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FIRST PERSON

First person – Deblina Sain Basu

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. Deblina Sain Basu is first author on 'FMRP protects the lung from xenobiotic stress by facilitating the integrated stress response', published in JCS. Deblina is a PhD student in the lab of Dr Arjun Guha at Institute for Stem Cell Science and Regenerative Medicine (inStem), Bangalore, India, where she probes mechanisms that confer susceptibility to environmental insults.

Deblina Sain Basu

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

Epithelial cells in the lung come in contact with hazardous chemicals each time we inhale. Exposure to these chemicals, or xenobiotics, results in cellular stress and can lead to cell death. Upon exposure, cells in the respiratory epithelium make certain changes to their regular activities and induce various stress response pathways to cope with the effects. Here we report that fragile X mental retardation protein (FMRP) is necessary for the cells in the airways to initiate an essential stress response pathway called the integrated stress response in response to xenobiotic stress. In the absence of FMRP, cells fail to actuate this pathway and many cells are lost. Although FMRP is broadly expressed in mice and humans alike, the function of the protein has largely been studied in neuronal cells in the context of Fragile X syndrome, an intellectual disability disorder. In this study, we confirm that this protein is present in the lung as well and carries out an important role in this organ by facilitating stress responses.

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

Yes, there were many challenges. First of all, investigation of FMRP was not a common study for lung biology. On top of that, we could not deduce the logical explanation for the FMRP phenotype in the lung from other stress response studies related to FMRP. Our observations on superoxide dismutase and γH2AX in our injury model did not support the idea that SOD1 or replicative stress could be the explanatory mechanism behind the phenotype that we observed. At a certain point, we were clueless about the mechanism. I remember a very long discussion with my guide regarding what could be the next step to get some idea about the mechanism. Through that discussion it came out that we might need to look into the integrative stress response pathway, as it is a very common and major pathway of stress responses in pulmonary epithelial cells; FMRP also has a proven role in regulating the translation machinery.

There were also many technical challenges, which were taken care of by troubleshooting and careful titration.

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

Many such 'eureka' moments came and most of them faded away. I remember when I started working on the project, almost every result used to excite me a lot. Those moments even included successful troubleshooting of an antibody staining. But finally when it came to the turning point of the study, which was the discovery of FMRP-dependent activation of ATF4, I became more conscious of my observations. It took some time for me to believe it. After repeated experiments in different cellular systems it slowly settled down in my mind but by then I'd missed that 'eureka' moment.

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

JCS is a reputed journal which publishes impactful discoveries on cellular biology. We thought that our study could be a good fit for the journal, as the study reports, at a cellular level, that the loss of FMRP perturbs the alteration of a major stress response pathway and thereby confers susceptibility to xenobiotic stress.

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

I am always thankful to my guide Dr Guha, who has given me an opportunity to work on this project. He has guided me throughout the work with technical and logical insights. Apart from my guide, I got a chance to discuss and closely work with four other senior scientists, a big group of graduate students, undergraduate students and a postdoctoral scientist for some time. Each of them has taught me and guided me in terms of techniques, thought process, criticism, analysis and troubleshooting.

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 remember when I used to read about scientists and their lives, I used to wonder about their extraordinary questions, which

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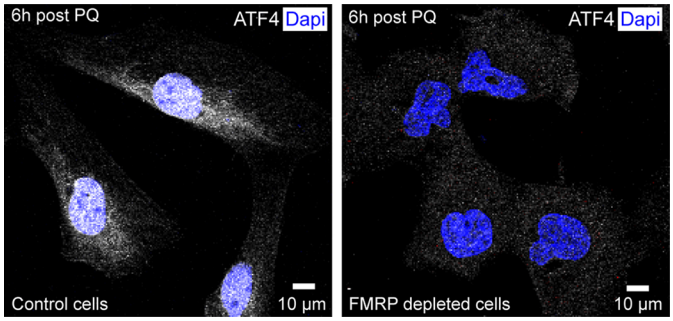

Impact of FMRP depletion on ATF4 expression post injury in BEAS-2B cells.

ultimately revealed some mysteries of the world. I wanted to meet them and observe how a sensible and logical mind thinks.

Who are your role models in science? Why?

I do not have any particular role model in science. I feel every scientist has their own journey and all of those are unique and beautiful. The common thing is a passion towards knowledge and that certainly influences me.

"…every scientist has their own journey and all of those are unique and beautiful."

What's next for you?

After completing my PhD, I would like to take some time to myself, to understand whether I would like to continue in academia.

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

I am a painter.

Reference

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