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

Cells can take up fluid from their surroundings using a process called macropinocytosis, which engulfs this material into an intracellular vesicle formed from the plasma membrane. The vesicles that are created, called macropinosomes, contain plasma membrane proteins that have to be removed and returned back to the cell surface. These proteins are sorted out by generating a small tubular membrane structure and detaching it along with the proteins from the parent vesicle. In this article, we have studied a protein called JIP4, which helps to generate these tubules. JIP4 is targeted to macropinosomes by binding to the protein Phafin2, which recognizes macropinosome membranes by their lipid composition. Losing JIP4 causes cells to accumulate extracellular fluid, probably because the sorting and processing of these vesicles is slower. Our study shows that JIP4 is important in recycling from the macropinosome and demonstrates how JIP4 is able to localize to macropinosomes to carry out this function.

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

Although it was easy to observe JIP4 at tubules using live-cell microscopy, it was harder to work with this protein in fixed samples. I spent quite a while optimizing fixation and immunostaining protocols, and it was very rewarding the first time it worked to visualize endogenous JIP4 that had accumulated at these tubular membrane structures.

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

Towards the end of the project, I generated a pair of chimeric proteins from JIP3 and JIP4 by swapping the region we had identified to be important for tubule targeting. One of the side findings in our paper is that, despite domain similarities with JIP4, JIP3 doesn’t bind Phafin2 and is not targeted to tubules. Swapping in this region from JIP4, however, effectively localizes JIP3 to tubules. While we already had other lines of evidence, the first time I saw JIP3 flickering on tubules was nonetheless quite memorable. Not quite a eureka moment, but more of an ‘it worked!’

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

Publishing in JCS lets us reach a cell biology audience, which fits with the scope and nature of our research findings. Our study adds a couple of new pieces to the puzzle, and a broad readership is desirable.

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?

I’ve always been curious and liked the sciences, so aspiring to a career in research was natural. A very inspiring biology teacher in high school turned my interest towards biology from chemistry. In my bachelor studies, there were chances to pursue exchange programs outside of Singapore. While I didn’t secure a spot on one of those programs, it did open my eyes to the opportunities out there. One of the countries on the list of destinations offered was Sweden, which eventually contributed to me moving here to Oslo for graduate studies.

Who are your role models in science? Why?

An early influence on my conception of science was Carl Sagan. He wrote about the sense of awe and wonder that drives scientific discovery, and how both open-mindedness and skepticism are critical.
What’s next for you?
I will be defending my PhD in a few months and then taking up a postdoc opportunity in Sweden, where I will be studying the molecular mechanisms of insulin secretion.

Tell us something interesting about yourself that wouldn’t be on your CV
I dance Salsa and particularly enjoy Latin jazz music.

Reference