

FIRST PERSON

First person – Zhiyi Lv

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. Zhiyi Lv is the first author on 'A 'molecular guillotine' reveals an interphase function of Kinesin-5', published in Journal of Cell Science. Zhiyi is a postdoctoral fellow in the lab of Jörg Großhans at Göttingen University, Germany, investigating the mechano-biology of *Drosophila* morphogenesis.

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

When my parents and friends ask what I am working on, I tell them I am trying to establish a method to kill a protein. And indeed, we have a very fancy name for our method: 'molecular guillotine'. Proteins are building blocks for our bodies. Understanding the functions of proteins is vital for understanding life. One of the most direct ways of finding out what a certain protein does is by looking at what happens to that organism when this protein is disrupted. There are different ways to disrupt the target protein, for example by mutating the gene encoding the target protein, RNAi or using chemical molecular inhibitors. We designed a method for disrupting the protein kinesin-5 by inserting a protease cleavage site between the head and stalk domains of the motor protein. Kinesin-5 serves indispensable functions during mitosis. It is difficult to genetically investigate its role in processes and cytoskeletal organization during interphase. Employing a kinesin-5 molecular guillotine, we found a novel interphase function of kinesin-5 in suppressing microtubule network fluctuations in the *Drosophila* early embryo. The molecular guillotine can potentially be applied in other proteins with accessible peptides, and molecular guillotining of target proteins can easily be generated by CRISPR/Cas9.

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

I was curious about the efficiency of the molecular guillotine. I extracted the proteins from TEV protease-injected embryos and did simple western blotting against C-terminal kinesin-5. It was so clear that almost all kinesin-5 molecules were cut by the TEV protease in 30 minutes! When I saw the result, I felt much more confident that the molecular guillotine is a really nice tool.

"...it is important to be open-minded, and to try to set up connections with experts in different fields."

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

My current mentor Jörg Großhans is always supportive, not only on specific scientific issues, but also in a more general sense of

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Zhiyi Lv.

how to work as a scientist. His passion for science is really motivating.

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

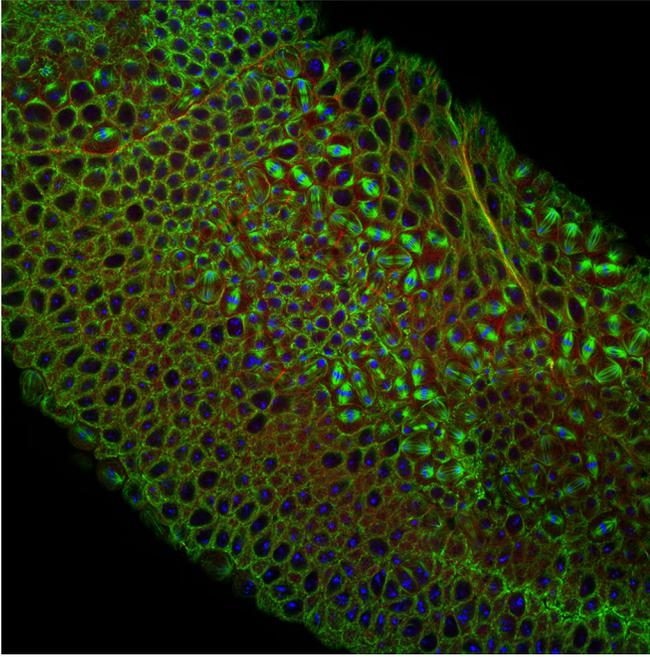
I have been working together with mathematicians and physicists for some time, and I really appreciate the collaborations. We always bring to each other something new. I think for new PhD students it is important to be open-minded, and to try to set up connections with experts in different fields. You will then probably have a broader view on your topic.

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

For postdocs, I think relatively longer working contracts or fellowships may encourage us to take some risky projects.

What's next for you?

Currently I am working on nuclear dynamics in the *Drosophila* syncytial embryo, which is a fascinating project. After this, I will probably look for another postdoc position. My research interest is understanding the mechanisms of morphogenesis using quantitative approaches.



A gastrulating *Drosophila* embryo stained for F-actin (red), microtubules (green) and DNA (blue).

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

Aquascaping and small tropical fishkeeping are my hobby. After a whole day working, it is great to sit down and watch my plants and fish.

Reference

Lv, Z., Rosenbaum, J., Aspelmeier, T. and Großhans, J. (2018). A 'molecular guillotine' reveals an interphase function of Kinesin-5. *J. Cell Sci.* **131**, jcs210583.