

PAWEL SWIETACH DPhil FPhysiol

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EDUCATION:

- 2001-2004 Doctorate (DPhil) in Physiology on *"Factors affecting the spatio-temporal distribution of protons and their permeation across the gap junction in cardiac myocytes"* Supervisor: Richard Vaughan-Jones, Oxford University
- 1998-2001 Degree (BA) in Physiological Sciences, First Class Honours, Christ Church, Oxford University

PROFESSIONAL POSITIONS:

- 2011-Present Associate Professor in Cardiovascular Physiology, Department of Physiology, Anatomy & Genetics (DPAG)
- 2011-Present Handa Tutorial Fellow and Governing Body member, Corpus Christi College, Oxford University
- 2004-08 British Heart Foundation-funded postdoctoral research scientist, DPAG
- 2005, 2007 National Institutes of Health-funded visiting scientist, Cardiovascular Research and Training Institute, Salt Lake City, Utah, USA (PI: Kenneth W Spitzer)

FELLOWSHIPS, HONOURS AND AWARDS:

- 2017-2022 European Research Council (ERC) Consolidator Grant Awardee
- 2008-2016 Royal Society University Research Fellow
- 2009-2012 Medical Research Council New Investigator
- 2006-2009 Hayward Junior Research Fellow, Oriel College, Oxford
- 2004-2006 Fulford Junior Research Fellow, Somerville, Oxford
- 2001-2004 Wellcome Trust Prize Studentship
- 2001 Physiological Society Prize for best performance in degree course

UNDERGRADUATE TEACHING:

- Average annual university teaching delivered: 33 hours. Nominated to OUSU Teaching Award for *Most Acclaimed Lecturer* (2016); Recipient of Medical Sciences Division *Teaching Excellence Commendation* (2017, 2015) and Recipient of Medical Sciences Division *Teaching Excellence Award* (2012).
- Lectures for the First Bachelor of Medicine (BM1 Part 1) and Biomedical Sciences (Prelims): *"Introduction to the cardiovascular system"*, *"Haemodynamics"*, *"Heart as a pump"*, *"Cardiac electrical excitation and the electrocardiogram"*, *"Baroreflex and tissue flows"*.
- Practical for the First Bachelor of Medicine and Biomedical Sciences: *"Human ECG and heart sounds"*.
- Lectures for Final Honour School (FHS) in Medical Sciences and Cell and Systems Biology: *"Overview of the cardiac action potential"*, *"Frank-Starling mechanism"*, *"Acid-base regulation"*.
- *Outreach and access activities:* Since 2010, I have taught on the University's UNIQ School in Medicine. I delivered a course consisting of a lecture (*"the heart as a pump"*), a 3 hr practical class (*"measuring ECG and heart sounds"*) and a 'mock' tutorial. In feedback for 2015, I received a 100% rating of "liked/strongly liked".
- *Examining:* Chair of Examiners, First Bachelor of Medicine Part I (2016/17), Examiner, First Bachelor of Medicine "Physiology and Pharmacology" (2015/16); Chair of Examiners, Preliminary Examination in Biomedical Sciences (2011/12 and 2012/13).

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

- 2005-present Physiological Society (UK), member
- 2017 Elected Fellow of the Physiological Society (*FPhysiol*)

PUBLICATIONS:

(✉=corresponding author)

- *Google Scholar* (retrieved 1/04/2018): *h*-index = 31, Citations = 2,975, *i*10-index = 54.
- *Web of Science* (retrieved 1/04/2018): *h*-index = 25, Citations = 2,016, Citations per article = 22.15.

PRIMARY RESEARCH PUBLICATIONS:

- [62](#) Rorsman NJG, Ta CM, Garnett H, **Swietach P**, Tammaro P. Defining the ionic mechanisms of optogenetic control of vascular tone by channelrhodopsin-2. *Br J Pharmacol*. doi: 10.1111/bph.14183.
- [61](#) Garciaarena CD, Malik A, **Swietach P**, Moreno AP, Vaughan-Jones RD. Distinct moieties underlie biphasic H⁺ gating of connexin43 channels, producing a pH optimum for intercellular communication. *FASEB J* **32**(4), 1969-1981 (2018).
- [60](#) ✉ Dovmark, T.H., Hulikova, Niederer, S. A., Vaughan-Jones, R. D., **Swietach, P**. Normoxic cells remotely regulate the acid-base balance of cells at the hypoxic core of connexin-coupled tumor growths. *FASEB J* **32**(1), 83-96 (2018).
- [59](#) ✉ Dovmark, T.H., Saccomano, M., Hulikova, A., Alves, F., **Swietach, P**. Connexin43 channels are a novel pathway for discharging lactate from hypoxic pancreatic ductal adenocarcinoma cells. *Oncogene* **36**, 4538-4550, (2017).
- [58](#) Ford, K.L., Moorhouse, E.L., Bortolozzi, M., **Swietach, P**, Vaughan-Jones, R.D. Regional acidosis locally inhibits but remotely stimulates Ca²⁺ waves in ventricular myocytes. *Cardiovas Res* **113**, 984-995, (2017).
- [57](#) ✉ Richardson, S.L. & **Swietach, P**. Red blood cell thickness is evolutionarily constrained by slow, hemoglobin-restricted diffusion in cytoplasm. *Sci Rep* **6**, 36018, (2016).
- [56](#) ✉ Richards, M., Lomas, O., Jalink, K., Ford, K.L., Vaughan-Jones, R.D., Lefkimmatis, K. & **Swietach, P**. Intracellular tortuosity underlies slow cAMP diffusion in adult ventricular myocytes. *Cardiovasc Res* **110**, 395-407, (2016).
- [55](#) McIntyre, A., Hulikova, A., Ledaki, I., Snell, C., Singleton, D., Steers, G., Seden, P., Jones, D., Bridges, E., Wigfield, S., Li, J.L., Russell, A., **Swietach, P**. & Harris, A.L. Disrupting Hypoxia-Induced Bicarbonate Transport Acidifies Tumor Cells and Suppresses Tumor Growth. *Cancer Res* **76**, 3744-3755, (2016).
- [54](#) ✉ Hulikova, A. & **Swietach, P**. Nuclear proton dynamics and interactions with calcium signaling. *J Mol Cell Cardiol* **96**, 26-37, (2016).
- [53](#) ✉ Hulikova, A., Black, N., Hsia, L.T., Wilding, J., Bodmer, W.F. & **Swietach, P**. Stromal uptake and transmission of acid is a pathway for venting cancer cell-generated acid. *Proc Natl Acad Sci U S A* **113**, E5344-5353, (2016).
- [52](#) **Swietach, P**, Spitzer, K.W. & Vaughan-Jones, R.D. Na⁺ ions as spatial intracellular messengers for co-ordinating Ca²⁺ signals during pH heterogeneity in cardiomyocytes. *Cardiovasc Res* **105**, 171-181, (2015).
- [51](#) Villafuerte, F.C., **Swietach, P**, Youm, J.B., Ford, K., Cardenas, R., Supuran, C.T., Cobden, P.M., Rohling, M. & Vaughan-Jones, R.D. Facilitation by intracellular carbonic anhydrase of Na⁺-HCO₃⁻ co-transport but not Na⁺/H⁺ exchange activity in the mammalian ventricular myocyte. *J Physiol* **592**, 991-1007, (2014).
- [50](#) ✉ Hulikova, A. & **Swietach, P**. Rapid CO₂ permeation across biological membranes: implications for CO₂ venting from tissue. *FASEB J* **28**, 2762-2774, (2014).
- [49](#) ✉ Hulikova, A., Aveyard, N., Harris, A.L., Vaughan-Jones, R.D. & **Swietach, P**. Intracellular carbonic anhydrase activity sensitizes cancer cell pH signaling to dynamic changes in CO₂ partial pressure. *J Biol Chem* **289**, 25418-25430, (2014).
- [48](#) **Swietach, P**, Youm, J.B., Saegusa, N., Leem, C.H., Spitzer, K.W. & Vaughan-Jones, R.D. Coupled Ca²⁺/H⁺ transport by cytoplasmic buffers regulates local Ca²⁺ and H⁺ ion signaling. *Proc Natl Acad Sci U S A* **110**, E2064-2073, (2013).
- [47](#) ✉ Schroeder, M.A., Ali, M.A., Hulikova, A., Supuran, C.T., Clarke, K., Vaughan-Jones, R.D., Tyler, D.J. & **Swietach, P**. Extramitochondrial domain rich in carbonic anhydrase activity improves myocardial energetics. *Proc Natl Acad Sci U S A* **110**, E958-967, (2013).

- [46](#) ☒ Hulikova, A., Harris, A.L., Vaughan-Jones, R.D. & **Swietach, P.** Regulation of intracellular pH in cancer cell lines under normoxia and hypoxia. *J Cell Physiol* **228**, 743-752, (2013).
- [45](#) Gondi, G., Mysliwicz, J., Hulikova, A., Jen, J.P., **Swietach, P.**, Kremmer, E. & Zeidler, R. Antitumor efficacy of a monoclonal antibody that inhibits the activity of cancer-associated carbonic anhydrase XII. *Cancer Res* **73**, 6494-6503, (2013).
- [44](#) Garciaarena, C.D., Ma, Y.L., **Swietach, P.**, Huc, L. & Vaughan-Jones, R.D. Sarcolemmal localisation of Na⁺/H⁺ exchange and Na⁺-HCO₃⁻ co-transport influences the spatial regulation of intracellular pH in rat ventricular myocytes. *J Physiol* **591**, 2287-2306, (2013).
- [43](#) ☒ **Swietach, P.**, Hulikova, A., Patiar, S., Vaughan-Jones, R.D. & Harris, A.L. Importance of intracellular pH in determining the uptake and efficacy of the weakly basic chemotherapeutic drug, doxorubicin. *PLoS One* **7**, e35949, (2012).
- [42](#) McIntyre, A., Patiar, S., Wigfield, S., Li, J.L., Ledaki, I., Turley, H., Leek, R., Snell, C., Gatter, K., Sly, W.S., Vaughan-Jones, R.D., **Swietach, P.** & Harris, A.L. Carbonic anhydrase IX promotes tumor growth and necrosis in vivo and inhibition enhances anti-VEGF therapy. *Clin Cancer Res* **18**, 3100-3111, (2012).
- [41](#) Murri-Plesko, M.T., Hulikova, A., Oosterwijk, E., Scott, A.M., Zortea, A., Harris, A.L., Ritter, G., Old, L., Bauer, S., **Swietach, P.** & Renner, C. Antibody inhibiting enzymatic activity of tumour-associated carbonic anhydrase isoform IX. *Eur J Pharmacol* **657**, 173-183, (2011).
- [40](#) ☒ Hulikova, A., Vaughan-Jones, R.D. & **Swietach, P.** Dual role of CO₂/HCO₃⁻ buffer in the regulation of intracellular pH of three-dimensional tumor growths. *J Biol Chem* **286**, 13815-13826, (2011).
- [39](#) ☒ **Swietach, P.**, Tiffert, T., Mauritz, J.M., Seear, R., Esposito, A., Kaminski, C.F., Lew, V.L. & Vaughan-Jones, R.D. Hydrogen ion dynamics in human red blood cells. *J Physiol* **588**, 4995-5014, (2010).
- [38](#) **Swietach, P.**, Camelliti, P., Hulikova, A., Kohl, P. & Vaughan-Jones, R.D. Spatial regulation of intracellular pH in multicellular strands of neonatal rat cardiomyocytes. *Cardiovasc Res* **85**, 729-738, (2010).
- [37](#) Schroeder, M.A., **Swietach, P.**, Atherton, H.J., Gallagher, F.A., Lee, P., Radda, G.K., Clarke, K. & Tyler, D.J. Measuring intracellular pH in the heart using hyperpolarized carbon dioxide and bicarbonate: a ¹³C and ³¹P magnetic resonance spectroscopy study. *Cardiovasc Res* **86**, 82-91, (2010).
- [36](#) Li, L., Niederer, S.A., Idigo, W., Zhang, Y.H., **Swietach, P.**, Casadei, B. & Smith, N.P. A mathematical model of the murine ventricular myocyte: a data-driven biophysically based approach applied to mice overexpressing the canine NCX isoform. *Am J Physiol Heart Circ Physiol* **299**, H1045-1063, (2010).
- [35](#) Everaert, N., Willemsen, H., Hulikova, A., Brown, H., Decuyper, E., **Swietach, P.** & Bruggeman, V. The importance of carbonic anhydrase II in red blood cells during exposure of chicken embryos to CO₂. *Respir Physiol Neurobiol* **172**, 154-161, (2010).
- [34](#) **Swietach, P.**, Patiar, S., Supuran, C.T., Harris, A.L. & Vaughan-Jones, R.D. The role of carbonic anhydrase 9 in regulating extracellular and intracellular pH in three-dimensional tumor cell growths. *J Biol Chem* **284**, 20299-20310, (2009).
- [33](#) Huang, W.C., **Swietach, P.**, Vaughan-Jones, R.D. & Glitsch, M.D. Differentiation impairs low pH-induced Ca²⁺ signaling and ERK phosphorylation in granule precursor tumour cells. *Cell Calcium* **45**, 391-399, (2009).
- [32](#) **Swietach, P.**, Wigfield, S., Cobden, P., Supuran, C.T., Harris, A.L. & Vaughan-Jones, R.D. Tumor-associated carbonic anhydrase 9 spatially coordinates intracellular pH in three-dimensional multicellular growths. *J Biol Chem* **283**, 20473-20483, (2008).
- [31](#) **Swietach, P.**, Spitzer, K.W. & Vaughan-Jones, R.D. Ca²⁺-mobility in the sarcoplasmic reticulum of ventricular myocytes is low. *Biophys J* **95**, 1412-1427, (2008).
- [30](#) Niederer, S.A., **Swietach, P.**, Wilson, D.A., Smith, N.P. & Vaughan-Jones, R.D. Measuring and modeling chloride-hydroxyl exchange in the Guinea-pig ventricular myocyte. *Biophys J* **94**, 2385-2403, (2008).
- [29](#) Huang, W.C., **Swietach, P.**, Vaughan-Jones, R.D., Ansorge, O. & Glitsch, M.D. Extracellular acidification elicits spatially and temporally distinct Ca²⁺ signals. *Curr Biol* **18**, 781-785, (2008).
- [28](#) Ch'en, F.F., Villafuerte, F.C., **Swietach, P.**, Cobden, P.M. & Vaughan-Jones, R.D. S0859, an N-cyanosulphonamide inhibitor of sodium-bicarbonate cotransport in the heart. *Br J Pharmacol* **153**, 972-982, (2008).

- [27](#) **Swietach, P.**, Spitzer, K.W. & Vaughan-Jones, R.D. pH-Dependence of extrinsic and intrinsic H⁺-ion mobility in the rat ventricular myocyte, investigated using flash photolysis of a caged-H⁺ compound. *Biophys J* **92**, 641-653, (2007).
- [26](#) **Swietach, P.**, Rossini, A., Spitzer, K.W. & Vaughan-Jones, R.D. H⁺ ion activation and inactivation of the ventricular gap junction: a basis for spatial regulation of intracellular pH. *Circ Res* **100**, 1045-1054, (2007).
- [25](#) Yamamoto, T., **Swietach, P.**, Rossini, A., Loh, S.H., Vaughan-Jones, R.D. & Spitzer, K.W. Functional diversity of electrogenic Na⁺-HCO₃⁻ cotransport in ventricular myocytes from rat, rabbit and guinea pig. *J Physiol* **562**, 455-475, (2005).
- [24](#) **Swietach, P.** & Vaughan-Jones, R.D. Relationship between intracellular pH and proton mobility in rat and guinea-pig ventricular myocytes. *J Physiol* **566**, 793-806, (2005).
- [23](#) **Swietach, P.**, Leem, C.H., Spitzer, K.W. & Vaughan-Jones, R.D. Experimental generation and computational modeling of intracellular pH gradients in cardiac myocytes. *Biophys J* **88**, 3018-3037, (2005).
- [22](#) **Swietach, P.** & Vaughan-Jones, R.D. Novel method for measuring junctional proton permeation in isolated ventricular myocyte cell pairs. *Am J Physiol Heart Circ Physiol* **287**, H2352-2363, (2004).
- [21](#) Zaniboni, M., **Swietach, P.**, Rossini, A., Yamamoto, T., Spitzer, K.W. & Vaughan-Jones, R.D. Intracellular proton mobility and buffering power in cardiac ventricular myocytes from rat, rabbit, and guinea pig. *Am J Physiol Heart Circ Physiol* **285**, H1236-1246, (2003).
- [20](#) Zaniboni, M., Rossini, A., **Swietach, P.**, Banger, N., Spitzer, K.W. & Vaughan-Jones, R.D. Proton permeation through the myocardial gap junction. *Circ Res* **93**, 726-735, (2003).
- [19](#) **Swietach, P.**, Zaniboni, M., Stewart, A.K., Rossini, A., Spitzer, K.W. & Vaughan-Jones, R.D. Modelling intracellular H⁺ ion diffusion. *Prog Biophys Mol Biol* **83**, 69-100, (2003).
- [18](#) Ch'en, F.F., Dilworth, E., **Swietach, P.**, Goddard, R.S. & Vaughan-Jones, R.D. Temperature dependence of Na⁺-H⁺ exchange, Na⁺-HCO₃⁻ co-transport, intracellular buffering and intracellular pH in guinea-pig ventricular myocytes. *J Physiol* **552**, 715-726, (2003).
- [17](#) **Swietach, P.**, Browning, J.A. & Wilkins, R.J. Functional and molecular determination of carbonic anhydrase levels in bovine and cultured human chondrocytes. *Comp Biochem Physiol B Biochem Mol Biol* **133**, 427-435, (2002).

REVIEWS, BOOK CHAPTERS AND INVITED ARTICLES:

- [16](#) ☒ **Swietach, P.**, Vaughan-Jones, R.D., Hulikova, A. & Niederer, S.A. Rebuttal from Pawel Swietach, Richard D. Vaughan-Jones, Alzbeta Hulikova and Steven A. Niederer. *J Physiol* **593**, 5035, (2015).
- [15](#) ☒ Hulikova, A., Vaughan-Jones, R.D., Niederer, S.A. & **Swietach, P.** CrossTalk opposing view: Physiological CO₂ exchange does not normally depend on membrane channels. *J Physiol* **593**, 5029-5032, (2015).
- [14](#) ☒ **Swietach, P.**, Vaughan-Jones, R.D., Harris, A.L. & Hulikova, A. The chemistry, physiology and pathology of pH in cancer. *Philos Trans R Soc Lond B Biol Sci* **369**, 20130099, (2014).
- [13](#) **Swietach, P.**, Leem, C.H., Spitzer, K.W. & Vaughan-Jones, R.D. Pumping Ca²⁺ up H⁺ gradients: a Ca²⁺-H⁺ exchanger without a membrane. *J Physiol* **592**, 3179-3188, (2014).
- [12](#) Garcarena, C.D., Youm, J.B., **Swietach, P.** & Vaughan-Jones, R.D. H⁺-activated Na⁺ influx in the ventricular myocyte couples Ca²⁺-signalling to intracellular pH. *J Mol Cell Cardiol* **61**, 51-59, (2013).
- [11](#) ☒ Hulikova, A., Harris, A.L., Vaughan-Jones, R.D. & **Swietach, P.** Acid-extrusion from tissue: the interplay between membrane transporters and pH buffers. *Curr Pharm Des* **18**, 1331-1337, (2012).
- [10](#) ☒ **Swietach P.**, Harris, AL, Vaughan-Jones RD. *New insights into regulation of tumour pH by carbonic anhydrases*. In: *The Tumor Microenvironment* (Ed: Bagley RG), 2010, Chapter 2, pp 23-41. Springer.
- [9](#) ☒ **Swietach, P.**, Spitzer, K.W. & Vaughan-Jones, R.D. Modeling calcium waves in cardiac myocytes: importance of calcium diffusion. *Front Biosci (Landmark Ed)* **15**, 661-680, (2010).
- [8](#) ☒ **Swietach, P.**, Hulikova, A., Vaughan-Jones, R.D. & Harris, A.L. New insights into the physiological role of carbonic anhydrase IX in tumour pH regulation. *Oncogene* **29**, 6509-6521, (2010).

- 7 Vaughan-Jones, R.D., Spitzer, K.W. & **Swietach, P.** Intracellular pH regulation in heart. *J Mol Cell Cardiol* **46**, 318-331, (2009).
- 6 Vaughan-Jones, R.D. & **Swietach, P.** Pushing and pulling the cardiac sodium/hydrogen exchanger. *Circ Res* **103**, 773-775, (2008).
- 5 ☒ **Swietach, P.**, Wigfield, S., Supuran, C.T., Harris, A.L. & Vaughan-Jones, R.D. Cancer-associated, hypoxia-inducible carbonic anhydrase IX facilitates CO₂ diffusion. *BJU Int* **101 Suppl 4**, 22-24, (2008).
- 4 **Swietach, P.**, Vaughan-Jones, R.D. & Harris, A.L. Regulation of tumor pH and the role of carbonic anhydrase 9. *Cancer Metastasis Rev* **26**, 299-310, (2007).
- 3 Vaughan-Jones, R.D., Villafuerte, F.C., **Swietach, P.**, Yamamoto, T., Rossini, A. & Spitzer, K.W. pH-Regulated Na⁺ influx into the mammalian ventricular myocyte: the relative role of Na⁺-H⁺ exchange and Na⁺-HCO₃⁻ Co-transport. *J Cardiovasc Electrophysiol* **17 Suppl 1**, S134-S140, (2006).
- 2 Vaughan-Jones, R.D., Spitzer, K.W. & **Swietach, P.** Spatial aspects of intracellular pH regulation in heart muscle. *Prog Biophys Mol Biol* **90**, 207-224, (2006).
- 1 **Swietach, P.** & Vaughan-Jones, R.D. Spatial regulation of intracellular pH in the ventricular myocyte. *Ann N Y Acad Sci* **1047**, 271-282, (2005).

SELECTED RESEARCH PRESENTATIONS:

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| 2017 | Annual meeting of the German Physiological Society, <i>Greifswald, Germany</i> | Symposium Speaker: "Sharing is caring" |
| 2017 | International meeting on pH, <i>Sandbjerg, Denmark</i> | Invited Speaker: "Why are red blood cells flattened?" |
| 2016 | Annual meeting of the International Society for Cancer Metabolism, <i>Brussels, Belgium</i> | Keynote Speaker: "Sharing is caring? Diffusive transmission of metabolic acid between cancer cells and across the stroma" |
| 2016 | Annual meeting of the Physiological Society, <i>Dublin, Ireland</i> | Invited Speaker at Presidential Symposium: "Is nuclear pH in cardiac myocytes regulated?" |
| 2015 | Annual meeting of the Scandinavian Physiological Society, <i>Aarhus, Denmark</i> | Invited Speaker: "A passive pathway for venting metabolic acid from hypoxic tumour regions" |
| 2015 | 10 th International Conference on Carbonic Anhydrases, <i>Maastricht, Netherlands</i> | Invited Speaker: "What are intracellular carbonic anhydrases for?" |
| 2015 | International Meeting on Ion Channels, Transporters and Cancer, <i>London, UK</i> | Invited Speaker: "A passive pathway for venting metabolic acid from hypoxic tumour regions" |
| 2014 | International Congress on Carnosine and Anserine ICCA2014, <i>Tokyo, Japan</i> . | Invited Speaker. "Histidyl-dipeptides pump Ca ²⁺ ions down gradients of pH: a novel cytoplasmic Ca ²⁺ /H ⁺ exchanger important for microdomain signaling in cardiac myocytes". |
| 2014 | 5 th Symposium of the International Society for Proton Dynamics in Cancer, <i>Smolenice, Slovakia</i> | Invited speaker. "Intracellular carbonic anhydrase activity sensitizes cancer cell pH-signaling to dynamic changes in CO ₂ partial pressure". |
| 2014 | Annual meeting of the German Physiological Society, <i>Mainz, Germany</i> | Invited Speaker: "A novel cytoplasmic Ca ²⁺ /H ⁺ exchanger without a membrane". |
| 2013 | XXXVII Congress of the International Union of Physiological Sciences, <i>Birmingham, UK</i> | Symposium Speaker: "Novel interactions between H ⁺ and Ca ²⁺ signalling in the heart" |
| 2013 | H ⁺ ion Sensing, Signaling and Servo-control, <i>Oxford, UK</i> | Symposium Speaker: "Insights into pH regulation in cancer: imaging multi-cellular cancer cell growths." |
| 2012 | Biophysical Society Annual Meeting, <i>San Diego, USA</i> | Speaker: "Role of cytoplasmic buffers in spatial H ⁺ -Ca ²⁺ interactions in ventricular myocytes". |
| 2011 | "International Symposium on New Approaches in Cardiovascular disorders", <i>Ankara, Turkey</i> | Invited Speaker: "Proton diffusion in the heart: the role of mobile pH buffers and gap junctional channels". |

2011	International Meeting on Bicarbonate Transport, Aarhus, Denmark	Invited Speaker: "The dual role of CO ₂ /HCO ₃ ⁻ in pH regulation in 3-D tumour-cell growths".
2010	8 th International Conference on Carbonic Anhydrases, Florence, Italy	Invited Speaker: "Regulation of pH in cancer cells: transporters, enzymes and diffusion".
2010	Gentner Symposium on H ⁺ mobility in Chemical and Biological Systems, Ma'agan, Israel	Speaker: "Role of mobile buffers in regulating intracellular pH: experimental findings from cardiac myocytes".
2007	International CAIX Symposium, in Brussels, Belgium	Invited Speaker: "pH regulation in tumours: role of carbonic anhydrase 9"
2006	Annual meeting of the Physiological Society, London, UK	Invited Speaker: "Proton shuttles and gap junctions: role in spatial pH regulation".

RESEARCH GRANTS AWARDED:

2016	European Research Council	Consolidator grant: "Surviving metabolism: acid handling and signalling".	€1,922,575 (as PI) 5 years from 2017
2016	British Heart Foundation	Project grant: "Regulation of nuclear pH in ventricular myocytes and its role in gene expression".	£226,672 (as PI) 3 years from 2017
2016	OUP-John Fell Fund	Small project grant: "Urinary carbonic anhydrase II excretion as a fast, simple and economical means of diagnosing haemolysis in newborns" 152/042	£7,408 (as PI) 2 months from 2016
2015	Children Living with Metabolic Diseases	Project grant: "Mechanisms of aberrant cardiac calcium signalling in response to propionic acidosis".	£16,000 (as PI) 2 years from 2015
2015	EP Abraham Fund	Research grant: "Regulation of cancer cell pH by stromal fibroblasts: studies of novel cancer-stroma interactions"	£30,000 (as PI) 6 months from 2015
2015	British Heart Foundation	Programme grant: "H ⁺ ion control and signalling in cardiac hypertrophy and heart failure". RG07/31534	£1,198,466 (as CoI) 5 years from 2016
2012	British Heart Foundation	Project grant: "Effects of nitric oxide signalling on proton dynamics in the healthy and diseased heart".	£188,409 (as PI) 3 years from 2013
2011	Association for International Cancer Research	Project grant: "Regulation of cancer cell pH by stromal fibroblasts: studies of novel cancer-stroma interactions".	£191,403 (as PI) 3 years from 2012
2011	European Commission	Marie Curie Initial Training Network Grant: "IonTrac: Ion transport proteins in control of cancer cell behaviour".	£193,964 (partner) 4 years from 2011
2010	CRUK Research Centre Development Fund	Small project grant: "Implementing a high-throughput assay to measure intracellular and membrane-bound carbonic anhydrase activity in cancer cells".	£7,500 (as PI) 6 months from 2010
2010	OUP John Fell Fund	Equipment grant: "High resolution, real-time imaging of living cells and tissue: a laboratory start-up".	£59,000 (as PI)
2010	Royal Society	Equipment grant: "A high-throughput flow-cytometry system for measuring intracellular pH (pH _i) in populations of cells".	£50,000 (as PI)
2008	Medical Research Council	New Investigator research grant: "Mechanisms, consequences and regulation of pH non-uniformity in 3-D tissue structures: implications on cancer therapy".	£306,221 (as PI) 3 years from 2009
2008	Royal Society	University Research Fellowship "How tissues remove acid: imaging spatial pH regulation in 3-D tumours".	£810,998 (as PI) 8 years from 2008



European
Research
Council



