Curriculum Vitae
Rodolfo Madrid, PhD

Personal Information

Nationality: Chilean
Birth date: June 04th, 1971
Degree: PhD
Position: Associate Professor
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Education

- 1989 - 1993 Bachelor in Sciences, mention in Biology, Faculty of Sciences, University of Chile, Chile.
- 1996 - 2001 PhD in Molecular Biology, Cellular Biology and Neuroscience, Faculty of Sciences, University of Chile, Chile.
- 2001 - 2003 Postdoctoral Fellow, Dept. of Ophthalmology, University of Washington, Seattle, USA.
- 2004 - 2008 Postdoctoral Fellow, Instituto de Neurociencias de Alicante, UMH / CSIC, Alicante, Spain.

Positions

- 2008 - 2013 Assistant Professor / Associate Researcher, Faculty of Chemistry and Biology / VRIDeI, Universidad de Santiago de Chile, Santiago, Chile.
- 2013 - 2016 Director of the Doctoral Program in Neuroscience, Faculty of Chemistry and Biology, Universidad de Santiago de Chile, Santiago, Chile.
- 2013 - Associate Professor, Universidad de Santiago de Chile, Santiago, Chile.
- 2016 - 2018 Vice-Dean of Research, Faculty of Chemistry and Biology, Universidad de Santiago de Chile, Santiago, Chile.
- 2018 Director of Research, Science and Technology, Universidad de Santiago de Chile, Santiago, Chile.

Research line

The focus of my research is the study of the molecular and cellular bases of thermotransduction and nociception, the role of TRP channels and other voltage-sensitive channels in sensory physiology, as well as biophysics of thermo-TRP channels. I have contributed to unveil the role of the thermo-TRP channel TRPM8 and Kv1 potassium channels in cold sensitivity and excitability of primary sensory neurons of the somatosensory system, and to the role of TRPM8 channel as a humidity detector of the corneal surface, among others. I have led or been part of several well-cited publications in important journals, including *The Journal of Neuroscience, Nature Medicine, Cell Reports, The Journal of Physiology (London), The Journal of Biological Chemistry, The Journal of Neurophysiology, Biophysical Journal, Physiology (Bethesda), Pain, and The Plant Cell*, among others, with a mean impact factor of 6.0. I edited the book TRP Channels in Sensory Transduction, published by Springer in 2015, and I have four book chapters. Altogether, these publications have received more than 800 citations. I have organized or have been invited to 16 Symposia of the field in four countries including Chile, and I have presented more than 130 abstracts in national and international meetings. I am a member of the Society for Neuroscience (USA) and of the Chilean Society for Neuroscience (Chile). I have led several grants in the field, including one ANILLO Associative Project (PIA-CONICYT) and three Regular FONDECYT Grants, among others, together with my participation as co-investigator in four FONDECYT Grants and two CORFO L1 Grants. I have mentored five postdoctoral fellows in my lab, including the advice of two FONDECYT Postdoctoral fellows, four PhD students, one MSc, nine undergraduate students, and several national and international postdocs, graduate and undergraduate students visiting my lab in the last years. In my laboratory we use multistrategic approaches, that include patch clamping of primary sensory neurons, heterologous expression of ion channels, Ca^{2+} imaging, extracellular recording of thermoreceptors and nociceptors *ex vivo*, several molecular and cell biology tools including AAV-based transduction of sensory neurons *in vitro* and *in vivo*, and behavioral tests. I am former Director of the Doctoral Program in Neuroscience of the University of Santiago de Chile, former Vice-Dean of Research of the Faculty of Chemistry and Biology of our University, and former Director of Research, Science and Technology of the University of Santiago de Chile. From 2017 I am Associate Researcher of the Millennium Nucleus of Ion Channel-Associated Diseases (MiNICAD), and from 2020 I am Associate Researcher of the Millennium Nucleus for the Study of Pain (MiNuSPain), centers supported by the Ministry of Science, Technology, Knowledge and Innovation of Chile.

Selected publications **H-index $_{01\text{-}2021}$: 15**

Cornejo, V.H. *et al*. (2020). Non-conventional axonal organelles control TRPM8 ion channel trafficking and peripheral cold sensing. *Cell Reports*, 30: 4505-4517. (Cited by other 3). (IF$_{2020}$: 7.82).

Rivera *et al*. (2020). Negative modulation of TRPM8 channel function by protein kinase C in trigeminal cold thermoreceptor neurons. *Int. J. Mol. Sci.,* 21: E4420. (Cited by other). (IF$_{2020}$: 4.56).

Piña, R. *et al*. (2019). Role of TRPM8 channels in altered cold sensitivity of corneal primary sensory neurons induced by axonal damage. *The Journal of Neuroscience,* 39(41):8177-92. (Cited by other 10). (IF$_{2019}$: 6.07)

Pertusa *et al*. (2018) Critical role of the pore domain in the cold response of TRPM8 channels identified by ortholog functional comparison. *The J. of Biol. Chem.,* 293(32):12454-71. (Cited by other 11). (IF$_{2018}$: 4.11)

González, A. *et al.* (2017). Role of the excitability brake potassium current I_{KD} in cold allodynia induced by chronic nerve injury. *The Journal of Neuroscience*, 37(12): 3109-3126. (Cited by other 19). (IF$_{2017}$: 5.97).

Rozas P. *et al*. (2016). Targeted overexpression of TNFα increases CdK5 activity and TRPV1-dependent Ca^{2+} influx in trigeminal neurons. *Pain* 157(6): 1346-1362. (Cited by other 19). (IF$_{2015}$: 5.56).

Olivares, *et al*. (2015). TRPM8-dependent dynamic response in a cold thermoreceptor model. *PloS One* 10(10): 1-17. (Cited by other 19). (IF$_{2015}$: 3.06).

Madrid, R. and Bacigalupo, J. (2015). TRP channels in Sensory Transduction (Eds. R. Madrid and J. Bacigalupo). *Springer Switzerland*. (Chapter downloads $_{\text{Jun 2020}}$: 5006).

Arias-Darraz, L., *et al*. (2015). Transient Receptor Potential Ion Channel in *Chlamydomonas* Shares Key Features with Sensory Transduction-Associated TRP Channels in Mammals. *The Plant Cell* 27(1):177-88. (Cited by other 24). (IF$_{2014}$: 8.23).

Madrid, R. and Pertusa, M. (2014). Intimacies and physiological role of the polymodal cold-sensitive ion channel TRPM8. *Current topics in membranes* 74: 293-324. (Cited by other 12). (IF$_{2014}$: 3.30).

Pertusa, M. *et al*. (2014). Bidirectional modulation of the thermal and chemical sensitivity of TRPM8 channels by the initial region of the N-terminal domain. *The Journal of Biological Chemistry* 289(32):21828-43. (Cited by other 16). (IF$_{2014}$: 4.57).

Fritz, E. *et al.* (2013). Mutant SOD1 expressing astrocytes release toxic factors that trigger motor neuron death by inducing hyperexcitability. *J. of Neurophys.*, 109(11):2803-14. (Cited by other 51). (IF$_{2013}$: 3.04).

Orio, P. *et al*. (2012). Role of Hyperpolarization activated currents in the firing pattern of cold thermoreceptor endings. *The Journal of Neurophysiology*, 108(11): 3009-23. (Cited by other 21). (IF$_{2012}$: 3.30).

Pertusa, M. *et al*. (2012). N-Glycosylation of TRPM8 Ion Channels Modulates Temperature Sensitivity of Cold Thermoreceptor Neurons. *The J. of Biol. Chem.*, 287(22): 18218-29. (Cited by other 50). (IF$_{2012}$: 4.65).

Latorre, R. *et al*. (2011). A cool ion channel in cold transduction. *Physiology (Bethesda)*, 26: 273-85. (Cited by other 45). (IF$_{2011}$: 10.85).

Parra, A. *et al*. (2010). Ocular surface wetness is regulated by TRPM8-dependent cold thermoreceptors of the cornea. *Nature Medicine*, 16(12): 1396-9. (Cited by other 147). (IF$_{2010}$: 25.43).

Madrid, R. *et al*. (2009). Variable threshold of trigeminal cold-thermosensitive neurons is determined by a balance between TRPM8 and Kv1 channels. *The Journal of Neuroscience*, 29(10): 3120-3131. (Cited by other 118). (IF$_{2009}$: 7.14).

Orio, P., *et al*. (2009). Characteristics and physiological role of hyperpolarization activated currents (I_h) in cold thermoreceptors. *The Journal of Physiol. (London)*, 587.9:1961-76. (Cited by other 42). (IF$_{2009}$: 5.10).

Mälkiä, A., *et al*. (2007). Bidirectional shifts of TRPM8 channel gating by temperature and chemical agents modulate the cold sensitivity of mammalian thermoreceptors. *The Journal of Physiology (London)*, 581.1: 155-74. (Cited by other 105). (IF$_{2007}$: 4.80).

Madrid, *et al*. (2006). Contribution of TRPM8 channels to cold transduction in primary sensory neurons and peripheral nerve terminals. *The Journal of Neurosci.*, 26(48): 12512-25. (Cited by other 145). (IF$_{2006}$: 7.77).

Selected Grants

Millennium Nucleus for the Study of Pain (MiNuSPain), 2020-2023. AR-PI.
Millennium Nucleus of Ion Channel-Associated Diseases (MiNICAD), 2017-2020 / 2020-2023. AR-PI.
FONDECYT #1161733, 2016-2019. *Functional unbalance of Kv1 channels and cold-sensitive TRP channels as a mechanism of cold hypersensitivity in orofacial neuropathic pain.* PI.
FONDECYT #1131064, 2013-2016. *Cellular and molecular determinants of the abnormal cold sensitivity of primary sensory neurons in response to axonal damage*. PI.
FONDECYT #1100983, 2010-2013. *Molecular and cellular bases of neuropathic pain: role of I_{KD} in cold-induced allodynia following injury in primary sensory neurons.* PI.
CONICYT Anillo #ACT-1113, 2012-2015. *Study of the physiological role of TRP channels in thermal transduction and synaptic plasticity*. Director. PI.