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First person – Dan Li

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. Dan Li is first author on 'DDX56 inhibits type I interferon by disrupting assembly of IRF3–IPO5 to inhibit IRF3 nucleus import', published in JCS. Dan is an associate professor in the lab of Haixue Zheng at the Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences, Gansu, China, investigating virus–host interactions.

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

Generally, when a host is attacked by pathogens a series of substances (such as type I interferon) are induced to resist the invasion of these pathogens. Interestingly, type I interferon production can be enhanced or attenuated by various substances. Here, we have shown that a protein called interferon-regulatory factor 3 (IFR3) plays a positive role in type I interferon production, whereas another protein, DEAD box polypeptide 56 (DDX56), shows an opposite function. Normally, IRF3 is mainly located in the body of the cell as a single protein unit and does not display the ability to induce interferon production. Upon virus infection, IRF3 forms a two-protein (dimer) complex and binds to another protein, IOP5. Then IRF3 translocates into the nucleus with the help of IOP5, where it induces the type I interferon production. We found that there is another molecule, DDX56, which binds to IRF3 and then disrupts the IRF3–IOP5 interaction, meaning that DDX56 inhibits type I interferon production through blocking the nuclear import process of IRF3.

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

This project presented many challenges. The largest challenge, though, was to evaluate the possibility of off-target effects. Because we only have one clone that is DDX56-deficient, using the CRISPR-Cas9 method, we used analysis software and sequencing to show that there are no off-target effects.

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

It was a great moment when I found that IRF3 interacts with IPO5, because the finding prompted us to investigate the effect of DDX56 on the interaction between IRF3 and IPO5. DDX56 knockdown or knockout increased the IRF3–IPO5 interaction. Following this finding, I was able to work out the mechanism by which DDX56 inhibits type I interferon.

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

We chose Journal of Cell Science because it's an established journal that would reach a broad audience of cell biologists.

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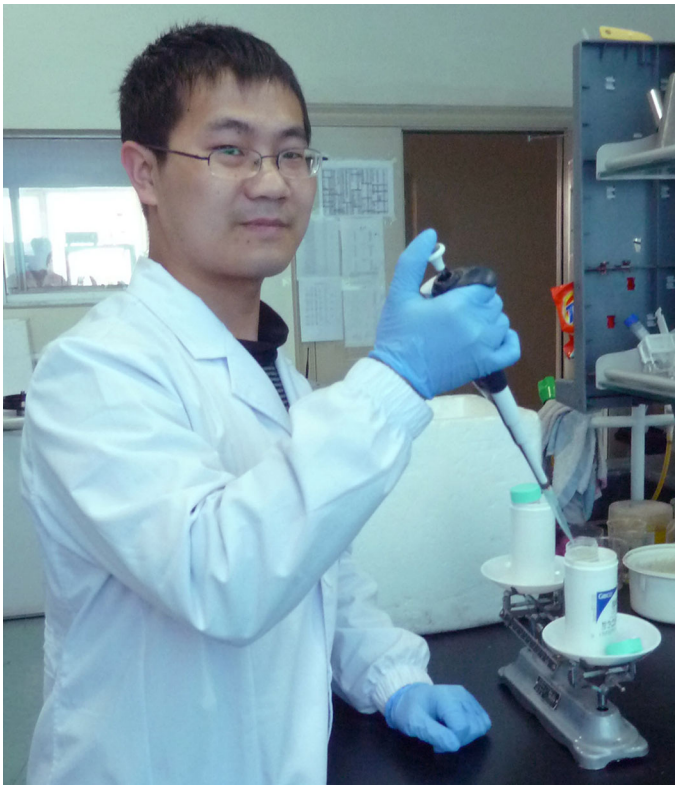

Dan Li

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

I would like to express my deep gratitude to my mentor and academic advisor, Dr Shengyi Liu, who I have had the great opportunity to work with since 2007. His faithful support has allowed me to pursue my research interests. He is a strong role model through his tireless passion for mentoring students. His enthusiasm and dedication to scientific research, which are transmitted to all lab members, have encouraged scientific discussion and fostered an excellent learning environment in our laboratory.

The excitement in identifying clues to answer these problems maintains my love for science.

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 always try to seek answers to understand existing biological problems. The excitement in identifying clues to answer these problems maintains my love for science.

Who are your role models in science? Why?

Prof. Hongbing Shu is my role model in science. He has a rigorous scientific spirit and rich scientific knowledge. He has

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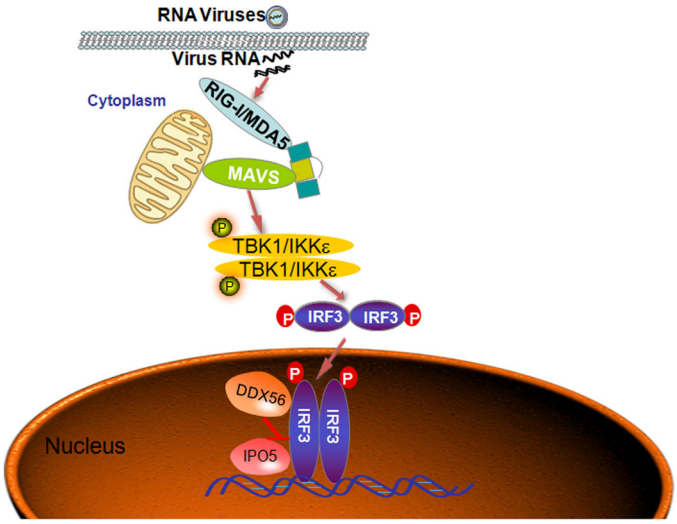

DDX56 disrupts the interaction between IRF3 and IPO5 to inhibit type I interferon production.

achieved great success in the field of innate immunity. His eagerness and enthusiasm for scientific topics motivate me to be a great scientist.

What's next for you?

I will apply for independent funding and look forward to new projects. I know that it's going to be a big challenge, but I can't wait to establish my own research group.

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

My hometown is Enshi in the Hubei province, where there are many beautiful mountains and water. I am particularly interested in my hometown's mountains and water.

Reference

Li, D., Fu, S., Wu, Z., Yang, W., Ru, Y., Shu, H., Liu, X. and Zheng, H. (2020). DDX56 inhibits type I interferon by disrupting assembly of IRF3–IPO5 to inhibit IRF3 nucleus import. *J. Cell Sci.* **133**, 230409. doi:10.1242/jcs.230409