

Special Issue on  
**Metabolic Control of Stemness and Differentiation**

# CALL FOR PAPERS

Beyond energy production, recent studies have shown that metabolism and mitochondrial biology play important roles in stem cell state and lineage specification. Metabolism is no longer a functional end-point of signaling events and gene regulation. Rather, metabolites are now understood to be active players, functioning as receptor ligands and enzyme modulators. Changes in metabolism, elicited by altered nutrient availability, as well as the distribution and quality of mitochondria, have been shown to be crucial regulators of cell fate. Consequently, the environment is a critical regulator of stem cell fate and has been shown to link nutrient availability with epigenetic changes to impact stem cell identity. Indeed, a direct link between cellular metabolism and chromatin dynamics has emerged, where metabolic intermediates of cellular metabolism act as cofactors for epigenetic modulators, thereby regulating their activity and influencing the epigenetic landscape. Epigenetic mechanisms including modifications of histones, incorporation of histone variants, changes in DNA methylation, ATP-dependent chromatin remodeling, and noncoding RNAs (ncRNAs) have been linked with metabolic pathway activity. The loss of pluripotency at the beginning of differentiation is accompanied by the progressive silencing of stemness genes and the activation of subsets of cell type-specific genes. These processes are orchestrated by epigenetic modifications, which can be altered and coordinated by the presence or absence of specific metabolites. Thus, new global regulatory networks are emerging based on metabolism in stem cell biology.

Casting light on the regulatory mechanisms underlying the metabolic regulation of stemness and stem cell differentiation is important not only for understanding tissue homeostasis during health and disease, but also to establish conditions which accurately support normal physiology in culture. These studies will offer insights into the nutrient requirements of stem cells that support efficient maintenance, differentiation, and engraftment, ensure appropriate replication of physiology in disease models, and also provide novel targets for pharmacological interventions to treat human diseases, potentially leading to new diagnostic and therapeutic steps forward in medicine. In addition, elucidating both the physiological and molecular mechanisms underlying stem cell biology and revealing the connections between cellular metabolism, mitochondria, and epigenetic regulation of stem cell division, commitment, or conversion will have important implications for advances in stem cell research and nuclear reprogramming, particularly for improving regenerative medicine approaches.

In this special issue, we seek research articles and reviews that aim to address the role of metabolism in regulating stem cell identity, lineage commitment and cell fate, reprogramming, and tissue homeostasis.

Potential topics include but are not limited to the following:

- ▶ Metabolic and nutrient regulation of stem cell proliferation, self-renewal, and/or commitment and differentiation
- ▶ Metabolic regulation of the acquisition of pluripotency with reprogramming
- ▶ The interplay between the metabolome and epigenome in stem cells
- ▶ The effect of the extracellular environment on stem cell functions/fate and on the maturity and function of differentiated cell

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/sci/emcsd/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

#### Lead Guest Editor

Viviana Moresi, Sapienza University of Rome, Rome, Italy  
*viviana.moresi@uniroma1.it*

#### Guest Editors

Athanassia Sotiropoulos, Cochin Institute, Paris, France  
*athanassia.sotiropoulos@inserm.fr*

Giuseppina Caretti, University of Milan, Milano, Italy  
*giuseppina.caretti@unimi.it*

Alexandra Harvey, University of Melbourne, Melbourne, Australia  
*ajharvey@unimelb.edu.au*

#### Submission Deadline

Friday, 28 September 2018

#### Publication Date

February 2019