© 2018. Published by The Company of Biologists Ltd | Journal of Cell Science (2018) 131, jcs214247. doi:10.1242/jcs.214247

FIRST PERSON

First person – Alexander Buffone, Jr

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping early-career researchers promote themselves alongside their papers. Alexander Buffone, Jr is the first author on 'Migration against the direction of flow is LFA-1 dependent in human hematopoietic stem and progenitor cells', published in Journal of Cell Science. Alexander is a postdoc in the lab of Daniel Hammer at the University of Pennsylvania, Philadelphia, investigating upstream migration of hematopoietic stem cells.

Alexander Buffone, Jr

How would you explain the main findings of your paper to non-scientific family and friends?

The phenomena of any immune cell, let alone hematopoietic stem and progenitor cells (HSPCs), crawling against the direction of flow seems counterintuitive. With the flow in the vasculature always going in only one direction, the fact that these cells can recruit from the free stream and crawl efficiently is the other direction was very interesting. The best analogy I've found for the upstream migration of the HSPCs is that the cells are behaving like a salmon crawling upstream against the current of a river.

Were there any specific challenges associated with this project? If so, how did you overcome them?

Interestingly enough, the biggest challenge associated with this project was finding a suitable source of primary HSPCs and at a high enough number to run multiple experiments. Luckily, we have the Stem Cell and Xenograft core here at Penn, who were super-helpful by helping us to isolate the cells we needed.

When doing the research, did you have a particular result or 'eureka' moment that has stuck with you?

In this specific work, there were two. Number one was when I looked at the integrin ligand profile of both the KG1a cells and primary HSPCs, and noticed that it was remarkably similar to the T-cells (which we knew went upstream). This made me think HSPCs might be a good candidate for upstream migration. The second was when we put the cells down on endothelial monolayers and they still readily migrated against the direction of flow. This was truly exciting as this opened up the possibility that the HSPCs exhibit this behavior in the body.

"Learn to be patient […] science is a marathon and not a sprint"

Have you had any significant mentors, and how have they helped you?

All three of my advisors have had a significant impact on my scientific career. My PhD advisor Sriram Neelamegham at State University of New York at Buffalo was influential in my development as a scientist. He taught me to be very exact in my experimentation and in planning out a project as a whole. My first postdoc advisor Joseph Lau at Roswell Park Cancer Institute, NY, was instrumental in giving me a translational focus to my research as he always thought about experimentation in the context of human disease. My current advisor Daniel Hammer at the University of Pennsylvania has been wonderful in letting me spread my wings as an independent scientist and to follow up on some of my crazy ideas (one of which was that HSPCs may crawl against the direction of flow).

What's the most important piece of advice you would give first-year PhD students?

Learn to be patient throughout your PhD. Science is a marathon and not a sprint and it's easy to get discouraged if experiments don't work immediately. Sometimes results don't come very quickly until the last few years of a PhD.

What's next for you?

Right now I am actively applying for assistant professor positions and hoping to start my own lab next fall.

Tell us something interesting about yourself that wouldn't be on your CV

I am an avid baker. I like to bake anything from homemade pies and baguettes, to my own bread. I even have my own rye

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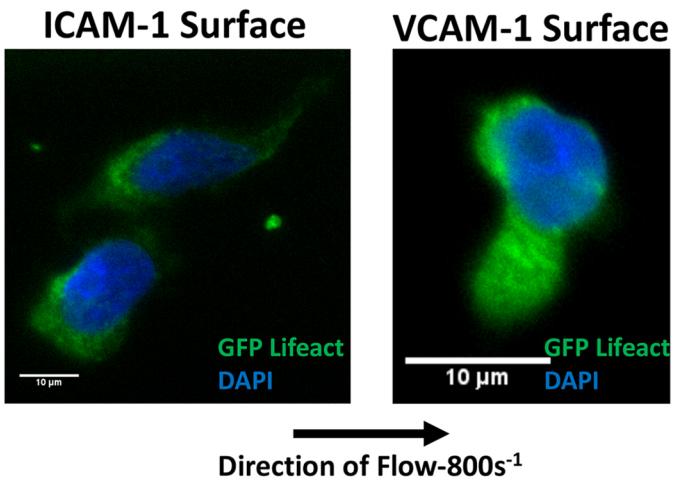

F-actin (green) localizes to the uropod and the trailing edge during downstream migration on VCAM-1 surfaces while localizing at the leading edge during upstream migration on ICAM-1 surfaces.

sourdough culture that I have been maintaining for a few years now. I love it because I find following a recipe during baking not that dissimilar to following a protocol in the lab, just with tastier results!

Reference

Buffone, A., Jr, Anderson, N. R. and Hammer, D. A. (2018). Migration against the direction of flow is LFA-1 dependent in human hematopoietic stem and progenitor cells. *J. Cell Sci.* **130**, jcs205575.