
BIOGRAPHICAL SKETCH

NAME: DEMAUREX, Nicolas

POSITION TITLE: Professor of Physiology

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of Geneva	MD	1993	Medicine
University of Geneva	Ph.D	1993	Cell Biology
Hospital for Sick Children, Toronto, Canada	Postdoc	1996	Cell Physiology

A. Positions and Honors

1997-2003	Max Cloëtta fellow,	Dept. of Physiology, University of Geneva
2004-2010	Associate Professor	Dept. of Cell Physiology and Metabolism, University of Geneva
2010-present	Full Professor	Dept. of Cell Physiology and Metabolism, University of Geneva
2012-2023	Vice-dean, faculty of medicine,	University of Geneva

Awards:

1993	Award from the Swiss Society of Infectious Diseases
1997	Career award from the Max Cloëtta Foundation, Zürich
1999	Research Award from the Leenaards Foundation, Lausanne Sc.

B. Contributions to Science

Grant Reviewer: Swiss National Research Fund; Medical Research Council (MRC), UK; Research Foundation Flanders (FWO), Belgium; Austrian Science Fund (FWF); Deutsche Forschungsgemeinschaft (DFG); Agence Nationale de la Recherche (ANR), France

Editorial:

Ad hoc Reviewer: Cell, Science, Nature, PNAS, EMBO J., J.Clin. Invest, J. Immunol, J.Exp. Med, J. Cell Biol, J. Cell Science, J. Biol. Chem., J. Physiol., J. Gen. Physiol., Am. J. Physiol., Mol. Biol. Cell; Eur. J. Physiol., Mol. Biol. Cell, Cell Death and Differentiation, Cell Calcium

C. Recent Research Support and/or Scholastic Performance

2017-2020 CTI 26125.1 "Targeting Hv1 proton channels: an innovative therapy for B-cell malignancies"
The major goals of this technology transfer grant are to validate new inhibitors of the voltage-gated proton channel Hv1 as potential therapeutic agents to treat B cell lymphoma"

2023-2027 SNF 310030_219547 "Regulation and function of store-operated and mechanosensitive Ca²⁺ channels in immune cells *The major goals of this grant are to define the role of capacitive and mechanosensitive calcium channels in the activity of immune cells.*

D. Research Statement

My research focuses on the mechanisms controlling the calcium and pH homeostasis of innate immune cells, with a particular focus on store-operated Ca²⁺ signaling. Store-operated Ca²⁺ entry (SOCE) channels are found in the plasma membrane of all animal cells and are activated through a decrease in the Ca²⁺ concentration in the endoplasmic reticulum (ER). In immune cells, SOCE generates Ca²⁺ signals important for gene expression, proliferation, and the secretion of inflammatory mediators. My laboratory was instrumental in establishing the molecular basis and significance of membrane contact sites generated between the ER and the plasma membrane during SOCE and we have made several important contributions towards understanding the role of Ca²⁺ signaling in regulating the functions of neutrophils and dendritic cells. Current efforts in the laboratory are focused on understanding the physiological roles of ion channels in sustaining the migration and bactericidal activity of white blood cells. We use a multifaceted approach for these studies that combines mouse genetics, electrophysiology, electron microscopy, and a variety of imaging techniques. My main contributions to science have addressed the following topics:

Selected Recent Publications (01.06.2018-31.12.2023):

Full list of publications available at: <https://www.ncbi.nlm.nih.gov/pubmed/?term=Demaurex+n>

Carreras-Sureda A, Zhang X, Laubry L, Brunnetti J, Konig S, Wang X, Castelbou C, Hetz C, Liu Y, Frieden M & **Demaurex N**. The ER stress sensor IRE1 interacts with STIM1 to promote store-operated calcium entry, T cell activation, and muscular differentiation. *Cell Reports* (2023) 42:113540. doi: 10.1016/j.celrep.2023.113540.

Scott CC, Wasnik V, Nunes-Hasler P, **Demaurex N**, Kruse K & Gruenberg J. Calcium storage in multivesicular endo-lysosome. *Phys Biol.* (2023). doi: 10.1088/1478-3975/acfe6a.

Kaba M, Carreras-Sureda A, Nunes-Hasler P, & **Demaurex N**. The lipid transfer proteins Nir2 and Nir3 sustain phosphoinositide signaling and actin dynamics during phagocytosis. *J. Cell Sci* (2023). 136:jcs260902. doi: 10.1242/jcs.260902.

Wang WA, Carreras-Sureda A & **Demaurex N**. SARS-CoV-2 infection alkalinizes the ERGIC and lysosomes through the viroporin activity of the viral envelope protein. *J. Cell Sci* (2023)136: jcs260685. DOI: 10.1242/jcs.260685

El Chemaly A, Jaquet V, Cambet Y, Caillon A, Cherpin O, Balafa A, Krause KH, **Demaurex N**. Discovery and validation of new Hv1 proton channel inhibitors with onco-therapeutic potential. *Biochim Biophys Acta Mol Cell Res.* (2023). DOI: 10.1016/j.bbamcr.2022.119415

Austin S, Mekis R, Mohammed SEM, Scalise M, Wang WA, Galluccio M, Pfeiffer C, Borovec T, Parapatics K, Vitko D, Dinhopl N, **Demaurex N**, Bennett KL, Indiveri C, Nowikovsky K. TMBIM5 is the Ca²⁺/H⁺ antiporter of mammalian mitochondria. *EMBO Rep.* (2022) 23:e54978. doi:10.15252/embr.202254978

Kim JH, Carreras-Sureda A, Didier M, Henry C, Frieden M, **Demaurex N**. The TAM-associated STIM11484R mutation increases ORAI1 channel function due to a reduced STIM1 inactivation break and an absence of microtubule trapping. *Cell Calcium* 105:102615 (2022). doi:10.1016/j.ceca.2022.102615.

Henry C, Carreras-Sureda A & **Demaurex N**. Enforced tethering elongates the cortical endoplasmic reticulum and limits store-operated calcium entry. *J. Cell Sci* (2022) 135: jcs259313. doi:10.1242/jcs.259313

Wang WA, **Demaurex N**. The mammalian trafficking chaperone protein UNC93B1 maintains the ER calcium sensor STIM1 in a dimeric state primed for translocation to the ER cortex. *J. Biol. Chem.* (2022) doi: 10.1016/j.jbc.2022.101607

Carreras-Sureda A, Abrami L, Kim JH, Wang WA, Henry C, Frieden M, Didier M, van der Goot F, **Demaurex N**. S-acylation by ZDHHC20 targets ORAI1 channels to lipid rafts for efficient Ca²⁺ signaling by Jurkat T cell receptors at the immune synapse. *Elife.* 10:e72051 (2021). doi:10.7554/eLife.72051

Pihán P, Lisbona F, Borgonovo J, Edwards-Jorquera S, Nunes-Hasler P, Castillo K, Kepp O, Urra H, Saarnio S, Vihinen H, Carreras-Sureda A, Forveille S, Sauvat A, De Giorgis D, Pupo A, Rodríguez DA, Quarato G, Sagredo A, Lourido F, Letai A, Latorre R, Kroemer G, **Demaurex N**, Jokitalo E, Concha ML, Glavic Á, Green DR, Hetz C. Control of lysosomal-mediated cell death by the pH-dependent calcium channel RECS1. *Sci Adv.* 7(46):eabe5469. (2021) doi: 10.1126/sciadv.abe5469.

Saul S, Castelbou C, Fickentscher C, **Demaurex N**. Signaling and functional competency of neutrophils derived from bone-marrow cells expressing the ER-HOXB8 oncoprotein. *J Leukoc Biol.* 106:1101-1115 (2019).

Bulla M, Gyimesi G, Kim JH, Bhardwaj R, Hediger MA, Frieden M, & **Demaurex N**. ORAI1 channel gating and selectivity is differentially altered by natural mutations in the first or third transmembrane domain. *J. Physiol.* 597:561-582 (2019).

Rosselin M, Nunes-Hasler P & **Demaurex N**. Ultrastructural characterization of flashing mitochondria. *Contact (Thousand Oaks)*.1: 1-14, doi.org/10.1177/2515256418801423 (2018).

Sedlyarov V, Eichner R, Girardi E, Essletzbichler P, Nunes-Hasler P, Srndic I, Moskovskich A, Heinz LX, Kartnig F, Bigenzahn J, Goldmann U, Rebsamen M, Kovrik P, **Demaurex N** and Superti-Furga G. A CRISPR/Cas9-based screen identifies the transporter SLC4A7 as key component of phagosomal acidification in macrophages. *Cell Host Microb* 23:766-774 (2018).