

FIRST PERSON

First person – Vartika Sharma

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. Vartika Sharma is first author on 'Deltex modulates Dpp morphogen gradient formation and affects Dpp signaling in *Drosophila*', published in JCS. Vartika conducted the research described in this article while a PhD student in Ashim Mukherjee's lab at Banaras Hindu University, Varanasi, India. She is now a Postdoc in the lab of David Walker at University of California Los Angeles, USA, where she explores the molecular and cellular mechanisms of aging.

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

In this paper, we established that Deltex (Dx) is a novel regulator of the Decapentaplegic (Dpp) pathway. Dx is a context-dependent regulator of Notch signaling and is known for its role in facilitating the endocytosis and trafficking of the Notch receptor. Since not much is known about the role of Dx in other signaling pathways, we performed a large-scale RNAi screen involving a set of kinases and phosphatases and found that Thickveins, the receptor of Dpp, is a strong interactor of Dx. Hence, we decided to focus on the Dpp pathway and demonstrated that Dx genetically and physically interacts with Dpp and its pathway components. In addition, Dx also modulates the expression of Dpp target genes. We further questioned whether Dx can help in the trafficking of Dpp in the manner it does for Notch. Indeed, our hunch was right, and we showed that Dx helps in the gradient formation of Dpp and its target Spalt. Our study thereby presents a new avenue of Dpp signaling regulation mediated through the cytoplasmic protein Dx.

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

As with any project, there were indeed many challenges. After finding Thickveins as an interactor of Dx, our main focus was to check the status of Dpp and its targets. Since not many antibodies were commercially available for the proteins of our interest, we had to request them from other labs and are very grateful to Prof. Antonia Monterio and Prof. Matthew Gibson for the anti-Spalt and anti-Dpp antibodies – this paper would not have been possible without their support. Another major challenge was documenting Dx's localization with Dpp and the endosomal marker Rab5. Imaging proteins such as Rab5 and Dpp, together with Dx, was indeed a major roadblock for us owing to the dynamic nature of the proteins. To overcome this, we increased our sample size and visualized the expression in fewer Z-stacks to prevent tissues from fluorescence quenching.

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

We were performing the RNAi-based modifier screening for quite some time and we were not getting any significant phenotypic modulations that we could focus on. It was getting disappointing with each passing day and we were on the verge of giving up on it.



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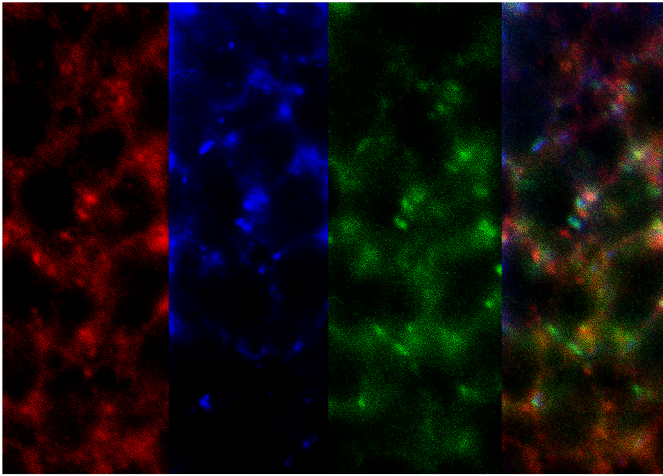
One day, we surprisingly found a strong interaction between Dx and Thickveins. After such a long wait, that was indeed a real 'eureka' moment for us.

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

Since I am a cell biologist by training, and I have continuously followed Journal of Cell Science which routinely publishes high standard papers in the field and has been established as one of the prestigious journals in its league. Therefore, Journal of Cell Science was our first choice for this paper. Here, I would also like to acknowledge the journal's friendly publication policy and the fast review process.

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

My PhD supervisor Prof. Ashim Mukherjee has played an immense role in shaping my scientific drive. Our lab works on Notch signaling and irrespective of that, he gave me the complete freedom to work on something very new for us. That's what science should



Role of Deltex in endocytosis-mediated Dpp trafficking. Deltex (blue) and Dpp (green) colocalize with Rab5 (red) in the same subcellular compartment, demonstrating that the three dynamic proteins interact together.

be like, without limits. Not only did he support the whole idea, but we discussed every aspect of the results. So, this paper was a growing together process for us. His catchphrase, “deserve then desire” always made me strive to get something better out of myself every other day. I am also grateful to Prof. Mousumi Mutsuddi for being an unwavering source of support and motivation.

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 am quoting Einstein here because nothing can motivate us more than our own curiosity: “The important thing is not to stop

questioning. Curiosity has its own reason for existence. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery each day”. And yes! Curiosity has its own reason for existing.

Who are your role models in science? Why?

I don’t have any specific role model, but I appreciate every researcher who tries to stay honest with their research, irrespective of all the challenges they are going through. I am constantly awed by the new discoveries and hence role models in the field of science is something that’s very dynamic for me.

What’s next for you?

I recently joined the University of California Los Angeles (UCLA) for my postdoc. Here, in pursuit of happiness, I am trying to explore the gut–brain axis in the context of aging with Prof. David Walker. I would like to stay in academia because the perks we get here in the form of new discoveries and papers are commendable.

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

I try painting serenity in chaos. I always believe that science is incomplete without art, so when not in the lab, I use some of my time for colors and a canvas. Sometimes I also pen down my emotions through my blog. Maybe someday I will publish my writings! In the meantime, I will try to be at the crossroad of art and science because I believe art is an effective way of communicating scientific research.

Reference

Sharma, V., Sarkar, B., Mutsuddi, M. and Mukherjee, A. (2022). Deltex modulates Dpp morphogen gradient formation and affects Dpp signaling in *Drosophila*. *J. Cell Sci.* **135**, jcs259658. doi:10.1242/jcs.259658