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**Plant Lab Research Summary:** How do cell signaling pathways control the physiology and pharmacology of ion channels and G protein-coupled receptors in the heart and brain? We combine electrophysiology with live-cell imaging, single-molecule spectroscopy and genetic techniques, such as CRISPR to identify new druggable targets in order to understand and treat diseases such as cardiac arrhythmia, epilepsy and pain

**Research Funding:** R01HL144615, NHLBI | Barker Foundation Award for kidney disease research | NU Tier 1 Award with R Koppes for cellular basis of cannabinoid and opioid pharmacology | Chicago Translational Science Award

**Education:** Post-doctoral fellow at Yale University & University of Chicago with Steve Goldstein | Ph.D. University of Leeds, UK | B.Sc., University of Liverpool

**Previous Academic Appointments:** Research Associate Professor, Dept. of Pharmaceutical Sciences, Northeastern University | Assistant Research Professor, Dept. of Biochemistry, Brandeis University

**Professional Accolades:** IUPHAR Guide to Pharmacology: K2P family of K<sup>+</sup> channels | Keynote speaker: Glyoxalase Centennial, The Biochemical Society | Cranefield Award: The Society of General Physiologists | Science Research Prize: Pritzker School of Medicine, University of Chicago | Medical Research Council Doctoral Fellowship | Wellcome Trust Undergraduate Fellowship,

**Current Teaching:** PHSC 6216, Human Physiology & Pathology | PMCL 6260 Pharmacology 1 | PHSC 2650, Intro to Health Sciences |

**Peer-reviewed research articles and reviews:** Google Scholar 10/25/19, 2609 citations, h-index: 22; i10 index: 26

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2. M Ramsden, [LD Plant](#), NJ Webster, PFT Vaughan, Z Henderson, HA Pearson (2001). Differential effects of unaggregated and aggregated amyloid  $\beta$  protein (1-40) on K<sup>+</sup> channels in primary cultures of rat cerebellar granule and cortical neurones. *J Neurochem*: 79, 699-712. [doi/10.1046/j.1471-4159.2001.00618.x/full](https://doi.org/10.1046/j.1471-4159.2001.00618.x/full)
3. [LD Plant](#), PJ Kemp, C Peers, Z Henderson & HA Pearson (2002). Hypoxic depolarization of cerebellar granule neurones by inhibition of TASK-1. *Stroke* 33: 2324-8. [doi.org/10.1161/01.STR.0000027440.68031.B0](https://doi.org/10.1161/01.STR.0000027440.68031.B0)
4. [LD Plant](#), JP Boyle, NM Thomas, NJ Hipkins, E Benediks, NM Hooper, Z Henderson, C Peers, RF Cowburn & HA Pearson (2002). Presenilin-1 mutations alter K<sup>+</sup> currents in the human neuroblastoma cell line, SH-SY5Y. *Neuroreport*: 13, 1553-6.
5. C Peers, A Lewis, [LD Plant](#), HA Pearson, & PJ Kemp (2002). O<sub>2</sub>-sensitive K<sup>+</sup> channels controlling cell excitability in 'Oxygen sensing: Responses and adaptation to hypoxia'. Marcel Dekker Inc Eds S Lahiri, G Semenza, N Prabhakar.
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8. IF Smith, JP Boyle, [LD Plant](#), HA Pearson and C Peers (2003). Hypoxic remodeling of Ca<sup>2+</sup> stores in type I cortical astrocytes. *Journal of Biological Chemistry*: 273, 4875-81. [doi: 10.1074/jbc.M209206200](https://doi.org/10.1074/jbc.M209206200)

9. S Rajan\*, LD Plant\*, ML Rabin, MH Butler, SA Goldstein (2005) SUMOylation silences the plasma membrane leak K<sup>+</sup> channel K2P1. *Cell*: 121, 37-47. DOI: 10.1016/j.cell.2005.01.019 *\*Joint First Author*  
*Commentary: Wilson VG & Rosas-Acosta G (2005): Wrestling with SUMO in a new arena. Science STKE: 290, pe32.*
10. LD Plant, S Rajan, S Goldstein (2005). K2P channels and their protein partners. *Current Opinion in Neurobiology*. 15 326-33. <http://dx.doi.org/10.1016/j.conb.2005.05.008>
11. SA Goldstein, DA Bayliss, D Kim, F Lesage, S Rajan, LD Plant. (2005) International Union of Pharmacology. LV. Nomenclature and Molecular Relationships of Two-P Potassium Channels. *Pharm Reviews*. 57(4), 527-40. DOI: 10.1124/pr.57.4.12
12. HF McGarry, LD Plant, MJ Taylor (2005). Diethylcarbamazine activity against *Brugia malayi* microfilariae is dependent on inducible nitric oxide synthase and the cyclooxygenase pathway. *Filaria Journal*: 4, 4-10. DOI: 10.1186/1475-2883-4-4.
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*Commentary: Makielski JC (2006): SIDS: genetic and environmental influences may cause arrhythmia in this silent killer. J. Clinical Investigation: 116, 297-9.*
15. D Thomas, LD Plant, C Wilkens, Z McCrossan, SA Goldstein (2008). Alternative translation initiation in rat brain yields K2P2 K<sup>+</sup> channels permeable to Na<sup>+</sup>. *Neuron*: 58, (6): 859-70. DOI: 10.1016/j.neuron.2008.04.016  
*Commentary: Yang SB & Jan LY (2008): Thrilling moment of an inhibitory channel. Neuron: 58, 823-4.*
16. LD Plant, I Dementieva, A Kollwe, S Olikara, JD Marks, SA Goldstein.(2010) One SUMO is sufficient to silence the dimeric K<sup>+</sup> channel K2P1 (2010). *Proc Natl Acad Sci U S A*: 107, (23): 10743-8. DOI: 10.1073/pnas.1004712107.
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18. LD Plant (2012). A role for K2P channels in the operation of somatosensory nociceptors. *Frontiers Mol Neurosci*. DOI: 10.3389/fnmol.2012.00021.
19. LD Plant, DA Bayliss, D Kim, SA Goldstein (on going). The IUPHAR electronic receptor database of Two-P Potassium Channels; <http://www.iuphar-db.org/IC/ReceptorFamiliesForward>
20. MG Distler, LD Plant, G Sokoloff, AJ Hawk, I Aneas, S Meredith, M Nobrega, AA Palmer (2012). Glyoxalase 1 increases anxiety by reducing GABA<sub>A</sub> receptor agonist methylglyoxal. *J. Clinical Investigation*: 122, (6): 2306-15. DOI: 10.1172/JCI61319
21. LD Plant, L Zuniga, D Araki, JD Marks, SA Goldstein (2012). SUMOylation silences heterodimeric TASK potassium channels Containing K2P1 subunits in cerebellar granule neurons. *Science Signaling*: 5 (251): ra84. DOI: 10.1126/scisignal.2003431  
*Commentary: Adler, EM (2013): Eschewing ischemia or responding to it. J. Gen. Phys: 141, 1-2.*
22. PB Shelat, LD Plant, JC Wang, JD Marks (2013). The tri-block co-polymer F-68 rescues cultured hippocampal neurons following oxygen-glucose deprivation by blocking apoptosis. *J. Neurosci*: 33 (30) 12287-99. DOI: 10.1523/JNEUROSCI.5731-12.2013.

23. LD Plant (2013). Multilevel Regulation: Controlling BK channels in central clock neurons. *J. Gen. Phys*: 142 (6) 579-83s. DOI: 10.1085/jgp.201311128.
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*Commentary: Kobertz, WR (2014): Stoichiometry of the cardiac  $I_{Ks}$  complex. PNAS: 111(14), 5065-6.*
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33. Z Gu<sup>#</sup>, LD Plant<sup>\*\*</sup>, XY Meng<sup>\*</sup>, JM Perez-Aguilar, DE Logothetis & R Zhou<sup>\*</sup> (2018). Exploring the nanotoxicology of  $MoS_2$ : A Study on the Interaction of  $MoS_2$  Nanoflakes and  $K^+$  Channels. *ACS Nano* 12 (1), 705-717 doi: 10.1021/acsnano.7b07871 *\*Joint corresponding author, #joint first author*
34. K Gada, LD Plant (2019). Two-pore domain potassium channels: emerging targets for novel analgesic drugs. *Br J Pharmacol* doi: 10.1111/bph.14518.
35. Z Gu<sup>\*</sup>, W Song, S Liu, B Li, LD Plant<sup>\*</sup>, XY Meng<sup>\*</sup>. Blockade of the human Voltage-dependent Anion Channel VDAC by  $MoS_2$  Nanoflakes. *\*Joint corresponding author*