Christos Pliotas
Academic (Teaching & Research) Reader
Division of Molecular & Cellular Function (L5)
Type of address: Visiting address.
Room D.3317
Michael Smith Building

Overview

Research in my group is focused on elucidating mechanical sensing and response in ion channels. We investigate how ion channels sense forces in membranes and open their pores in response to mechanical stimuli. The main method we employ is **P**ulsed **EL**ectron-**EL**ectron **DO**uble **R**esonance (PELDOR) spectroscopy, (also known as DEER spectroscopy), complemented by Cryo Electron Micrsocopy (cryoEM) and electrophysiology to characterise mechanosensitive ion channels.
We further study the BAM complex, which is an essential membrane protein complex involved in the folding of outer membrane proteins in gram negative bacteria, using in-cell Electron Paramagnetic Resonance (EPR) spectroscopy.
More details about our group, research activities, news and current lab members could be found in the Pliotas Group Research Website

Qualifications

Doctor of Philosophy, Biochemistry, University of Aberdeen
1 Oct 2007 → 31 Jan 2011
Award Date: 6 Jul 2011

Master of Science, Medical Physics, University of Aberdeen
20 Sept 2006 → 30 Sept 2007
Award Date: 1 Oct 2007

Bachelor of Science, Physics, National and Kapodistrian University of Athens
Award Date: 6 Jul 2006

Employment

Reader in Structural Biological EPR Spectroscopy
Academic (Teaching & Research) Reader
Division of Molecular & Cellular Function (L5)
The University of Manchester
8 Jun 2023 → present

Lecturer in Integrative Membrane Biology
University of Leeds
Leeds, United Kingdom
5 Sept 2018 → 8 Jun 2023

Royal Society of Edinburgh Research Fellow &Group Leader
University of St Andrews
St Andrews, United Kingdom
1 Jan 2016 → 1 Jan 2021

Postdoctoral Research Associate
University of St Andrews
St Andrews, United Kingdom
1 Feb 2011 → 31 Dec 2015

Research outputs

The mechanosensitive channel YbiO has a conductance equivalent to the largest gated-pore

Lane, B. J., Dionysopoulou, M., Yan, N., Lippiat, J. D., Muench, S. P. & Pliotas, C., 3 Apr 2025, In: Structure. 33, p. 1-11

Enabling structural biological electron paramagnetic resonance spectroscopy in membrane proteins through spin labelling
Shah, A., Wort, J. L., Ma, Y. & Pliotas, C., Feb 2025, In: Current Opinion in Chemical Biology. 84, 102564.

Conformational dynamics and asymmetry in multimodal inhibition of membrane-bound pyrophosphatases
Liu, J., Shah, A., Ma, Y., Hardman, K., Johansson, N., Ribeiro, O., Brookfield, A., Bowen, A., Yli-Kauhaluoma, J., Xhaard, H., Jeuken, L., Goldman, A., Pliotas, C. & Vidilaseris, K., 4 Dec 2024, In: eLife.

Monitoring the Conformational Ensemble and Lipid Environment of a Mechanosensitive Channel Under Cyclodextrin-Induced Membrane Tension
Lane, B. J., Ma, Y., Yan, N., Wang, B., Ackermann, K., Karamanos, T. K., Bode, B. E. & Pliotas, C., 6 Jun 2024, In: Structure. 32, p. 1-12

Membrane force reception: mechanosensation in G protein-coupled receptors and tools to address it
Hardman, K., Goldman, A. & Pliotas, C., 1 Oct 2023, In: Current Opinion in Physiology. 35, 100689.

Darobactin B Stabilises a Lateral-Closed Conformation of the BAM Complex in E. coli Cells
Haysom, S. F., Machin, J., Whitehouse, J. M., Horne, J. E., Fenn, K., Ma, Y., Mkami, H. E., Böhringer, N., Schäberle, T. F., Ranson, N. A., Radford, S. E. & Pliotas, C., 21 Aug 2023, In: Angewandte Chemie International Edition. 62, 34, e202218783.

Approaches for the modulation of mechanosensitive MscL channel pores
Lane, B. J. & Pliotas, C., 15 Mar 2023, In: Frontiers in Chemistry. 11, 1162412.

Genetic and cellular characterization of MscS-like putative channels in the filamentous fungus Aspergillus nidulans
Dionysopoulou, M., Yan, N., Wang, B., Pliotas, C. & Diallinas, G., 31 Dec 2022, In: Channels.

Novel variants provide differential stabilisation of human equilibrative nucleoside transporter 1 states
Boakes, J. C., Harborne, S. P. D., Ngo, J. T. S., Pliotas, C. & Goldman, A., 8 Nov 2022, In: Frontiers in Molecular Biosciences. 9, 970391.

HDX-guided EPR spectroscopy to interrogate membrane protein dynamics
Lane, B. J., Wang, B., Ma, Y., Calabrese, A. N., Mkami, H. E. & Pliotas, C., Sept 2022, In: STAR protocols.

Pocket delipidation induced by membrane tension or modification leads to a structurally analogous mechanosensitive channel state
Wang, B., Lane, B. J., Kapsalis, C., Ault, J. R., Sobott, F., Mkami, H. E., Calabrese, A. N., Kalli, A. C. & Pliotas, C., 7 Apr 2022, In: Structure.

Using pulsed EPR in the structural analysis of integral membrane proteins
Hartley, A. M., Ma, Y., Lane, B. J., Wang, B. & Pliotas, C., 16 Nov 2021, *Electron Paramagnetic Resonance.* Chechik, V., Murphy, D. M. & Bode, B. E. (eds.). Oxford: Royal Society of Chemistry, Vol. 27. p. 74-108 45 p. (Specialist Periodical Reports (SPR) - Electron Paramagnetic Resonance).

The tetraspanin Tspan15 is an essential subunit of an ADAM10 scissor complex
Koo, C. Z., Harrison, N., Noy, P. J., Szyroka, J., Matthews, A. L., Hsia, H.-E., Müller, S. A., Tüshaus, J., Goulding, J., Willis, K., Apicella, C., Cragoe, B., Davis, E., Keles, M., Malinova, A., McFarlane, T. A., Morrison, P. R., Nguyen, H. T. H., Sykes, M. C. & Ahmed, H. & 11 others, Maio, A. D., Seipold, L., Saftig, P., Cull, E., Pliotas, C., Rubinstein, E., Poulter, N. S., Briddon, S. J., Holliday, N. D., Lichtenthaler, S. F. & Tomlinson, M. G., 4 Sept 2020, In: Journal of Biological Chemistry. 295, 36, p. 12822-12839 18 p.

In-lipid structure of pressure sensitive domains hints mechanosensitive channel functional diversity
Kapsalis, C., Ma, Y., Bode, B. E. & Pliotas, C., 21 Jul 2020, In: Biophysical Journal. 119, 2, p. 448-459 12 p.

Allosteric activation of an ion channel triggered by modification of mechanosensitive nano-pockets
Kapsalis, C., Wang, B., Mkami, H. E., Pitt, S. J., Schnell, J. R., Smith, T. K., Lippiat, J. D., Bode, B. E. & Pliotas, C., 10 Oct 2019, In: Nature Communications. 10, p. 1-14 14 p., 4619.

Optimization of recombinant membrane protein production in the engineered Escherichia coli strains SuptoxD and SuptoxR
Michou, M., Kapsalis, C., Pliotas, C. & Skretas, G., 19 Jul 2019, In: ACS Synthetic Biology. 8, 7, p. 1631–1641 11 p.

Sparse labeling PELDOR spectroscopy on multimeric mechanosensitive membrane channels
Ackermann, K., Pliotas, C., Valera, S., Naismith, J. H. & Bode, B. E., 7 Nov 2017, In: Biophysical Journal. 113, 9, p. 1968-1978 11 p.

Adenosine monophosphate binding stabilizes the KTN domain of the Shewanella denitrificans Kef potassium efflux system
Pliotas, C., Grayer, S. C., Ekkerman, S., Chan, A. K. N., Healy, J., Marius, P., Bartlett, W., Khan, A., Cortopassi, W. A., Chandler, S. A., Rasmussen, T., Benesch, J. L. P., Paton, R. S., Claridge, T. D. W., Miller, S., Booth, I. R., Naismith, J. H. & Conway, S. J., 15 Aug 2017, In: Biochemistry. 56, 32, p. 4219–4234 16 p.

Ion Channel Conformation and Oligomerization Assessment by Site-Directed Spin Labeling and Pulsed-EPR
Pliotas, C., 10 Aug 2017, *A Structure-Function Toolbox for Membrane Transporter and Channels.* Ziegler, C. (ed.). Cambridge, MA: Academic Press, Vol. 594. p. 203-242 40 p. (Methods in Enzymology).

Enhanced imaging of lipid rich nanoparticles embedded in methylcellulose films for transmission electron microscopy using mixtures of heavy metals
Asadi, J., Ferguson, S., Raja, H., Hacker, C., Marius, P., Ward, R., Pliotas, C., Naismith, J. H. & Lucocq, J., Aug 2017, In: Micron. 99, p. 40-48 9 p.

Spectator no more, the role of the membrane in regulating ion channel function
Pliotas, C. & Naismith, J. H., Aug 2017, In: Current Opinion in Structural Biology. 45, p. 59-66 8 p.

Nanoparticle suspensions enclosed in methylcellulose: a new approach for quantifying nanoparticles in transmission electron microscopy
Hacker, C., Asadi, J., Pliotas, C., Ferguson, S. G. A., Sherry, L., Marius, P., Tello, J. A., Jackson, D., Naismith, J. H. & Lucocq, J., 4 May 2016, In: Scientific Reports. 6, p. 1-13 13 p., 25275.

Accurate Extraction of Nanometer Distances in Multimers by Pulse EPR
Valera, S., Ackermann, K., Pliotas, C., Huang, H., Naismith, J. H. & Bode, B. E., 24 Mar 2016, In: Chemistry - A European Journal. 22, 14, p. 4700-4703 4 p.

The role of lipids in mechanosensation
Pliotas, C., Dahl, A. C. E., Rasmussen, T., Mahendran, K. R., Smith, T. K., Marius, P., Gault, J., Banda, T., Rasmussen, A., Miller, S., Robinson, C. V., Bayley, H., Sansom, M. S. P., Booth, I. R. & Naismith, J. H., Dec 2015, In: Nature Structural and Molecular Biology. 22, p. 991–998 8 p.

Understanding the structural requirements for activators of the Kef bacterial potassium efflux system
Healy, J., Ekkerman, S., Pliotas, C., Richard, M., Bartlett, W., Grayer, S. C., Morris, G. M., Miller, S., Booth, I. R., Conway, S. J. & Rasmussen, T., 1 Apr 2014, In: Biochemistry. 53, 12, p. 1982–1992 11 p.

Probing the structure of the mechanosensitive channel of small conductance in lipid bilayers with pulsed electron-electron double resonance
Ward, R., Pliotas, C., Branigan, E., Hacker, C., Rasmussen, A., Hagelueken, G., Booth, I. R., Miller, S., Lucocq, J., Naismith, J. H. & Schiemann, O., 18 Feb 2014, In: Biophysical Journal. 106, 4, p. 834-842 9 p.

Quantification of free cysteines in membrane and soluble proteins using a fluorescent dye and thermal unfolding
Branigan, E., Pliotas, C., Hageluken, G. & Naismith, J. H., Nov 2013, In: Nature protocols. 8, p. 2090–2097 8 p.

Conformational state of the MscS mechanosensitive channel in solution revealed by pulsed electron-electron double resonance (PELDOR) spectroscopy
Pliotas, C., Ward, R. J., Branigan, E., Rasmussen, A., Hageluken, G., Huang, H., Black, S. S., Booth, I. R., Schiemann, O. & Naismith, J. H., 10 Sept 2012, In: Proceedings of the National Academy of Sciences of the United States of America. 109, 40, p. E2675-E2682 8 p.

Mechanism of ligand-gated potassium efflux in bacterial pathogens
Roosild, T. P., Castronovo, S., Healy, J., Miller, S., Pliotas, C., Rasmussen, T., Bartlett, W., Conway, S. J. & Booth, I. R., 16 Nov 2010, In: Proceedings of the National Academy of Sciences of the United States of America. 107, 46, p. 19784-19789 6 p.

Prizes

BBSRC New Investigator Award
Pliotas, C. (Recipient), 23 Jun 2019

Fellow of the Royal Society of Biology (FRSB)
Pliotas, C. (Recipient), 1 Jan 2024

Royal Society of Edinburgh Research Fellowship
Pliotas, C. (Recipient), 1 Jan 2016

Sir Robin MacLellan Prize
Pliotas, C. (Recipient), 22 Jun 2022