

## FIRST PERSON

# First person – Poonam Sehgal

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. Poonam Sehgal is the first author on 'Epidermal growth factor receptor and integrins control force-dependent vinculin recruitment to E-cadherin junctions', published in Journal of Cell Science. The work in this article was carried out while Poonam was a postdoc in the lab of Dr Deborah Leckband at University of Illinois, Urbana-Champaign, USA, investigating the mechanism of E-cadherin-mediated force-transduction signaling in epithelial cells.

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

Mechanotransduction is a universal phenomenon that is essential for all living organisms. Simply put, it is how a cell converts a mechanical force it has experienced into biochemical signals within. The force can be external, such as exercise-induced stresses on the muscles, or internal tissue-specific forces, like the beating of your heart, inflation and deflation of the lungs, and blood pumping through your vasculature. These forces are perceived by the cells that experience them and cause the initiation of signaling pathways that will influence various processes like embryo development, disease progression and regulation of homeostasis. In epithelial (skin) cells, E-cadherins are adhesion proteins that physically couple adjacent cells and act as force sensors as well as transducers. Our work with epithelial cells has shown that, on experiencing mechanical force, E-cadherin crosstalks with another protein, epidermal growth factor receptor (EGFR), initiating a process that strengthens and protects the cell-cell and cell-matrix junctions, ensuring structural stability.

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

A significant challenge with this project was the choice of cell line to work with. While our previous study was carried out in MCF7 cells, they were not suitable for western blotting or immunostaining in EGFR-related experiments as they express only low levels of EGFR. We tackled this challenge by also using exogenous-E-cadherin-expressing A431D cells that have an innate high expression of EGFR. We performed key experiments in both cell lines wherever it was feasible. This showed the universality of our pathway. We also repeated key experiments in primary human small airway epithelial cells (SAECs) to show the physiological relevance of our work.

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

**"I had never been happier to see a 'no change' result."**

My 'eureka' moment happened when I saw absence of vinculin recruitment at the site of mechanical stress when cells were treated

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with the EGFR inhibitor gefitinib. This study showed for the first time a link between force-activated E-cadherin-mediated signaling via EGFR and  $\alpha$ -catenin force transduction, which were previously believed to be independent. This experiment made me believe that force-dependent EGFR signaling and  $\alpha$ -catenin force transduction coordinated to target vinculin to mechanically stimulated cadherin junctions. I had never been happier to see a 'no change' result.

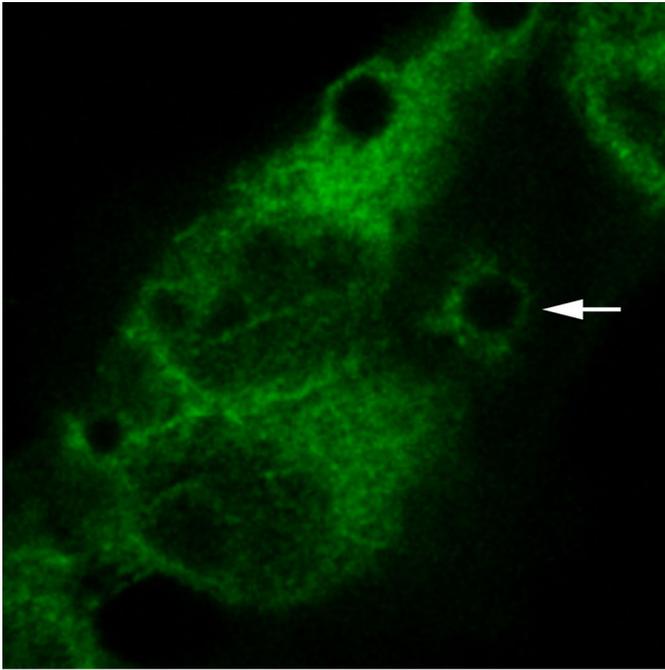
### Have you had any significant mentors, and how have they helped you?

My PhD advisor Dr Veena K. Parnaik gave me a lot of independence in planning and executing my experiments. Her confidence in me strengthened my growth as a researcher. My postdoc advisor Dr Deborah Leckband has always stressed the importance of tailoring your presentation to your specific audience. I believe her advice has made me a better presenter by being more aware of my audience. I will always be grateful to both mentors for their words of wisdom.

**"Most essentially, have faith in yourself. After all, every expert was a beginner once."**

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

Planning ahead will save you from unexpected trouble later. A rigorous literature review is important to avoid predictable mistakes. Never forget to do your control experiments, they are an important part of your experiment. Treat your first year as your learning curve and do not



Vinculin recruitment (green) around a bead when E-cadherin-mediated force is exerted on the cell.

give in to negativity when experiments do not work. Most essentially, have faith in yourself. After all, every expert was a beginner once.

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

It is very important to network. Science is more interdisciplinary now than it ever was before. So knowing people from outside your field is as important as knowing people within your field. Every young scientist needs financial support, and increasing availability of fellowships will also surely help.

**What's next for you?**

I have finished my current postdoc position and am looking forward to new challenges that will help me grow in my profession.

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

I love reading. A good book can hold my attention for hours and I cannot let it go without finishing it. I enjoy reading from a wide range of genres as it exposes me to new ideas and helps me broaden my horizons. My all-time favorite authors are Sir Arthur Conan Doyle and J. K. Rowling.

**Reference**

Sehgal, P., Kong, X., Wu, J., Sunyer, R., Trepap, X. and Leckband, D. (2018). Epidermal growth factor receptor and integrins control force-dependent vinculin recruitment to E-cadherin junctions. *J. Cell Sci.* **131**, jcs206656.