Channels 7:5, 329–329; September/October 2013; © 2013 Landes Bioscience

In this issue of *Channels*

Special issue on STIM and Orai

Christoph Romanin

Institute of Biophysics; Johannes Kepler University Linz; Linz, Austria

Let me first take the opportunity to thank all the authors for their excellent contributions to this special issue dedicated to the relatively young field of "STIM/Orai" research. I would also like to express my sincere thanks to the *Channels* Editor-in-Chief, Gerald Zamponi, who approached me more than a year ago with this project and the extraordinary dedicated *Channels* staff, in particular, Harmony Zambrano, who successfully helped to get this issue wrapped up.

The concept of store-operated channels (SOCs) was first introduced by James Putney, almost 30 years ago, suggesting that the depletion of an intracellular Ca^{2+} store leads to the activation of Ca^{2+} entry, the extent of which is regulated by the filling state of the endoplasmic reticulum. The prototypic SOC is represented by the Ca^{2+} release-activated Ca^{2+} (CRAC) current which has been initially characterized by electrophysiological experiments in mast cells and T-lyphocytes. In 2005 and 2006, the molecular key components of CRAC channels have been identified as STIM1 and Orai, respectively. The latest breakthrough, providing structural resolution, has been obtained in 2012 by the crystallization of active entities of both STIM1 and Orai. In the time period between the identification of these key components and their structural resolution, substantial progress has been achieved in understanding the mechanism of STIM/Orai coupling culminating in CRAC channel activation. Moreover, additional proteins have emerged that modulate STIM-Orai communication. Even store-independent activation has been identified by arachidonate- (ARC) or leukotrieneC4- regulated Ca^{2+}-channels involving STIM1/Orai. All of these findings have meanwhile paved the way for elucidation of the (patho)physiological role of STIM and Orai proteins in native Ca^{2+} signaling pathways, for instance in regulating gene expression or immunity and their involvement in pathogenesis of various diseases. Particularly with respect to the latter, molecular pharmacology on the STIM/Orai system has just started in an attempt to provide tissue- and disease-specific drugs for therapeutic interventions.

The purpose of this special issue of *Channels* is to cover the above aspects in a manner that provides students or scientists interested in the field with up-to-date information on the current concepts and developments in the STIM/Orai research, which we expect to gain increasing importance as molecular structures and mechanisms will be linked to (patho)physiological processes.

Christoph Romanin
Guest Editor, *Channels*

Correspondence to: Christoph Romanin; Email: christoph.romanin@jku.at
Submitted: 10/19/2013; Accepted: 10/19/2013
http://dx.doi.org/10.4161/chan.27137