CURRICULUM VITAE

NAME: Luis Alfonso Vaca Domínguez.

CURRENT POSITION AND ADDRESS:

Full-time "C" Professor
Department of Cellular and Developmental Biology
Institute of Cellular Physiology,
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NATIONAL RESEARCH SYSTEM
Member since 1995
Current level III

EDUCATION:
High school:
Colegio de Bachilleres, México D. F.
Bachelor.
Graduated in June 1978.

Bachelor's degree:
Autonomous Metropolitan University, Mexico D. F.
Surgeon
Graduated July 1985. Graduated with Honors.

Master's degree:
National Autonomous University of Mexico, Mexico D. F.
Master in Basic Biomedical Research.
Graduated in July 1989. Graduated with Honors.
Thesis: Epitope mapping in Noxiustoxin using monoclonal antibodies and synthetic peptides.
Advisor: Dr. Lourival Possani Posstay.

Master's degree:
The Institute for Computer Sciences, Houston, TX. USES.
Master's degree (Computer Science) Graduated in August 1994.

Doctorate:
National Autonomous University of Mexico, Mexico D. F.

PhD in Biomedical Sciences.
Graduated July 1994. Graduated with Honors.
Thesis: Use of scorpion toxins as structural sensors in potassium channels.
Advisors: Dr. Lourival Possani Posstay and Dr. Diana L. Kunze
Gabino Barreda Medal for the best doctoral thesis

COMPUTER LANGUAGES:
Pascal, C ++, Assembler, Basic.

PROGRAMS (SOFTWARE) DEVELOPED:

Views: Graphical interface for DOS operating system.
EPPro: Electrophysiological data acquisition and analysis program. It is currently part of pClamp.
DPD: Program to calculate ionic diffusion in membranes for DOS operating system.
DPW: Program to calculate ionic diffusion in membranes for Windows operating system.
NE: Multiple text editor for DOS.
INTEGRAL: Integral calculus of equations with multiple solutions.
ANAIMAGE: Quantitative analysis of multidimensional images

AWARDS:

1986 Master's Scholarship from the National Council of Science and Technology. 3 years.
1989 Cystic Fibrosis Foundation Fellowship (USA). 2 years ($ 60,000 DLS).
1992 American Heart Association Grant-in-Aid from the National Center (USA). 3 years ($ 120,000 DLS).
1993 Advanced Research Program / Advanced Technology Program (USA). 2 years ($ 193,056 DLS).
1995 R29 (First award) from the National Institutes of Health (NIH). 5 years ($ 518,000 DLS). Active until December 1996.
1995 Training Grant from the National Institutes of Health (NIH). Co-investigator. 3 years ($ 1,000,000 DLS).
1995 Directorate General for Academic Personnel Affairs (UNAM). 3 years.
($ 1,012,132 M.N.). Ref. IN209495
1996 National Council of Science and Technology (CONACyT). 2 years.
($ 338,048 M.N.). Ref. 0103PN
1997 The Third World Academy of Sciences Research Grant. 1 year
($ 3,000.00 DLS). Ref. 96-376 RG / BIO / LA
1997 Gabino Barreda Medal for University Merit.
1998 National Council of Science and Technology (CONACyT). 2 years.
($ 499,998 M. N.). Ref. 25312N
1998 Directorate General for Academic Personnel Affairs (UNAM). 3 years.
($ 587,922 M. N.). Ref. IN219298
1999 Alexander von Humboldt Award
2001 Miguel Alemán Award in Health Research 2001.

2003 General Directorate of Academic Personnel Affairs (UNAM). 3 years.
($ 412,132 M.N.). Ref. ES-201802/14
2004 General Directorate of Academic Personnel Affairs (UNAM). 1 year.
($ 200,000 M. N.). Ref. IX200704 / 15
2004 Silanes Prize for the best basic research article 2004.
2005 National Council of Science and Technology (CONACyT). 3 years. ($ 2,338,048.00 M.N.). Ref. 42469.
2005 General Directorate of Academic Personnel Affairs (UNAM). 3 years. ($ 600,000 M. N.). Ref. ES-201802/14
2008 General Directorate of Academic Personnel Affairs (UNAM). 3 years. ($ 600,000 M. N.).
2008 Institute of Science and Technology of the Federal District 2 years.
($ 1,500.00.00 M.N.)
2008 National Council of Science and Technology (CONACyT). 1 year. ($ 130,000.00)
2009 Institute of Science and Technology of the Federal District 1 year. ($ 1,500.00.00 M.N.)
2009 Institute of Science and Technology of the Federal District 1 year. ($ 2,000.00.00 M.N.). Co-responsible. Responsable. Dr. Angelica Zepeda
2009 Institute of Science and Technology of the Federal District 2 years. ($ 2,000.00.00 M.N.) Responsible Dra. Angélica Zepeda, Institute of Biomedical Research, UNAM.
2010 CANIFARMA Award in Technology.
2011 Institute of Science and Technology of the Federal District 2 years.
($ 1,700.00.00 M.N.)
2011 CONACyT Basic science groups 4 years ($ 3,950,000.00). Project 177822
2012 General Directorate of Academic Personnel Affairs (UNAM). 3 years. ($ 600,000.00 M. N.). Ref. IN202512
2014 Carameltech. Project for the development of interferon in nanoparticles. ($ 1,200,000.00 M.N.)
2014 Carameltech. Project for the development of Filgastrim in nanoparticles. ($ 850,000.00 M.N.)
2014 Sanfer. Development of a vaccine for circovirus 2 (Phase 1) incorporated in genetically encoded nanoparticles. ($ 500,000.00 M.N.) 2015 Conacyt, donation for infrastructure ($ 9,000,000.00).
2016 Secretary of Science and Technology of the Federal District ($ 2,000,000.00).
2016 Roche Dr. Jorge Rosenkranz Award in the Biotechnology area.
2016 CANIFARMA Award in Technology.
2017 Sanfer. Development of a vaccine for circovirus 2 (Phase 2) incorporated in genetically encoded nanoparticles. ($ 500,000.00 M.N.)
2017 CANIFARMA Award in Technology.

Research Associate.	Dept. Molecular Physiology
(1990-1991)	Baylor College of Medicine
	Houston, TX. 77030.

Research Instructor. (1991-1993)	Dept. Molecular Physiology Baylor College of Medicine Houston, TX. 77030.
Research Assistant Professor. (1994-1996)	Dept. Molecular Physiology Baylor College of Medicine Houston, TX. 77030.
Research Assistant Professor (**Joint appointment**) (1995-1996)	Case Western Reserve Rammelkamp Campus The Metro Health System Cleveland, OH 44109
Visiting Professor (2019-2020)	University of Washington Seattle, WA

Articles in peer-review journals

1. Toro L, **Vaca L** and Stefani E (1991) Calcium-activated potassium channels from coronary smooth muscle reconstituted in lipid bilayers. *Am. J. Physiol.* 260(Heart Circ. Physiol. **29**):H1779-H1789.
2. **Vaca L** and Kunze DL (1992) Anion-Cation-Dependent permeability of a large conductance anion channel in the T84 human colonic cell line. *J. Membrane Biology* **130:**241-249.
3. **Vaca L**, Schilling WP and Kunze DL (1992) G-protein-mediated regulation of a Ca2+-dependent K+ channel in cultured vascular endothelial cells. *Pflügers Archiv.* **422:**66-74.
4. **Vaca L** and Kunze DL (1993) cAMP-dependent phosphorylation modulates voltage gating in a Cl- channel from bovine aortic endothelial cells. *Am. J. Physiol.* (Cell Physiol. **33**):C370-C375.
5. **Vaca L**, Gurrola GB, Possani LD and Kunze DL (1993) Blockade of an endothelial KCa channel with synthetic peptides corresponding to the amino acid sequence of noxiustoxin: a K+ channel blocker. *J. Membrane Biology* **134:**123129.
6. **Vaca L** & Kunze DL (1993) Depletion and refilling of intracellular Ca2+ stores induce oscillations of Ca2+ current. *Am. J. Physiol.* (Heart Circ. Physiol. **33**):H1319-H1322.

7. Yokoyama T, **Vaca L**, Rossen RD, Durante W, Hazarika P & Mann DL (1993) Cellular basis for the inotropic effects of tumor necrosis factor-alpha in the adult mammalian heart. *J. Clin. Invest.* **92:**2303-2312.

8. Hassessian H, **Vaca L** & Kunze DL (1994) Blockade of the inward rectifier potassium current by the Ca2+-ATPase inhibitor 3',5',-Di(Tert-butyl)-1,4benzohydroquinone (BHQ). *British J. of Pharmacol.* **112:**1118-1122.

9. Yanfang H, **Vaca L**, Zhu X, Birnbaumer L, Kunze DL & Schilling WP (1994) Appearance of a novel Ca2+ influx pathway in ***sf9*** insect cells following expression of the transient receptor potential-like (TRPL) protein of Drosophila. *B.B.R.C.* **201**:1050-1056.

10. **Vaca L,** Sinkin WG**,** Hu Y, Kunze DL & Schilling WP (1994) Activation of recombinant Trp by thapsigargin in ***sf9*** insect cells. *Am. J. Physiol.* (Cell Physiol. **36**): C1501-C1505.

11. **Vaca L** & Kunze DL (1994) Depletion of intracellular Ca2+ stores activates a Ca2+-selective channel in vascular endothelium. *Am. J. Physiol* (Cell Physiol. **36**): C920-C925.

12. **Vaca L** & Kunze, DL (1995) IP3-activated Ca2+ channels in the plasma membrane of cultured vascular endothelial cells. *Am. J. Physiol.* 269 (Cell Physiol. **38**):C733-C738.

13. Yangie, Kunze DL, **Vaca L** & Schilling WP (1995) IP_3 activates the Drosophila cation channel TRPL in recombinant baculovirus-infected sf9 cells. A*m. J. Physiol.* 269(*Cell Physiol.* **38**):C1332-C1339.

14. **Vaca L**, Licea A and Possani LD (1996) Modulation of membrane potential in cultured vascular endothelium. *Am. J. Physiol.* 270(*Cell Physiol*. **39**):C819-C824.

15. Sinkins W, **Vaca L**, Kunze DL & Schilling WP (1996) The COOH-terminal domain of drosophila TRP channels confers thapsigargin sensitivity. *J. Biol. Chem.* **271**, No. 6. 2955-2960.

16. Nieto AR, Gurrola GB, **Vaca L** & Possani LD (1996) Noxiustoxin 2, a novel K+ channel blocking peptide from the venom of the scorpion *Centruroides noxius* Hoffmann. *Toxicon*. **34**:913-922.

17. **Vaca, L** (1996) Calmodulin inhibits calcium influx in vascular endothelium. *FEBS LETTERS.* **390**:289-293.

18. Kunze DL, Sinkins WG, **Vaca L** and Schilling WP (1997). Properties of single Drosophila TRPL channels expressed in sf9 insect cells. *Am. J. Physiol.* 272(*Cell Physiol*. **41**):C27-C34.

19. Gutierrez D, Diaz de Leon L and **Vaca L** (1997) Characterization of the Maitotoxin-induced calcium influx pathway from human skin fibroblast. *Cell Calcium*. **22**:31-38.

20. Escobar L, Salvador C, Martínez M & **Vaca L**. (1998) Maitotoxin, a cationic channel activator. *Neurobiology* **6**:59-74.

21. Morales-mulia S, **Vaca L**, Hernández-cruz A & Pasantes-morales H. (1998) Osmotic swelling-induced changes in cytosolic calcium do not influence regulatory volume decrease in cultured astrocytes. *Neurochem*. **71**:2330-2338.

22. Escobar L, Martinez M, Salvador C, & **Vaca L**. (1999) Modulation of a calciumactivated chloride current by Maitotoxin. *Toxicon* **37**(2): 359-370.

23. Trueta C, Díaz M, **Vaca L**, Clapp C and Martínez de la Escalera G (1999) Functional uncoupling between calcium and secretion in α-T3 gonadotropic cell line. *J. Cell Physiol*. **179**:347-357.

24. **Vaca L.** (1999) SITS Blockade Induces Multiple Subconductance States in a Large Conductance Chloride Channel. *J. Memb. Biol.* **169**:65-73.

25. Guadalupe Reyes-Cruz, José Vázquez-Prado, Werner Müller-Esterl & **Luis Vaca.** (2000) Regulation of the Human Bradykinin B2 Receptor Expressed in Sf21 Insect Cells: A possible Role for Tyrosine Kinases. *J. Cell. Biochem.* **76**:658-73.

26. **Vaca L**., Stieber J., Ludwig A., Hofmann F. & Biel M. (2000) Mutations in the S4 domain of a pacemaker channel alter its voltage dependence. *FEBBS LETTERS* **479**:35-40.

27. Antaramian A and **Vaca L** (2000) Store-Operated Calcium Influx in Excitable Cells Review. *Recent. Res. Devel. Neurochemistry* **3**(1): 47-60.

28. Anaid Antaramián, Armando Butanda-Ochoa, Olivia Vázquez-Martínez, Mauricio Díaz-Muñoz & **Luis Vaca** (2001) Functional expression of recombinant type 1 ryanodine receptor in sf21 cells. *Cell Calcium* **30**(1):9-17.

29. Tuz K, Ordaz B, **Vaca L**, Quesada O, Pasantes-Morales H (2001) Isovolumetric regulation mechanisms in cultured cerebellar granule neurons. *J. Neurochem* **79**(1): 143-51.

30. Martínez-François Juan Ramón, Morales-Tlalpan Verónica & **Vaca Luis** (2002) Characterization of the Maitotoxin-activated cationic current from human skin fibroblasts. *J. Physiol*. **538**(Pt 1): 79-86

31. Carlos Saldaña, David Naranjo, Antonio Peña & **Luis Vaca** (2002) Splitting the two pore-domains from TOK1 results in two cationic channels with novel functional properties *J. Biol. Chem.* **15**;277(7):4797-805

32. Morales-Tlalpan V, Vaca L. (2002) Modulation of the maitotoxin response by intracellular and extracellular cations. *Toxicon*. **40**(5):493-500.

33. **Vaca L**, Sampieri A. (2002) Calmodulin modulates the delay period between release of calcium from internal stores and activation of calcium influx via endogenous TRP1 channels. *J. Biol. Chem.* **277**(44):42178-87.

34. Salvador C, Mora SI, Ordaz B, Antaramian A, Vaca L, Escobar LI. (2003) Basal activity of GIRK5 isoforms. *Life Sci.* **72**(13):1509-18.

35. Valdes VJ, Sampieri A, Sepulveda J, Vaca L. (2003) Using double-stranded RNA to prevent in vitro and in vivo viral infections by recombinant baculovirus. *J. Biol. Chem.* **278**(21):19317-24.

36. Zepeda A, Vaca L, Arias C, Sengpiel F. (2003) Reorganization of visual cortical maps after focal ischemic lesions. *J Cereb Blood Flow Metab.* **23**(7):811-20.

37. Ordaz B, Vaca L, Franco R, Pasantes-Morales H. (2004) Volume changes and whole cell membrane currents activated during gradual osmolarity decrease in C6 glioma cells: contribution of two types of K+ channels. *Am J Physiol Cell Physiol.* **286**(6):C1399-409.

38. Zepeda A, Sengpiel F, Guagnelli MA, Vaca L, Arias C. (2004) Functional reorganization of visual cortex maps after ischemic lesions is accompanied by changes in expression of cytoskeletal proteins and NMDA and GABA(A) receptor subunits. *J Neurosci.* **24**(8):1812-21.

39. Flores-Jasso CF, Valdes VJ, Sampieri A, Valadez-Graham V, Recillas-Targa F, Vaca L. (2004) Silencing structural and nonstructural genes in baculovirus by RNA interference. *Virus Res.* **102**(1):75-84.

40. Cruz-Cruz R, Salgado A, Sanchez-Soto C, Vaca L, Hiriart M. (2005) Thapsigargin-sensitive cationic current leads to membrane depolarization, calcium entry, and insulin secretion in rat pancreatic beta-cells. *Am J Physiol Endocrinol Metab.* **289**(3):E439-45.

41. Sampieri A, Diaz-Munoz M, Antaramian A, Vaca L. (2005) The foot structure from the type 1 ryanodine receptor is required for functional coupling to storeoperated channels. *J. Biol. Chem.* **280**(26):24804-15.

42. Ordaz B, Tang J, Xiao R, Salgado A, Sampieri A, Zhu MX, Vaca L. (2005) Calmodulin and calcium interplay in the modulation of TRPC5 channel activity: Identification of a novel C-terminal domain for calcium/calmodulin-mediated facilitation. *J. Biol. Chem.* **280**(35):30788-96.

43. Carlos Fabian Flores-Jasso, Inés Velazquez-Quesada, Carlos Landa-Solis, Andres A. Gutierrez and Luis Vaca (2005) One-oligonucleotide method to construct vectors for RNA interference *Acta Pharmacologica Sinica* **26**(12):1467-73.

44. Luz-Madrigal Agustín, Carmen Clapp, Jorge Aranda, and **Luis Vaca** (2007) Selective gene transfer into the retina vasculature using recombinant baculovirus carrying a human FLT-1 promoter. *Virology Journal* **18:**80-88.

45. Salgado Alfonso, Ordaz Benito, Sampieri Alicia, Zepeda Angélica, Glazebrook Patricia, Kunze Diana, **Vaca Luis**. (2008) Regulation of the cellular localization and function human transient receptor potencial channel 1 by other members of the TRPC family**.** *Cell Calcium*. **43**(4):375-87

46. Sampieri Alicia, Zepeda Angélica ,Salgado Alfonso and **Vaca Luis** (2008) STIM1 converts TRPC1 from a receptor-operated to a store-operated channel: moving TRPC1 in and out of lipid rafts. *Cell Calcium.* **45**(5):439-46.

47. Sampieri A, Zepeda A, Asanov A, **Vaca L**. (2009) Visualizing the store-operated channel complex assembly in real time: identification of SERCA2 as a new member. *Cell Calcium.* **44**(5):479-91

48. C. Fabián Flores-Jasso, Catalina Arenas, José Luis Reyes, Cecilia ContrerasCubas, Alejandra Covarrubias and **Luis Vaca**. (2009) First step in pre-miRNAs processing by human Dicer. *Acta Pharmacologica Sinica* **8**:1177-85.

49. Pedroza-Roldan C, Charles-Niño C, Saavedra R, Govezensky T, **Vaca L**, Avaniss-Aghajani E, Gevorkian G, Manoutcharian K. (2009) Variable epitope library-based vaccines: Shooting moving targets. *Mol Immunol.* **47**:270-82

50. Alexander Asanov, Angélica Zepeda and **Luis Vaca** (2010) A novel form of Total Internal Reflection Fluorescence Microscopy (LG-TIRFM) reveals different and independent lipid raft domains in living cells. *BBA.* **1801**:147- 155

51. **Luis Vaca** (2010) SOCIC: The Store Operated Calcium Influx Complex. *Cell Calcium* **47**(3):199-209.

52. Medecigo M, Manoutcharian K, Vasilevko V, Govezensky T, Munguia ME, Becerril B, Luz-Madrigal A, **Vaca L**, Cribbs DH, Gevorkian G. (2010) Novel amyloid-beta specific scFv and VH antibody fragments from human and mouse phage display antibody libraries. *J Neuroimmunol*. **223**(1-2):104-14.

53. Monroy-Contreras, R and **Vaca, L** (2011) Molecular Beacons: powerful tools for imaging RNA in living cells. *Journal of Nucleic Acids* 2011:741723.

54. Stéphanie Thebault, Carmen González, Celina García, David, Arredondo Zamarripa, Gabriel Nava, **Luis Vaca**, Fernando López-casillas, Gonzalo Martínez de La Escalera, Carmen Clapp (2011). Vasoinhibins prevent bradykininstimulated endothelial cell proliferation by inactivating eNOS via reduction of both intracellular Ca2+ levels and eNOS phosphorylation at Ser1179. *Pharmaceuticals* **4**(7), 1052-1069

55. Meneses-Ruiz DM, Laclette JP, Aguilar-Díaz H, Hernández-Ruiz J, Luz-Madrigal A, Sampieri A, **Vaca L**, Carrero JC. (2011) Mucosal delivery of ACNPV baculovirus driving expression of the Gal-lectin LC3 fragment confers protection against amoebic liver abscess in hamster. *Int J Biol Sci*. **7**(9): 1345-56.

56. Moreno C, **Vaca L**. (2011) SOC and now also SIC: Store-operated and storeinhibited channels. *IUBMB Life*. **63**(10): 856-63.

57. Willoughby D, Everett KL, Halls ML, Pacheco J, Skroblin P, **Vaca L**, Klussmann E, Cooper DM. (2012) Direct Binding Between Orai1 and AC8 Mediates Dynamic Interplay Between Ca2+ and cAMP Signaling. *Science Signal*. **10**;5(219):ra29.

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59. Asanov A, Zepeda A, **Vaca L**. (2012) A platform for combined DNA and protein microarrays based on total internal reflection fluorescence. *Sensors* (Basel) **12**(2):1800-15.

60. Ayling LJ, Briddon SJ, Halls ML, Hammond GR, **Vaca L**, Pacheco J, Hill SJ, Cooper DM. (2012) Adenylyl cyclase AC8 directly controls its microenvironment by recruiting the actin cytoskeleton in a cholesterol-rich milieu. *J Cell Sci.* **15**;125(Pt 4):869-86.

61. Ramírez-Jarquín JO, Lara-Hernández S, López-Guerrero JJ, Aguileta MA, Rivera-Angulo AJ, Sampieri A, **Vaca L**, Ordaz B, Peña-Ortega F. (2012) Somatostatin modulates generation of inspiratory rhythms and determines asphyxia survival. *Peptides*. **34**(2):360-72.

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63. Moreno C, Sampieri A, Vivas O, Peña-Segura C, **Vaca L**. (2012) STIM1 and Orai1 mediate thrombin-induced Ca(2+) influx in rat cortical astrocytes. *Cell Calcium*. **52**(6):457-67.

64. Zepeda A, Arias C, Flores-Jasso F, **Vaca L**. (2013) RNA imaging: tracking in real-time RNA transport in neurons using molecular beacons and confocal microscopy. *Methods Cell Biol.* **113**:361-89.

65. Luz-Madrigal A, Asanov A, Camacho-Zarco AR, Sampieri A, **Vaca L**. (2013) A Cholesterol Recognition Amino Acid Consensus Domain in GP64 Fusion Protein Facilitates Anchoring of Baculovirus to Mammalian Cells. *J Virol*. **87**(21):11894907.

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69. **Luis Vaca**. Point-of-care Diagnostic Tools to Detect Circulating MicroRNAS as Biomarkers of Disease. (2014). *Sensors* (Basel) *14*(5), 9117-9131.

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72. Asanov A, Sampieri A, Moreno C, Pacheco J, Salgado A, Sherry R, **Vaca L**. (2015) Combined single channel and single molecule detection identifies subunit composition of STIM1-activated transient receptor potential canonical (TRPC) channels. *Cell Calcium*. **57**(1):1-13.

73. Dulce María Meneses-Ruiz, Hugo Aguilar-Diaz, Raúl José Bobes, Alicia Sampieri, **Luis Vaca**, Juan Pedro Laclette, and Julio César Carrero (2015) Protection against Amoebic Liver Abscess in Hamster by Intramuscular Immunization with an *Autographa californica* Baculovirus Driving the Expression of the Gal-Lectin LC3 Fragment. *BioMed Research International*. Article ID 760598.

74. Pérez-Flores G, Lévesque SA, Pacheco J, **Vaca L**, Lacroix S, Pérez-Cornejo P, Arreola J. (2015). The P2X7/P2X4 interaction shapes the purinergic response in murine macrophages. *Biochem Biophys Res Commun*. **20**;467(3):484-90.

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78. Kevin M. Méndez-Acevedo, Victor Julián Valdes, Alexander Asanov, Luis Vaca (2017) A novel family of mammalian transmembrane proteins involved in cholesterol transport. *Scientific Reports* Aug 7;7(1):7450. doi: 10.1038/s41598017-07077-z.

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84. Alicia Sampieri, Karla Santoyo, Alexander Asanov and **Luis Vaca**. (2018) Association of the IP3R to STIM1 provides a reduced intraluminal calcium microenvironment, resulting in enhanced store-operated calcium entry. Scientific Reports. Sci Rep. 2018 Sep 5;8(1):13252.

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