

FIRST PERSON

First person – Chia-Li Liao

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. Chia-Li Liao is first author on 'Unveiling a novel serpinB2-tripeptidyl peptidase II signaling axis during senescence', published in JCS. Chia-Li is a PhD student in the lab of Jing-Jer Lin, Institute of Biochemistry and Molecular Biology, National Taiwan University, investigating the molecular mechanisms of size-scaling between cells and organelles during senescence.

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

Cellular senescence is a term to describe the limited proliferation capacity of cells after serial divisions or under cellular stress. Because senescent cells are found to accumulate in many aged tissues, cellular senescence is recognized as a key molecular basis of aging. TPPII is an enzyme maintaining proteostasis by acting downstream of the 'protein recycler' proteasome. Previous studies have shown that TPPII deficiency is involved in cell proliferation and aging. In our study, we applied an activity probe to gain more insights into the role of TPPII in senescence. We found TPPII activity, but not its protein or mRNA, is decreased in senescent cells. Moreover, we identified serpinB2 as the protease inhibitor repressing TPPII activity. Decreased TPPII induces growth arrest and elevated lysosomal activity in senescent cells. These findings unveil the serpinB2-TPPII axis in cellular senescence for the first time.

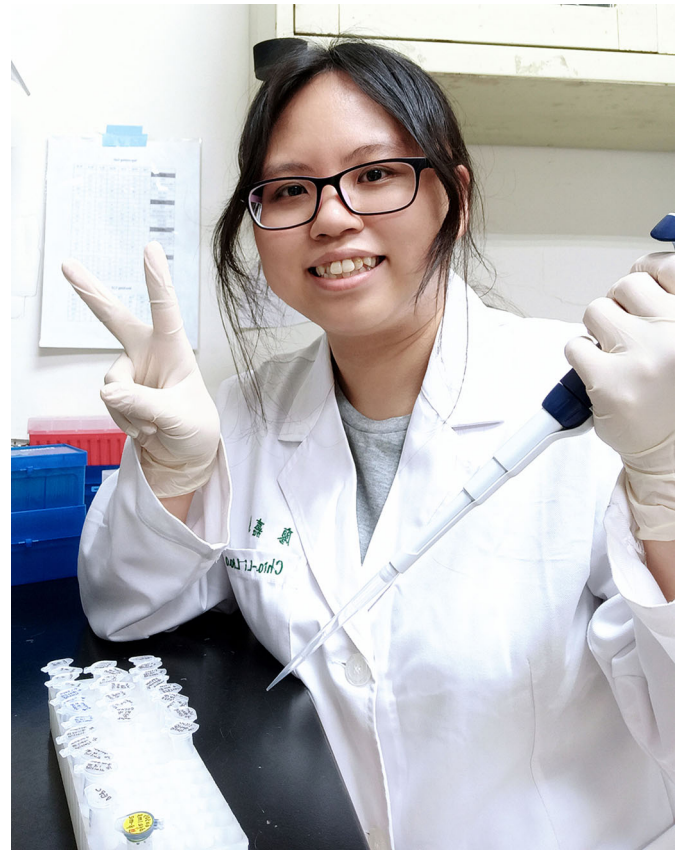
Were there any specific challenges associated with this project? If so, how did you overcome them?

I think the activity probe-based assay was one of the most challenging parts for me when I began this project. Because proteins are very vulnerable to temperature and proteases after cells are lysed, adding protease inhibitor is a common strategy to prevent protein degradation. However, since TPPII itself is a serine protease and we wanted to analyze its activity, protease inhibitor could not be used in our assay. The sample preparation and handling process therefore became very critical. After several tries, we thought the key point was to prepare the cell lysate freshly, and we established a standard protocol to efficiently perform the activity assay.

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

A particularly impressive moment for me was when I found that TPPII is really suppressed by serpinB2 in cells. It was exciting because complex formation was suggested to be the principal means to regulate TPPII activity, while the natural regulators of TPPII were elusive in previous studies. On the other hand, serpinB2 was previously reported to be active in the extracellular space. The intracellular functions and targets of serpinB2 were poorly described, so discovering serpinB2 and TPPII as pair of inhibitor-substrates in the cell is quite memorable to me.

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Chia-Li Liao

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

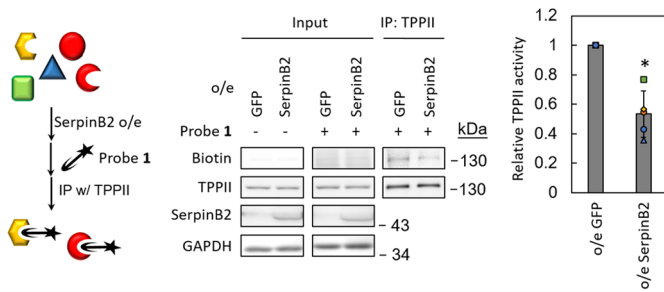
I think Journal of Cell Science feeds its audience with rigorous, well-written articles and diverse perspectives on cell biology. Considering the subject of our study, I believe Journal of Cell Science is the right journal to help us announce our findings.

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

My father Yung-Sen Liao is my life mentor. Although he has little background in biochemistry, he always patiently listens to me talking about my research. When I encountered a bottleneck, he guided me to look at things in different ways instead of giving me direct instructions to solve the problems. I am really grateful to my father and hope to be an open-minded, wise person like him.

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 think curiosity is the main driver of my career in science. Where does life come from? How does life work? Why do organisms age? These are the questions I have been thinking about since I was a kid. Observing the phenomena, forming a hypothesis and testing it, all of these processes are interesting to me. It's like we are trying



TPPII suppressed by serpinB2 in cells. SerpinB2 is detected via the biotin-labelled serine hydrolase activity probe.

to put a big puzzle together, piece by piece. Although sometimes there are many frustrations on the way, the desire to fill in my curiosity by scientific methods led me to where I am.

“It’s like we are trying to put a big puzzle together, piece by piece.”

Who are your role models in science? Why?

My supervisor Jing-Jer Lin is my role model in science. I am very fortunate to have worked in his lab since I was a master’s student. Dr Lin is an insightful, careful scientist, and is good at raising

questions and designing delicate experiments to prove the hypothesis. Besides research, he also dedicates himself to teaching. His passion for both research and education encourages me to keep on improving myself to be a qualified scientist.

What’s next for you?

I am planning to find a post-doc position abroad after completing my PhD degree. I hope I can be an independent researcher and learn how to manage running a laboratory in the future. I am also very much looking forward to communicating with people from different countries to broaden my horizons in, not only science, but also cultures.

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

In addition to science, I also have diverse interests in language, literature and drawing. I began to read books related to these topics during my free time recently. Absorbing knowledge in different territories reminds me how wide the world is. This helps me avoid ‘steeping’ in frustrations and refreshes me.

Reference

Liao, C.-L., Hu, R.-C., Liao, M.-S., Chen, Y.-J., Chen, Y.-P., Hsieh, H.-H., Tai, C.-H., Chou, T.-C., Chu, C.-Y., Chen, Y.-J. et al. (2022). Unveiling a novel serpinB2-tripeptidyl peptidase II signaling axis during senescence. *J. Cell Sci.* **135**, jcs259513. doi:10.1242/jcs.259513