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FIRST PERSON

First person – Connie Shen

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping researchers promote themselves alongside their papers. Connie Shen is first author on 'Nuclear segmentation facilitates neutrophil migration', published in JCS. Connie is a PhD candidate in the lab of Judith Mandl at McGill University, Montréal, Canada, where she studies the dynamics of immune cell migration.

How would you explain the main findings of your paper in lay terms?

The human body comprises trillions of cells. The majority of cells are structural, forming the stationary building blocks of our organs, such as bones, muscle, and skin. However, protection from infection requires that our immune cells are constantly moving throughout the body, searching for possible pathogen invasions and fighting off microbes when an exposure occurs. Neutrophils are one of the first immune cells on the scene at the site of infection, and they therefore move quickly throughout our body's tissues. One factor that can limit cell migration through the complex obstacles that arise from the structure of a tissue is the relatively bulky nucleus. Neutrophils have a uniquely shaped nucleus that is not round like nuclei in most other cells, but is segmented into multiple lobes, like 'pearls on a string'. The textbook hypothesis for the neutrophils' unique nuclear shape is that it enables the cells to squeeze through confined environments. Surprisingly, there is limited direct evidence to support this, so we sought to investigate this question experimentally. We transferred neutrophils from the blood of volunteers into a device designed to become progressively more confining to cells and challenging to migrate through. We found that an increased number of nuclear lobes is associated with more efficient migration when the neutrophils are traversing through tight spaces.

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

I had to travel from my home base in Canada over to The Netherlands to work on this project, since that is where the experimental human endotoxemia research was taking place. I arrived at Utrecht University at the lab of Nienke Vrisekoop in February 2020. You can probably see where this is going… the original plan was to stay there for a couple months to carry out the experiments, but the trip was cut short by the looming COVID-19 pandemic and an emergency evacuation by my university. Although the pause undoubtedly slowed our progress, we were eventually able to resume the experiments and finish the research.

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

An exciting moment was when we ran our first proof-of-concept experiments and could see the neutrophils racing through our custom microfluidic device before our eyes. It is always a satisfying feeling to witness an idea being actualized.

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Connie Shen

Why did you choose Journal of Cell Science for your paper?

I greatly appreciate the community-oriented mission of JCS and its commitments to open science.

Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

Aside from my supervisor Judith and collaborator Nienke, a postdoc in the Mandl lab, Jérémy Postat, has been an incredible scientific mentor. Working closely alongside him has been such a joy. There is never a dull day in the lab – he is always working on new crafty imaging apparatuses or showing me the results of one of his beautifully designed experiments. His creative and collaborative approach to science is one that I emulate. Bonus fact: Jérémy designed the microchannels used in the present study and personally helped fabricate a ton of them for us to use and is therefore an author on this paper!

What motivated you to pursue a career in science, and what have been the most interesting moments on the path that led you to where you are now?

There was no particular moment that I could point to that set me on this scientific path. I am the kind of person who derives a deep satisfaction from learning how the world works. I ended up where I am now for graduate school because I particularly love really seeing how things work, and microscopy opens up a very unique view of the world. Live microscopy on migrating cells is particularly fun because you can witness the inner workings of the cells in real time as they operate as small biological machines.

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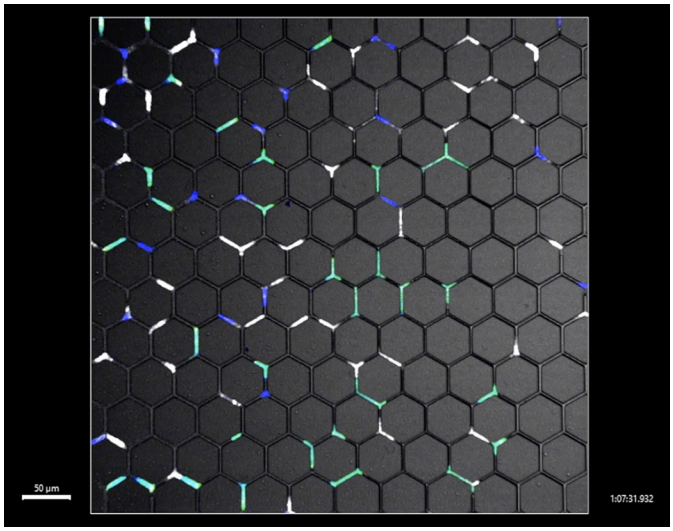

A frame from a confocal microscopy time-lapse featuring differentially stained neutrophils migrating through a microfluidic device.

What's next for you?

I am currently working on wrapping up some other ongoing projects in the lab. After that it's thesis writing, defense, and graduation for me. I am not sure yet what the future holds after that!

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

Things that have kept me sane in graduate school include (but are not limited to): Montréal's robust active urban transport network, aspirational B-level volleyball, skiing fresh corduroy in sub-zero temperatures, naps in the microscope room (and on the couch the grad students convinced my supervisor to get for her office), and militant use of the Oxford comma.

Reference

Shen, C., Mulder, E., Buitenwerf, W., Postat, J., Jansen, A., Kox, M., Mandl, J. N. and Vrisekoop, N. (2023). Nuclear segmentation facilitates neutrophil migration. *J. Cell Sci.* **136**, jcs260768. doi:10.1242/jcs.260768