

## EDITORIAL

# The good, the bad and the very useful – at least to cell biologists

Michael Way (Editor-in-Chief)

Technological advances on many fronts, including imaging and genome manipulation, mean that cell biologists have never had it so good. Long-standing questions about cell function are being answered daily as we uncover ever-deeper mechanistic insight into fundamental cellular processes using the latest available tools and techniques. Many of these insights come from examining the consequence of precise manipulation of the cell. Yes, we are good, but we are a long way from being the best cellular manipulators. That title easily goes to pathogens, which have evolved to hijack and use the different cellular systems of their unwilling hosts to ensure their continued survival, replication and spread. Pathogens are clearly the best cell biologists, as over evolutionary time they have exquisitely adapted to understand how cells actually work. Moreover, they are capable of manipulating and using multiple cellular processes at the same time. For example, your ‘average’ intracellular pathogen has no problem rewiring signalling and metabolism networks to enable replication, while at the same time suppressing apoptosis and immune detection to ensure cell survival to allow replication to finish. Their mastery of cell biology is second to none!

Investigating how pathogens avoid defense mechanisms and take advantage of their hosts provides important insights into the underlying causes of disease. It can also help identify potential targets for therapeutic intervention. Having a full cellular and molecular understanding of infection processes will undoubtedly help us combat existing diseases, as well as new ones that often arise when pathogens cross species boundaries. It will also help overcome the serious issue of increasing resistance of bacterial pathogens to antibiotics. However, pathogens also have a useful side – at least for cell biologists – as they represent invaluable tools to dissect and understand how cells function. Ironically, many people today are unaware that a large number of early fundamental discoveries in cell biology, such as the identification of v-Src, the first non-receptor tyrosine kinase and oncogene, were actually obtained using pathogens. In terms of my own research interests, they also helped elucidate seminal insights into the mechanisms regulating actin polymerisation, including *Listeria* being instrumental in demonstrating that the Arp2/3 complex can induce *de novo* actin polymerisation.

Examination of the intimate relationship between pathogens, cells and hosts continues to be a fertile and exciting area for cell biology research. This is why we have decided that the fifth JCS Special Issue will focus on the cell biology of host–pathogen interactions. This Special Issue will be guest edited by Derek Walsh (Feinberg School of Medicine, Northwestern University, USA). Derek received his PhD in cell biology from Dublin City University (DCU), Ireland, in 2000. As a postdoc with Ian Mohr at New York University (NYU) School of Medicine he studied how herpesviruses and poxviruses regulate mRNA translation. In 2006 he returned to DCU to establish his own independent group, but with the economic implosion of 2009/10 he had to close his lab and return to his mentor, Ian Mohr, to try to rebuild his career. Despite



Derek Walsh

Hurricane Sandy destroying the NYU lab in 2012, Derek is as persistent as the herpesviruses he studies. Hopeful that misfortune did not come in threes, Derek accepted a faculty position at Northwestern University, Chicago, in 2014, made tenure in 2017, and will be promoted to Professor in September 2019. His work focuses on the regulation and function of microtubules during herpesvirus infection, as well as signalling and translational control during poxvirus infection. It is worth pointing out here again the seminal earlier work with viruses, which uncovered the presence of mRNA 5' caps, 2' O-methylation, 3' polyA tails and many other fundamentals of mRNA biogenesis and translation.

We will welcome submissions for our Special Issue on the Cell Biology of Host–Pathogen Interactions until the end of July 2020. The Special Issue will also contain reviews and poster articles, commissioned by our in-house Reviews Editors. We look forward to working with Derek on this exciting Special Issue, and invite you to find out more at <https://jcs.biologists.org/host-pathogen-interactions> and contact us at [jcs@biologists.com](mailto:jcs@biologists.com) about any potential submissions.

In addition to the Special Issue, we have also decided that the next JCS Cell Dynamics meeting will focus on the host–pathogen interface (for more information, see <https://www.biologists.com/meetings/celldynamics2020/>). The meeting will be held in May 2020 and will bring together an outstanding group of speakers studying a diverse range of pathogens and cellular processes, as well as how hosts respond to infection. There will also be a large number of talks picked from submitted abstracts. Our two previous JCS Cell

Dynamics meetings have been exceptional, with great interactions, discussions and loads of unpublished work presented, as well as many opportunities for early-career scientists to showcase their

work. Our third meeting is shaping up to be just as successful, and as we filled up well before the close of registration for our second meeting, I encourage you to register as soon as you can.