

FIRST PERSON

First person – Olivia Grafinger

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. Olivia Grafinger is first author on 'β1 integrin-mediated signaling regulates MT1-MMP phosphorylation to promote tumour cell invasion', published in JCS. Olivia is a PhD student in the lab of Dr Marc Coppelino at University of Guelph, ON, Canada, where she is interested in the relationship between cell adhesion and ECM degradation during invadopodia formation and cellular invasion.

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

Adhesion is a vital process that allows the cells in our body to stick to each other as well as to the extracellular matrix surrounding them. In migrating cancer cells, adhesion to the surrounding matrix is balanced with its degradation, allowing the cell to invade and ultimately spread to distant parts of the body to produce secondary tumours. Our work aims to investigate the relationship between these two processes, and here we report that cellular adhesion by integrin receptors is required for the recycling of an important degradative enzyme to the migration front of invading cells. These findings provide an important insight into the world of cancer biology and allow us to better understand the dynamic nature of invadopodia.

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

One of the most challenging obstacles that we had to face with this project was identifying the specific residue on MT1-MMP that is phosphorylated downstream of β1 integrin signaling. We used non-phosphorylatable mutant constructs, and investigated the changes in enzyme phosphorylation and invadopodia formation that occurred when cells expressed these constructs. These experiments allowed us to more fully understand the relationship between β1 integrin and MT1-MMP.

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

I was amazed to see the wide array of effects that the simple process of adhesion had on the rest of the cell. It is something that you read about in textbooks, but actually being the one at the bench observing first-hand the amount of downstream proteins influenced by β1 integrin signaling was eye-opening and exciting!

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

We chose the Journal of Cell Science to publish this work for a couple of reasons, the first being that work that paved the way for this research was published here. Secondly, we turned to the Journal of Cell Science multiple times during the course of this project for knowledge on integrin signaling and invadopodia dynamics. We feel that our work fits well with the Journal of Cell Science's scope,



Olivia Grafinger

and we hope that through its large and diverse audience it will be enjoyed by many!

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

My advisor, Dr Marc Coppelino, has been a constant source of support and guidance for this project. I am so grateful for the opportunity to work in his lab and in an environment that fosters learning and discovery. Furthermore, I would like to extend my gratitude to all of the past and present members of my lab, all of whom have encouraged me in some way, shape, or form over the years.

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 have always had a great sense of curiosity and have always been intrigued by the unknown. Science, naturally, was a career pathway that was of interest to me. I loved the prospect of being able to investigate things that haven't yet been answered. I experienced the devastating effects of cancer second-hand, when my grandfather was diagnosed with breast cancer. Through my PhD studies I have been further able to understand the complex world of cancer biology, which keeps me intrigued and asking questions every day.

Who are your role models in science? Why?

My role models in science are the amazing individuals that work alongside me every day. I love collaborating with my peers and discussing the highs (and lows) of research with them. They keep me grounded, focused, and eager.

What's next for you?

I am currently in the planning stages of my thesis, with plans to defend later this year. For my last couple of months in the lab, I have been conducting experiments related to what occurs when β1 integrin signaling is inhibited, a complete 180 from what is described in this article! Following graduation, I plan on pursuing a role in teaching, as it brings me the most joy to share my love of science with others.

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An MDA-MB-231 treated with a β 1 integrin-activating antibody forms invadopodia, visible as black spots of degradation in the fluorescent red gelatin substrate.

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

When I am not working in the lab I love to get active – I instruct group fitness classes, am a member of a running club, and organize a local 5 km race every year!

Reference

Grafinger, O. R., Gorshtein, G., Stirling, T., Brasher, M. I. and Coppolino, M. G. (2020). β 1 integrin-mediated signaling regulates MT1-MMP phosphorylation to promote tumour cell invasion. *J. Cell Sci.* **133**, jcs239152. doi:10.1242/jcs.239152