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FIRST PERSON

First person – Sonam Gurung

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. Sonam Gurung is first author on 'ADAR2-mediated Q/R editing of GluK2 regulates kainate receptor upscaling in response to suppression of synaptic activity', published in Journal of Cell Science. Sonam conducted the research described in this article while a PhD Student in Prof. Jeremy Henley's lab in the School of Biochemistry, University of Bristol. She is now a Postdoc in the lab of Prof. Jack Mellor in the School of Physiology, University of Bristol, where she aims to unravel molecular mechanisms of synaptic plasticity.

Sonam Gurung

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

Neurons (nerve cells) in our brain are continually receiving, processing and forwarding information. To do this effectively, they constantly re-adjust the connectivity and sensitivity of the connections (synapses). My research aimed to better understand the processes that regulate these changes in sensitivity at synapses. One mechanism involves changes in the surface levels of different types of excitatory receptor proteins that bind to the neurotransmitter glutamate, which is the chief excitatory neurotransmitter in the central nervous system. Depending on the amount of stimulation a neuron receives, it can either increase or decrease the number of excitatory glutamate receptors on the surface. We are particularly interested in the glutamate receptor subtype called kainate receptors (KARs).

My research shows that when you decrease neuronal activity over a long period of time, neurons compensate for this loss by increasing the number of KARs on the surface. They do this by editing the RNA that encodes part of the KAR, which results in a single amino acid change in the protein from glutamine (Q) to arginine (R); this is therefore called Q/R editing. This single residue change facilitates delivery of KARs to the neuronal surface. This is important because it reveals an exciting new role of this editing process in the selective regulation of kainate receptors which, in turn, controls the sensitivity of the neuron.

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

Determining changes in RNA editing was one of the key experiments throughout our research project. Finding a good assay to study this efficiently was key. I tried a few different methods that had been used in the literature. While not all were successful technically, the BbvI restriction enzyme assay worked beautifully, which was a great moment; the results we obtained with this assay were also backed up by the chromatograph assays.

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

Once I had observed a robust scaling effect, I wanted to determine the possible mechanisms behind this phenomenon. The moment when the RNA editing assay worked and then showed a difference as well, that was an incredible moment. I remember the first experiment I did looking at RNA editing and it still brings a smile to my face! It seemed such a beautiful, elegant and unique way to regulate receptor assembly and trafficking during activity.

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

Our work focused on unravelling the molecular mechanisms behind the regulation of KAR plasticity, which seemed very suited for Journal of Cell Science. We also thought that the neuroscience background of this paper would add further diversity to the plethora of varied work published in JCS. Moreover, being a widely respected journal, we believed publishing our work in JCS would help it reach a wider audience in the whole of the cell biology field and not just within the neuroscience community.

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

I had an amazing group of mentors who helped me throughout my project and PhD. Prof. Jeremy Henley, my PI, has been amazing throughout, motivating and encouraging me and giving me confidence in my skills and achievements. None of the work I did would have been possible without Dr Kevin Wilkinson, who helped me set up a lot of the experimental techniques, and in particular,

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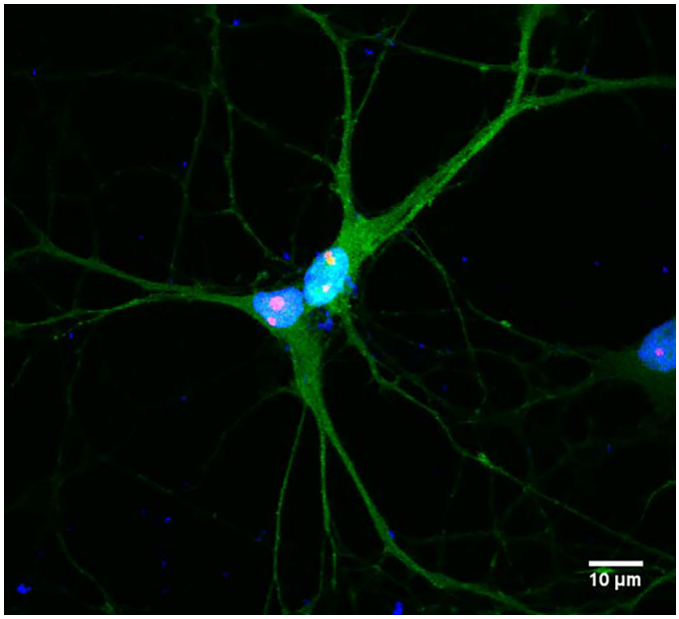

Dissociated hippocampal neurons filled with GFP and stained for DAPI (blue) and anti-ADAR2 (red). ADAR2 is localised in the nucleus, predominantly in the nucleolar structures.

molecular biology techniques that could be applied to neurons, which is not easy! I could then adapt these techniques accordingly in my project. And finally Dr Ash Evans, who also helped me come up with ideas to further this project. Certainly their input and advice were key to the success of this work.

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?

Having done a year in industry during my undergraduate years, where I studied biochemistry, I was encouraged to pursue science further as I really enjoyed it. I recommend this to any undergraduates! My first year of PhD included rotations in different labs, which allowed me to work in completely different fields. I gained knowledge in different fields and techniques. I loved working with primary cultured red blood cells and macrophages, then working with cultured neurons, and then moving on to working with zebrafish as a model organism.

What's next for you?

At the moment, I am working as an Elizabeth Blackwell postgraduate fellow at the University of Bristol, learning patch-clamp electrophysiology, something I have never done before. This will give me additional skills, making me more of an attractive candidate for jobs and fellowship applications particularly within the field of neuroscience, which is what I hope to pursue in the future.

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

Outside of work, I love doing my exercise classes. In particular, I am obsessed with Afro-Caribbean Zumba classes, which I got into since my PhD; they have certainly helped me keep sane throughout the process. I recommend this to anybody. Having a good work–life balance really does help.

Reference

Gurung, S., Evans, A. J., Wilkinson, K. A. and Henley, J. M. (2018). ADAR2-mediated Q/R editing of GluK2 regulates kainate receptor upscaling in response to suppression of synaptic activity. *J. Cell Sci.* **131**, jcs222273.