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Editorial

Reprogramming, The Journal

Carlos-Filipe Pereira[i]

Cellular reprogramming is a diverse and growing discipline that studies the reversal or modification of cellular identity. The field aims to understand how cell fate is acquired, maintained, and inherited in homeostatic conditions and what happens when cell identity is hijacked in disease. Owing to the vast therapeutic potential of cellular reprogramming, efforts have also been placed to harness cell fate engineering for clinical applications. Cellular reprogramming history began addressing a fundamental question in biology: how are the myriad of cell types that compose an adult organism generated?

In the beginning of the 20th century the scientific debate revolved around whether this cell type diversity was achieved by losing genes through differentiation or if somatic cells would retain the complete genetic information to give rise to a whole organism. Transfer of a single nucleus at a determined stage of differentiation, to an enucleated unfertilized egg, provided an opportunity to investigate if differentiation involved irreversible genetic modification. Pioneering studies in the 1960s by Sir John Gurdon utilizing somatic cell nuclear transfer in frogs demonstrated that indeed it is possible to generate fertile progeny from an adult somatic cell, although at low efficiency.

It took almost four decades from cloning in frogs to success in mammals, an achievement known as Dolly the sheep. This was made possible by extraordinary technical advances by the founding editor of *Cellular Reprogramming*, Sir Ian Wilmut at the University of Edinburgh (*Nature* 385, 810–813; 1997). With this accomplished milestone, and the high interest and prospects for the field, *Cellular Reprogramming*, the Journal, was founded in 1999. Dolly resulted from the combined efforts of scientists, veterinary surgeons, and farmers. *Cellular Reprogramming* quickly became a prime place to publish their contributions in basic and applied animal science as well as stem cells. For 22 years *Cellular Reprogramming* has been under the editorial leadership of Sir Ian Wilmut. He worked hard together with deputy editor Jane Taylor to maintain the journal's focus on cellular reprogramming with a special devotion to cloning. So as I proudly accept the role of editor-in-chief, I thank Ian and Jane on behalf of everyone who has published, reviewed, or edited for the journal.

Amusingly, it was Dolly and its impact in society that led me to pursue a career in science. At that time, I was deciding whether I would become an architect or a scientist. I became fascinated how a single cell isolated from adult sheep could give rise to an entire organism. This was decisive for my future career in stem cells, epigenetics, and cellular reprogramming. Since then, the cellular reprogramming field has been very close to my heart. I have made my first contributions to cellular reprogramming by establishing cell fusion and heterokaryons as a new method to study reprogramming mechanisms toward pluripotency. I then brought cellular reprogramming concepts to hematopoiesis and immunology, opening exciting avenues for immunotherapy (*Science Immunology* 3, eaau4292; 2018). So, in a way, I became an ''architect of cell fate'' thanks to Ian Wilmut! I am honored for being invited for the role of editor-in-chief of *Cellular Reprogramming*. I humbly accepted this position, and I am committed to build on the legacy of the only journal devoted specifically to cellular reprogramming.

The cellular reprogramming field has developed enormously since somatic cell nuclear transfer breakthroughs in mammals. The discoveries of Shinya Yamanaka in 2006, with the identification of only four transcription factors to induce pluripotency in somatic cells created a sea of change in stem cell research — cellular reprogramming was then highlighted with the Nobel Prize in Physiology or Medicine 2012 to Shinya Yamanaka and John Gurdon.

The pace of research in cellular reprogramming has been tremendous. We can now convert somatic cells into induced pluripotent stem cells (iPSCs) or directly toward other somatic unipotent and multipotent cell fates by direct cell reprogramming. We can elicit reprogramming with transcription factors, miRNAs, epigenetic modulators, or with chemical compounds. Reprogramming can be achieved *in vitro* or *in vivo* and when coupled with genome editing tools generated unprecedented disease models. The discovery of reprogramming mediated by defined factors opened transformational avenues across a broad range of scientific disciplines such as immunology and immunotherapy while focusing on immune cellular identities, cellular rejuvenation, or forward programming strategies for guided lineage differentiation.

My vision for the journal is to capture the whole breath of cellular reprogramming. I believe that we will consolidate *Cellular Reprogramming* as a scientific hub for the field, a journal that publishes high-quality articles, spanning across the whole cellular reprogramming research landscape and its societal impact. The journal covers but is not limited to

Division of Molecular Medicine and Gene Therapy, Lund Stem Cell Centre, Wallenberg Centre for Molecular Medicine, Lund University, Lund, Sweden.
[i]ORCID ID (https://orcid.org/0000-0002-9724-1382).

the different ways cellular reprogramming can be achieved experimentally, including nuclear transfer, cell fusion, or expression of defined factors. It also covers natural reprogramming processes in model organisms from plants to humans. As basic iPSC and direct reprogramming research is now starting to be translated into clinical applications, we will welcome translational studies and support the impact of cellular reprogramming in the clinic.

Cellular Reprogramming, the Journal will evolve and keep up with the pace of the reprogramming field. We have revisited the aims of the journal to emphasize its broad interdisciplinary nature. We will increase our social media presence and generate more special issues. We are planning a special issue in direct cell reprogramming in the beginning of 2022. We have a diverse and accomplished editorial board who have kindly supported *Cellular Reprogramming* throughout the years. We will also bring new blood to the editorial board, expertise in contemporary topics of cellular reprogramming, and welcome emerging leaders in the field. New editorial board members in topics covering iPSC reprogramming mechanisms, genome integrity, neural reprogramming, RNA modification, blood engineering, and cellular rejuvenation among others are already on board.

As the new editor-in-chief of *Cellular Reprogramming*, I am also thrilled to launch *Reprogramming Stars*, an interview series with the leaders in cellular reprogramming. In the coming issues, I will interview leaders in the field, learn from their discoveries and challenges in studying the reversal and modification of cell identity, as well as their ambitions and vision for the future. *Reprogramming Stars* will capture the findings, opinions, projects, and ideas of the most brilliant scientists in cellular reprogramming.

In this issue you can find an interview with our first reprogramming star, Tomomi Tsubouchi. Tomomi has made key contributions in understanding how DNA replication impacts reprogramming. Despite being a friend and colleague of Tomomi for more than a decade, I learned some new aspects of her approach to cellular reprogramming and the cell cycle, and I hope you enjoy reading the interview as much as I enjoyed conducting it.

Cellular Reprogramming is now the only peer-reviewed journal dedicated to cellular reprogramming mechanisms, technologies, and applications. This journal is for you, reprogramming scientist, exploring the boundaries of the field, in need of a hub to communicate your findings and ideas. I hope we will gather a large and diverse community of ''reprogrammers'' that will use *Cellular Reprogramming* as a central tool for their activity. In the coming years together with Mary Ann Liebert key staff, including Sri Raghuram and Taylor Bowen, I hope to bring the *Cellular Reprogramming* journal to a prime spot and capture the essence of modern cellular reprogramming.

Address correspondence to:
Carlos-Filipe Pereira
Lund University
Faculty of Medicine
Division of Molecular Medicine and Gene Therapy
BMCA12, Sölvegatan 17
Lund 221 84
Sweden

E-mail: filipe.pereira@med.lu.se