CD40 signaling restricts RNA virus replication in Mφs, leading to rapid innate immune control of acute virus infection

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Q: Where did your journey in science begin?

A: I initially got interested in science because my father was a scientist. I joined the Marine Corps directly after High School and got a later start at college. When it came time to pick a major I thought, "science worked for my dad, I guess I will probably like it too?" I have always had a passion for solving problems and science ended up being an excellent fit for me.

Q: How did you choose your current research topic and interest?

A: I have been interested in zoonotic viruses, specifically those that cause hemorrhagic fevers, for several years. When I came to Iowa and found out that there was someone working on Ebola virus, I was immediately captivated. The topic itself was more related to what my PI was working on when I started in the lab, although I honed in on the projects relating to macrophages because I found I enjoyed working at the interface of virology and immunology.

Q: Could you use a few lay sentences to describe/summarize your findings in this paper?

A: Our lab has historically been interested in Ebola virus and the ways it interacts with the human immune system. We characterized a signaling pathway on a subset of white blood cells that is triggered by Ebola very early in infection. When this pathway is activated it results in the production of an anti-viral compound, called interferon gamma, which helps to control the replication of the virus. When this signaling pathway is broken the body is less capable of defending itself from infection and the virus is able to cause more severe disease.

Q: What was the most exciting or memorable moment(s) during the process of this research?

A: The memory that jumps to mind stems from the very first experiment we performed. In trying to replicate the work of a previous student I accidentally infected the mice with an inappropriately low dose of the virus. This error actually unmasked the phenotype we then spent the next several years exploring. Sometimes it pays to make mistakes!

Q: What was the biggest hurdle or challenge associated with this story?

A: I would say the publication process itself was the most challenging aspect. It took us a very long time (with failures along the way) to refine this story and figure out how to best present it. We knew we had something interesting but really struggled with finding the narrative.

Q: Besides your PI is there anyone that significantly helped you in your path to become a scientist?

A: Too many people to name! Iowa is well known for its collaborative research environment and there have been many people that have helped mentor me along the way. Most importantly though would be my father. He taught me "how to learn" from a young age and constantly pushed me to be the best version of myself. I can confidently say I would have never considered a career in science without his support and example.

Q: What's next for you?

A: The MD/PhD career path is somewhat formulaic in the early stages. Once I finish up medical school in May I will start my residency in Pathology. I am planning on doing a research-focused program (Physician Scientist Training Program, PSTP) that combines residency training, postdoctoral work, and a fellowship in transfusion medicine. Ultimately I hope to stay in academia, covering the transfusion medicine service and running a lab. The subject of my life's work has yet to reveal itself, but I imagine I will stay in the realm of host-pathogen interactions or venture into clinical immunology.

Q: What would your advice be for junior or incoming Ph.D. Students who want to pursue a career in science and perhaps your field?

A: Consider the merits of saying "yes" when presented with new opportunities, even if they take you outside your comfort zone or you don't immediately see the return on the investment of your time and efforts. There have been many instances in my short time in science that collaborations, speaking engagements, publications, etc have arisen from seemingly mundane tasks that were presented to me. That isn't to say you shouldn't be careful of your time, and certainly you don't want to spread yourself too thin, but opportunity tends to come knocking more often when you have a history of answering the door.

Q: Tell us something interesting outside of being a scientist about yourself.

A: Probably the most interesting aspect of my life outside of science is my hobby as an amateur arthropod macro photographer. My interest in photography stems from a fascination with social insects (of the order Hymenoptera), specifically ants, and a desire to observe them more closely. I have been photographing arthropods for a couple of years now and find it to be a fun hobby that also gives me an excuse to travel. I tend to plan my vacations based on the local arthropod biodiversity, often paying little attention to more typical local attractions, much to the chagrin of my spouse and our children.