© 2020. Published by The Company of Biologists Ltd | Journal of Cell Science (2020) 133, jcs250282. doi:10.1242/jcs.250282

JCS PRIZE

2019 Winner: Dominika Rudzka

Michael Way (Editor-in-Chief)

We are pleased to announce that the winner of the 2019 JCS Prize is Dominika Rudzka for her paper entitled 'Migration through physical constraints is enabled by MAPK-induced cell softening via actin cytoskeleton re-organization' (Rudzka et al., 2019).

The prize, $1000, is awarded annually to the first author of the paper that is judged by the Editors to be the best eligible paper published in the Journal of Cell Science that year. To be considered for the prize, the first author must be a student or a postdoc of no more than five years standing.

Dominika Rudzka was born in Poland. She obtained her master's and engineering degree in Pharmaceutical Biotechnology at the University of Technology in Wroclaw, Poland, under the guidance of Prof. Marcin Drag. Her interest in studying cell biology started with her first experience in participating in a project where she learned the synthesis of tetrapeptide substrates and investigated their specificity on proteolytic enzymes.

During the last year of her master's studies, Dominika applied to the Leonardo da Vinci Program and was awarded a three-month internship at the Beatson Institute for Cancer Research in Glasgow, UK. During those three months, she was – under the guidance of Dr. Douglas Strathdee – involved in establishing embryonic stem cell lines, which were used to model the processes underlying cancer. She also got familiar with various methods and techniques to study the cell 'micro-universe', an experience that encouraged Dominika to pursue a research career in cancer biology and prompted her to apply for a PhD studentship at The Beatson Institute under the supervision of Prof. Michael Olson.

During the 4-year PhD programe, Dominika investigated the cancer cell migration and invasion processes. Dominika gained knowledge in many state-of-the-art microscopy techniques, enabling her to study and visualize cytoskeletal structures. During her research, Dominika scanned established cancer lines and selected populations of cancer cells that were able to move efficiently through narrow membrane micropores, as her primary research goal was to identify properties that enabled those cells to passage through physical constraints. Most significantly, she found that reduced actin cytoskeleton anisotropy, focal adhesion density and cell stiffness are characteristics associated with efficient passage through constraints. Membrane fluidity and nuclear elasticity were excluded as primary contributors (Rudzka et al., 2019). To identify signalling pathways related to the observed changes of cytoskeleton and elasticity, Dominika used RNA sequencing (Rudzka et al., 2017). She found that the most-common gene signature is associated with increased signalling through the Ras–Raf–MEK–ERK pathway. Dominika also discovered that blocking the activity of this pathway with MEK inhibitors, results in restoration of actin stress fibres, increased cell stiffness and restrained cell invasion through collagen matrices (Rudzka et al., 2019). These results revealed that MAPK signalling – in addition to tumour cell proliferation – has a significant role in the regulation of cell biomechanics.

After finishing her PhD, Dominika moved to the Drug Discovery Unit at the Beatson Institute. This allows her to combine an industry-standard drug-discovery job with high-quality academic research. For Dominika, research in the Drug Discovery Unit is more multidisciplinary, allowing her to get to know topics and techniques from different fields of science. Moreover, in her opinion, it provides more applied research opportunities compared with those of the basic scientific research in academia.

References

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