks per hour session. You can check out the updated schedule on our new website: https://bloodandboneseminar.com

11. Does your lab attend the ISEH Annual Meeting?
This would have been our first year! We are excited to attend virtually this year and definitely looking forward to New York in 2021.

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