

Mary Fedarko Roberts

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Education:

Bryn Mawr College, Bryn Mawr PA	A.B.	1969	Chemistry
Stanford University, Stanford CA	Ph.D.	1974	Chemistry
University of Illinois, Urbana IL	Post-doc	1974-1975	Biochemistry
University of California, La Jolla CA	Post-doc	1975-1978	Biochemistry

Academic Positions:

1978-1983 Assistant Professor, Chem. Dept., Massachusetts Institute of Technology
1983-1986 Associate Professor, Chem. Dept., M.I.T.
1986-1987 Staff Scientist, Francis Bitter National Magnet Laboratory, M.I.T.
1987-1990 Visiting Scientist, Francis Bitter National Magnet Laboratory, M.I.T.
1987-1991 Associate Professor, Department of Chemistry, Boston College
1991-2017 Professor, Department of Chemistry, Boston College
1993-1999 Chair, Chemistry Graduate Admissions, Boston College
2002-2006 Vice-Chair, Department of Chemistry, Boston College
2002-2015 Visiting Scientist, Department of Biochemistry, Brandeis University
2017- Professor Emerita, Boston College

Awards/Honors:

ASBMB Fellow, elected 2022
Boston College Distinguished Senior Research Award, 2008
AAAS Fellow, elected 2007
N.S.F. Faculty Award for Women, 1991-1997
Alfred P. Sloan Fellow, 1982-1984
Dreyfus Teacher / Scholar, 1980

Professional Activities:

Member of Biophysical Chemistry (BBCB) Study Section, N.I.H., 1984-1987
Member of Biophysics Panel, N.S.F., 1989-1992
Member of CRUI Panel, N.S.F., 1994-1996
Scientific Advisory Committee, Damon Runyon-Walter Winchell Foundation Cancer Fund,
1993-1997
Biophysical Society Council Member, 1994-1997
Advisory Board, FASEB Summer Research Conference on Phospholipases
Member of Physiological Chemistry (PC) Study Section, N.I.H., 2000-2004, (Chair 2002-2004)

DOE Biosciences Review Panel, 2000; 2012; BES Early Career Review 2009
Editorial Board, *Journal of Biological Chemistry*, 2003-2007
Ad hoc member, N.I.H. Protein Structure Initiative special emphasis panel, 2005
Member of Biomembranes (BBM) Study Section, 2005-2009 (Chair 2007-2009)
Editorial Board, *Biochemical Journal*, 2009-2017
Co-Chair of the 2010 ASBMB Annual Meeting in Anaheim
Co-Chair of the 2015 ASBMB Annual Meeting in Boston
AAAS Chair of General Medical Sciences, 2020; Interim Chair 3/1/2022=12/31/2022
AAAS Kavli journalism award reviewer, 2020, 2021
Member of working group for AIMBE diversity summit “Equity and Anti-Racism: A Roadmap to Policy Transformation in BME” 01/28-29/2021 (<https://aimbe.org/diversity-summit/>)

PUBLICATIONS:

256. Roberts, M.F., and Hedstrom, L. (2022) High resolution ^{31}P field cycling NMR reveals unsuspected features of enzyme-substrate-cofactor dynamics. *Front. Mol. Biosci.*, under review.
255. Moutoussamy, E.E., Khan, H.M., Roberts, M.F., Gershenson, A., Chipot, C., and Reuter, N. (2022) Standard binding free energy and membrane desorption mechanism for a phospholipase C. *J. Chem. Theory Comput.*, under review.
254. Roberts, M.F., Cai, J., Natarajan, S.V., Khan, M.K., Reuter, N., Gershenson, A., and Redfield, A.G. (2021) Phospholipids in motion: High resolution ^{31}P NMR field cycling studies. *J. Phys. Chem. B* **125**, 8827-8838.
253. Rosenberg, M.M., Yao, T., Patton, Redfield, A.G., Roberts, M.F., and Hedstrom, L. (2020) Enzyme-substrate-cofactor dynamical networks revealed by high-resolution field cycling relaxometry. *Biochemistry* **59**, 2359-2379.
252. Waheed, Q., Khan, H.M., He, T., Roberts, M.F., Gershenson, A., and Reuter, N. (2019) Interfacial aromatics mediating cation- π interactions with choline-containing lipids can contribute as much to peripheral protein affinity for membranes as aromatics inserted below the phosphates. *J. Phys. Chem. Lett.*, **10**, 3972-3977.
251. Roberts, M.F., Khan, H.M., Goldstein, R., Reuter, N., and Gershenson, A. (2018) Search and subvert: minimalist bacterial phosphatidylinositol-specific phospholipase C (PI-PLC) enzymes. *Chem. Rev.*, **118**, 8435-8473 (2018).
250. Rosenberg, M.M., Redfield, A.G., Roberts, M.F., and Hedstrom, L. (2018) Dynamic characteristics of guanosine-5'-monophosphate reductase complexes revealed by high resolution ^{31}P field-cycling NMR relaxometry. *Biochemistry* **57**, 3146-3154.
249. Roberts, M.F. (2018) High-resolution applications of shuttle field-cycling NMR. Chapter 15 in *Field Cycling NMR Relaxometry: Instrumentation, Model Theories and Applications* (R. Kimich, editor), in series: New Developments in NMR No, 18, Royal Society Press.
248. Roberts, M.F. (2017) Defining a viral membrane-binding complex on an atomic level. *Structure* **25**, 3-4.
247. Gradziel, C.S., Jordan, P.A., Jewel, D., Dufort, F.J., Miller, S.J., Chiles, T.C., and Roberts M.F. (2016) D-3-Deoxy-dioctanoylphosphatidylinositol induces cytotoxicity in human MCF-7 breast cancer cells via a mechanism that involves downregulation of the D-type cyclin-retinoblastoma pathway. *Biochim. Biophys. Acta* **1861**, 1808-1815.

246. Rosenberg, M.M., Redfield, A.G., Roberts, M.F., and Hedstrom, L. (2016) Substrate and cofactor dynamics on guanosine monophosphate reductase probed by high resolution field cycling ^{31}P NMR relaxometry. *J. Biol. Chem.* **291**, 22988-22998.
245. Huang, Q., Gershenson, A., and Roberts, M.F. (2016) Recombinant broad-range phospholipase C from *Listeria monocytogenes* exhibits optimal activity at acidic pH. *Biochim. Biophys. Acta* **1864**, 697-705.
244. Khan, H.M., He, T., Fuglebakk, E., Grauffel, C., Yang, B., Roberts, M.F., Gershenson, A., and Reuter, N. (2016) A role for weak electrostatic interactions in peripheral membrane protein binding. *Biophys. J.* **110**, 1367-1378.
243. He, T., Gershenson, A., Eyles, S.J., Lee, Y.-J., Liu, W. R., Wang, J., Gao, J., and Roberts, M. F. (2015) Fluorinated aromatic amino acids distinguish cation- π interactions from membrane insertion. *J. Biol. Chem.* **290**, 19334-19342.
242. Mitchell, G., Ge, L., Huang, Q., Chen, C., Kianian, S., Roberts, M.F., Schekman, R., and Portnoy, D.A. (2015) Avoidance of autophagy mediated by PlcA or ActA is required for *Listeria monocytogenes* growth in macrophages. *Infect. Immun.* **83**, 2175-2184.
241. Wei, Y., Stec, B., Redfield, A.G., Weerapana, E., and Roberts, M.F. (2015) Phospholipid binding sites of PTEN: Exploring the mechanism of PIP₂ activation. *J. Biol. Chem.* **290**, 1592-1606.
240. Yang, B., Pu, M., Khan, H., Friedman, L., Reuter, N., Roberts, M.F., and Gershenson, A. (2015) Quantifying transient interactions between *Bacillus* phosphatidylinositol-specific phospholipase C and phosphatidylcholine-rich vesicles. *J. Am. Chem. Soc.* **137**, 14-17.
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238. Gradziel, C.S., Wang, Y., Stec, B., Redfield, A.G., and Roberts, M.F. (2014) Cytotoxic amphiphiles and phosphoinositides bind to two discrete sites on the Akt1 PH domain. *Biochemistry* **53**, 462-472.
237. Cai, J., Guo, S., Lomasney, J.W., and Roberts, M.F. (2013) Ca²⁺-independent binding of anionic phospholipids by phospholipase C $\delta 1$ EF-hand domain. *J. Biol. Chem.* **288**, 37277-37288.
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234. Grauffel, C., Yang, B., He, B., Roberts, M.F., Gershenson, A., and Reuter, N. (2013) Cation- π interactions as lipid-specific anchors for phosphatidylinositol-specific phospholipase C. *J. Am. Chem. Soc.* **135**, 5740-5750.
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232. Cheng, J., Goldstein, R., Stec, B., Gershenson, A., and Roberts, M.F. (2012) Competition between anion binding and dimerization modulates *S. aureus* phosphatidylinositol-specific phospholipase C enzymatic activity. *J. Biol. Chem.* **287**, 40317-40327.

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219. Longo, C.M., Wei, Y., Roberts, M.F., and Miller, S.J. (2009) Asymmetric syntheses of L,L- and L,D-di-myo-inositol-1,1'-phosphate and their behavior as stabilizers of enzyme activity at extreme temperatures. *Angew. Chem. Int. Ed.* **48**, 4158-4161.
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215. Wang, Y.K., Chen, W., Blair, D., Pu, M., Xu, Y., Miller, S.J., Redfield, A.G., Chiles, T.C. and Roberts, M. F. (2008) Insights into the structural specificity of the cytotoxicity of 3-deoxy-phosphatidylinositols. *J. Am. Chem. Soc.* **130**, 7746-7755.
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202. Roberts, M.F. (2006) Characterization of organic compatible solutes of halotolerant and halophilic organisms. *Meth. Microbiol.* **35**, 615-647.
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199. Kobayashi, M., Gryczynski, Z., Malick, J., Feng, J., Roberts, M.F., Lakowicz, J.R., and Lomasney, J.W. (2005) Spectroscopic characterization of the EF-hand domain of phospholipase C- δ 1: Identification of a lipid interacting domain. *Arch. Biochem. Biophys.* **440**, 191-203.
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