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FIRST PERSON

First person – Kristina Drizyte-Miller

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. Kristina Drizyte-Miller is first author on 'The small GTPase Rab32 resides on lysosomes to regulate mTORC1 signaling', published in JCS. Kristina is a PhD student in the lab of Mark A. McNiven at Mayo Clinic Graduate School of Biomedical Sciences, Mayo Clinic, Rochester, MN, USA, investigating the role of membrane trafficking proteins in the regulation of cell growth, metabolism and quality control pathways.

Kristina Drizyte-Miller

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

Cells rely on a complex vesicle and membrane trafficking machinery to support cell growth and metabolism. A family of proteins known as small Rab GTPases are key to these processes. Our study focused on a poorly characterized small GTPase, Rab32, and how it may regulate metabolic signaling pathways in epithelial cells, such as hepatocytes. We found that Rab32 localizes to lysosomes and regulates cell growth, proliferation and metabolism. It turned out that Rab32 is necessary for basal and nutrient-induced activation of mechanistic target of rapamycin complex 1 (mTORC1), a master regulator of cell growth and metabolism. We further demonstrated that Rab32 associates with mTOR kinase on lysosomes and facilitates lysosomal mTOR recruitment, a step that is necessary for its activation. We were excited to identify a new regulator of this pathway since it is implicated in so many human diseases.

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

It was challenging to work with Rab32-knockdown cells since they have significantly reduced growth rates and are smaller in size compared to control cells. To overcome this, we had to optimize and find the 'right' cell confluency, and then keep it consistent between all experiments.

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

Looking back, I think I had two 'eureka' moments during this project. The first one was when we discovered that Rab32 was required for amino-acid-induced activation of mTORC1 signaling. The second one was when we overexpressed active Rag GTPases in Rab32-depleted cells and were able to rescue mTORC1 signaling defects. We were excited about this result as it supported our hypothesis that Rab32 regulates mTORC1-lysosome association.

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

Journal of Cell Science is a well-recognized and respected journal within the cell biology community, and we wanted our study to be accessible to a broad audience of scientists.

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

I was surrounded by a fantastic group of people during my PhD journey. My mentor Dr Mark McNiven created an excellent environment for me to develop as an independent scientist, and am very grateful to him and all members of the McNiven lab for their help. I especially want to thank my colleague Dr Micah Schott for his guidance and support on this study.

Science has provided me with endless opportunities, and I can't wait to see where it takes me next.

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?

Growing up in Lithuania, I did an experiment where I isolated caffeine from green tea leaves in a 'Soviet Union'-like chemistry laboratory in high school. I remember thinking "how cool is that!". I think, from there on, I was set on pursuing a career in science. I consider myself very fortunate in my journey as a scientist. I come from a small country in Europe but was able to get an undergraduate degree from Lancaster University (UK), spend a year studying abroad in Colorado (USA) and, finally, complete my PhD in Minnesota (USA). I met so many different people, saw so many places and had so many unique experiences. Science has provided me with endless opportunities, and I can't wait to see where it takes me next.

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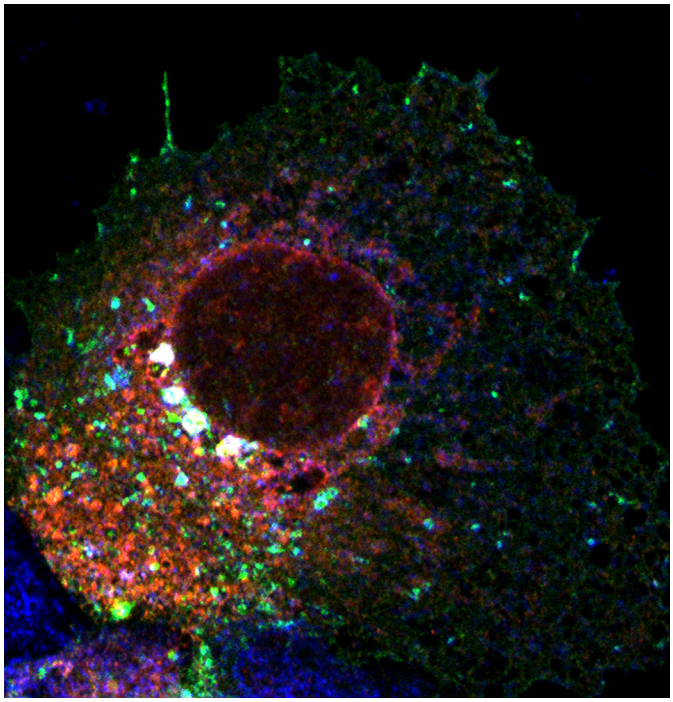

Rab32 (red) colocalizes with mTOR (blue) on lysosomes (green) in Hep3B hepatoma cells.

What's next for you?

I just defended my PhD and plan to transition into a postdoctoral position. I am interested in researching the role of autophagy and metabolism in the context of human diseases.

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

I went to music school for 11 years in addition to attending regular elementary/middle/high school. I have a music degree in playing a Lithuanian folk instrument called 'lumzdelis'.

Reference

Drizyte-Miller, K., Chen, J., Cao, H., Schott, M. B. and McNiven, M. A. (2020). The small GTPase Rab32 resides on lysosomes to regulate mTORC1 signaling. *J. Cell Sci.* **133**, jcs236661. doi:10.1242/jcs.236661