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FIRST PERSON

First person – Meraj Hasan Khan

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. Meraj Hasan Khan is the first author on 'The Sharpin interactome reveals a role for Sharpin in lamellipodium formation via the Arp2/3 complex', published in Journal of Cell Science. Meraj is a PhD student in the laboratory of Jeroen Pouwels at the University of Turku, Finland, investigating the cytoskeleton and protein early markers of metastasis.

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

This paper focuses on the adaptor protein Sharpin, which regulates many cellular processes by directly binding to target proteins and affecting their activity. Importantly, deregulation of Sharpin is linked to several diseases, such as autoinflammation, immunodeficiency and cancer. In this paper, we identified a long list of new potential Sharpin interactors and confirm that Sharpin binds to the Arp2/3 complex. Among many other things, the Arp2/3 complex drives protrusions at the leading edge of cells, so-called lamellipodia, that provide the protrusive force that drives cell migration. We show that the interaction between Sharpin and the Arp2/3 complex drives lamellipodium formation, and thus could have implications in physiological processes such as wound healing and immune responses.

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

Sharpin is a multifunctional adaptor protein with many known functions, and we had previously described its role in cell migration through integrins. To tease out the specific role for the newly discovered interaction with Arp2/3, we had to identify a mutant that specifically disrupts the Arp 2/3 interaction but retains its binding with integrins. We identified such a mutant and used that to specifically show that the Sharpin–Arp2/3 interaction drives lamellipodium formation and cell migration.

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

As described above, one of the major challenges was to identify a mutant of Sharpin that specifically does not bind to Arp2/3, while leaving other Sharpin functions intact. When the results of our FRET experiments came in, they showed that one of our mutants did just that, and that was really a 'eureka' moment for us.

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

My PhD supervisor Dr Jeroen Pouwels has helped me very significantly for this project and for my other projects in my PhD.

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Meraj Hasan Khan

Jeroen's troubleshooting is unprecedented, and he follows results very easily.

"Governments and funding agencies should realise the importance of research and how it shapes a society."

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

Give enough time to literature reading; it is the most important and necessary requirement to make your work better. Organize journal clubs because they are the easiest way to gain knowledge outside of your projects.

What changes do you think could improve the professional lives of early-career scientists?

Funding is one of the most important factors that could make the life of early-career scientists better. I have seen this personally – scientists at the early-career stage struggle a lot to get good funding for their labs. Governments and funding agencies should realise the importance of research and how it shapes a society.

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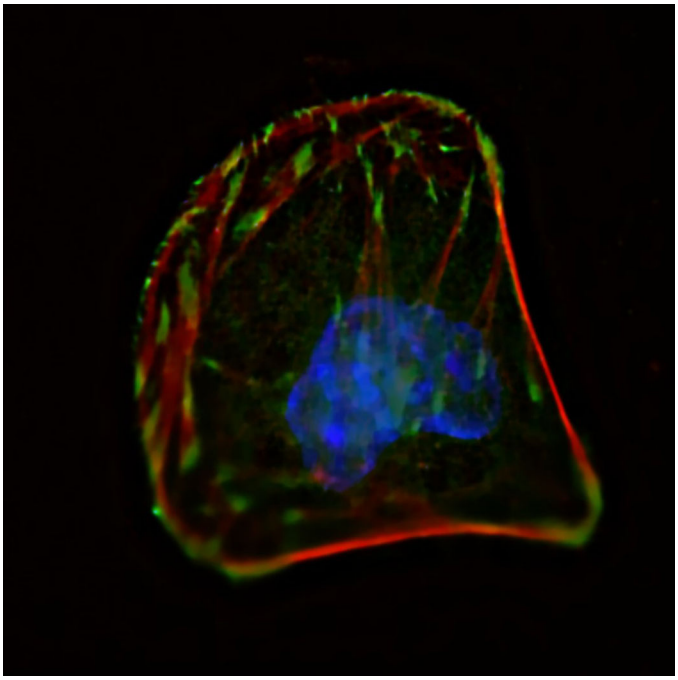

HeLa cells plated on a fibronectin-coated crossbow-shaped micropattern, stained for vinculin (green) and actin (red), with the nucleus in blue.

What's next for you?

I am currently wrapping up my thesis, which I will defend early next year. In addition, I am looking for a postdoc position, in which I would like to focus on the role of cytoskeletal or membrane proteins in cancer.

"I believe in serendipity, and that's why I perform some experiments outside my current projects, even if they are a bit of a stretch."

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

I believe in serendipity, and that's why I perform some experiments outside my current projects, even if they are a bit of a stretch. It costs me some extra hours in the evening, and many times the results are not what I was expecting, but sometimes such experiments do work out, and can be the start of a whole new project.

Reference

Khan, M. H., Salomaa, S. I., Jacquemet, G., Butt, U., Miihkinen, M., Deguchi, T., Kremneva, E., Lappalainen, P., Humphries, M. J. and Pouwels, J. (2017). The Sharpin interactome reveals a role for Sharpin in lamellipodium formation via the Arp2/3 complex. *J. Cell Sci.* **130**, 3094-3107.