



RUTGERS

George M. Carman

Director, Rutgers Center for Lipid Research
Professor II, Department of Food Science
Rutgers University
65 Dudley Road
New Brunswick, NJ 08901-8520

Tel: 732-932-9611 ext 217
Email: carman@aesop.rutgers.edu
<http://foodsci.rutgers.edu/carman>
<http://rclr.rutgers.edu>

CURRICULUM VITAE

Education

Ph.D., Food Biochemistry, University of Massachusetts, 1977

M.S., Microbiology, Seton Hall University, 1974

B.A., Biology (with honors), William Paterson College, 1972

Appointments

Director, Center for Lipid Research, Rutgers University, 2007-present

Professor II (Distinguished), Department of Food Science, Rutgers University, 1990-present

Visiting Professor, Department of Molecular Biology, Princeton University, 1990-1991

Professor, Department of Food Science, Rutgers University, 1986-1990

Associate Professor, Department of Food Science, Rutgers University, 1982-1986

Assistant Professor, Department of Food Science, Rutgers University, 1978-1982

Postdoctoral Research Fellow, Department of Biochemistry and Molecular Biology,
University of Texas Medical School, Houston, 1977-1978

Research Areas

Biochemistry and molecular biology of phospholipid metabolism and lipid signaling

Professional Affiliations

American Society for *Biochemistry* and Molecular Biology, American Oil Chemists' Society,
American Society for Microbiology, American Chemical Society, Institute of Food Technologists

Honors

Research Excellence Award for Sustained Research and Impact, School of Environmental and
Biological Sciences, Rutgers University, 2009

Faculty Mentor of the Year, Compact for Faculty Diversity, 2008

Merck-AAAS Speaker, Hope College, 2006

American Oil Chemists Society-Supelco/Nicholas Pelick Research Award, 2004

Endel Karmas Award for Teaching Excellence, Rutgers University, 2004

Board of Trustees Award for Excellence in Research, Rutgers University, 1999

American Academy of Microbiology Fellow, 1998

Foundation for Microbiology Lecturer, 1996-1998

Selman A. Waksman Honorary Lectureship Award, 1996

Research Excellence Award, NJ Agricultural Experiment Station, Rutgers University, 1993

Merit Awards from Rutgers University, 1981, 1983, 1985-1991, 1993, 1994, 1997-2008

Chairman, Gordon Research Conference-Molecular and Cellular Biology of Lipids, 1993

Distinguished Alumni Award from William Paterson College, 1981

Welch Foundation Postdoctoral Fellowship, 1977

Manufacturers Hanover Trust Co. Scholarship, 1968

Memberships in the American Society of Biochemistry and Molecular Biology and the Honorary
Societies of Sigma Xi, Phi Tau Sigma

Rutgers Presidential Committee on Academic Planning and Review, 2008-20011

Rutgers Presidential Committee on Standards and Priorities in Academic Development, 1998-
2004

Associate/Executive Editorships

Journal of Biological Chemistry, Associate Editor, 2006-2011
Analytical Biochemistry, Executive Editor, 1994-2012
Journal of Lipid Research, Associate Editor, 2003-2006
Biochimica et Biophysica Acta, Executive Editor, 2004-2006, Guest Editor, "Regulation of Lipid Metabolism in Yeast" (special issue), 2007

Editorial Boards

Journal of Biological Chemistry, Board Editor, 1998-2003, 1992-1997
Journal of Lipid Research, Board Member, 2006-2012
Journal of Bacteriology, Board Member, 1992-1994
Applied and Environmental Microbiology, Board Member, 1985-1990
Gene Regulation and Systems Biology, Board Member, 2006-2008
Journal of Food Biochemistry, Board Member, 1979-1992
Journal of Food Science, Board Member, 1985-1987
InScight, Board Member, 1998-2002
World Journal of Biological Chemistry, Board Member, 2009-2013

Grants

National Institutes of Health
Phospholipid Metabolism and Membrane Function, GM 28140, 1980-2010, PI
Regulation of Phospholipid Synthesis, GM 50679, 1994-2013, PI
Regulation of Phosphatidylinositol Metabolism, GM 35655, 1986-1995, PI
Gordon Research Conference on Lipid Metabolism, GM 49037, 1993, PI
Liquid Chromatography Mass Spectrometry System, RR 021120, 2006, Co-PI
National Science Foundation
Regulation of Yeast Phosphatidate Phosphatase, DCB 9204588, 1992-1995, PI
Gordon Research Conference on Lipid Metabolism, IBN 9300895, 1993, PI
American Heart Association
Gordon Research Conference on Lipid Metabolism, 1993, PI
United States Department of the Army
Gordon Research Conference on Lipid Metabolism, 1993, PI
United States Department of Agriculture
Determination of Phosphatidylcholine by Enzymatic Analysis, 1980, PI
Universal Foods Corporation
Biochemistry of Yeast Cell Membranes, 1980-1984, PI
General Foods Fund
Reduction of Linolenic Acid from Soybean Oil, 1979-1981, PI
Mobil Oil Foundation
Enzyme Research Project, 1981-1982, PI

Service to National/International Organizations

Review Panels

National Institutes of Health
Biological Chemistry and Macromolecular Biophysics Study Section, Ad Hoc Member, 2009, 2008, Chair, 2006
Chemistry and Related Sciences Special Emphasis Panel, 1998, 2004
Physiological Chemistry Study Section, Member, 1988-1992, 1998-2002
Physiological Chemistry Study Section, Ad Hoc Member, 1984, 1986, 1987
Reviewers Reserve, 1992-1996
Special Topics in Biological Sciences Study Section, Chair, 2008

Study Section Boundaries Team (for Biological Chemistry and Macromolecular Biophysics Integrated Review Groups), 2003
National Science Foundation: Review Panel for Research Experiences for Undergraduates, 1987
Biotechnology and Biological Sciences Research Council of Scotland, Hannah Research Institute Visiting Group, 1999
Medical University of South Carolina, Department of Biochemistry and Molecular Biology, External Advisory Board, Chair, 2002, 2005
University of Massachusetts, Food Microbiology Review Committee, 1980

Meetings

American Society for Biochemistry and Molecular Biology
Annual Meeting Program Planning Committee, Co-Chair, 2006, 2001, Member, 1998, 2002-2004
Meetings Committee, 2001-2004, Chair, 2002-2004
National Council, 2000-2001, 2002-2006
Strategic Plan Retreat, 2000
Satellite Meeting "Membrane Lipids and Cell Function," Co-Organizer, 2001
Satellite Meeting "Molecular Characterization of Membrane Lipid Metabolism," Co-Organizer, 1998
Theme Meeting "Biochemistry and Molecular Biology of Lipids," Co-Organizer, 2006
Federation of American Societies for Experimental Biology (FASEB)
Experimental Biology Executive Board, 2005-2008
FASEB Summer Research Conferences Advisory Committee, 2003-2009
Gordon Research Conference-Molecular and Cellular Biology of Lipids
Chair, 1993, Advisory Committee, 1993-present
Keystone Symposia, "Cell Activation and Signal Transduction: Lipid Second Messengers IV," Organizer, 2000
Institute of Food Technologists
Annual Meeting Program Committee, 1981-1984
Chairperson to Scientific Sessions of Annual Meetings 1982, 1983
NY Section, Seminar Chair, 1984-1985
Phi Tau Sigma, President of Rutgers University Chapter, 1979-1981
Theobald Smith Society, NJ Branch of the American Society for Microbiology
President, 1997-1998, President Elect and Program Chair, 1996-1997
Local Councilor, 1994-1996
Waksman Award Committee, 1999-2001, Chair 2000
USDA Northeast Regional Project NE-116, Chair, 1982-1984, Secretary, 1980-1982
Yeast Lipid Conference, Steering Committee, 2005-2012.

Community Service

Cub Scouts, Troop 66, Den Leader, 1997-1999.
Boy Scouts, Troop 88, Merit badge councilor, 2007-2009, Troop committee, 2007-2009.
West Windsor Township, Basketball Coach, 1998, 1999, 2002, 2003, 2005-2007; Little League Baseball Coach, 1995, 2001, 2003, 2004, 2007; Girls Softball Coach, 2000, Swimming Official, 2002-2005.
West Windsor-Plainsboro School System, Science Inventors Judge, 1995; Math Partners, development of mathematics curriculum, 1993

Collaborators

Markus Aebi, Robert M. Bell, Enoch P. Baldwin, Kendall J. Blumer, David N. Brindley, James Broach, Roman Chrast, Günther Daum, Edward A. Dennis, William Dowhan, Joseph Eichberg, Scott Emr, Susan A. Henry, Michael Kazmaier, Claudia Kent, Christopher McMaster, Alfred R. Merrill, Thomas Montville, Robert Niederman, Odile Ozier-Kalogeropoulos, Christian R.H. Raetz, Symeon Siniossoglou, Myron Solberg, Paul Sternweis, Ming-Daw Tsai, Dennis R. Voelker, Charles J. Waechter, Bruce P. Wasserman, Josef Wissing

Teaching/Mentoring

Courses Taught

Undergraduate: Food Chemistry, Topics in Food Chemistry

Graduate: Food Enzymology, Lipids and Signal Transduction, Food Fundamentals II (participate), Advanced Biochemistry (participate), Biochemistry and Molecular Biology (participate), Yeasts (participate), Microbial Biochemistry (participate),.

Current Laboratory Members (10)

Gil-Soo Han (research assistant professor), Zhi Xu (research associate), Hyeon-Son Choi (postdoctoral), Stylianos Fakas (postdoctoral), Anibal Soto (graduate), Florencia Pascual (graduate), Wen-Min Su (graduate), Minjung Chae (graduate), Christopher Roller (undergraduate), Devin Plote (undergraduate)

Former Laboratory Members

Postdoctoral Fellows (17)

Sreenivas Avula (1999-2005), Myonsuk Bae-Lee (1988-1989), Maria Bruno (1993-1995), Lorena Eiguez (2007-2008), Donna Fugit (1983), Kathleen Holland (1986), Michael J. Homann (1988), Michael C. Kersting, (2002-2005), Keunsung Kim (1997-1999), Anthony J. Kinney (1988-1989), Virginia M. McDonough (1992-1995), Jeanelle Morgan (2006-2009), Shanthi Rangaswamy (1995-1996), Joseph E. Stukey (1993-1995), David A. Toke (1996-1999), Kathleen Welsch (1988), Ying Yu (2000-2002), Geri M. Zeimet (1995-1997)

Ph.D. Recipients (26)

Myongsuk Bae-Lee (1986), Charles J. Belunis (1989), Rosa J. Buxeda (1993), Yu-Fang Chang (2007), Mal-Gi Choi (2006), Hyeon-Son Choi (2008), Michael C. Cirigliano (1986), Anthony S. Fischl (1986), Paulette M. Gaynor (1989), Seung-Hee Han (2007), Michael J. Homann (1987), Wendy Iwanyshyn (2005), Michael J. Kelley (1989), Kee-Hong Kim (1999), Yi-Ping Lin (1991), Kelly R. Morlock (1991), He Mu (2000), Joseph T. Nickels Jr. (1993), June Oshiro (2003), Darin B. Ostrander (1998), Apostolos Pappas (1999), Tae-Sik Park (2001), Margaret A. Poole (1986), Wen-I Wu (1995), Weng-Lang Yang (1996), Ying Yu (2000)

M.S. Recipients (17)

Mal-Gi Choi (2003), Jeffery J. Cousminer (1982), Deirdre A. Dillion (1997), Steven M. Felder (1980), Anthony S. Fischl (1983), Jamie Furneisen (1999), Michael J. Homann (1984), Joyce M. Hromy (1986), Celeste N. Johnston (2002), Maureen McKenzie (1982), Douglas Minck (1989), Anupama Nadkarni (1994), Daniel J. O'Brien (2001), June Oshiro (1999), Jennifer Quinlan (1991), Michele Robinson (1981), Jeanette E. Quinn (2001)

Undergraduate Students (38)

Refereed Publications (160)

1. Carman, G.M., and G.-S. Han. 2009. Regulation of phospholipid synthesis in yeast. *J. Lipid Res.* 50: S69-S73.
2. Carman, G.M., and G.-S. Han. 2009. Phosphatidic acid phosphatase, a key enzyme in the regulation of lipid synthesis. *J. Biol. Chem.* 284: 2593-2597.
3. Grimsey, N., G. S. Han, L. O' Hara, J. J. Rochford, G. M. Carman, and S. Siniosoglou. 2008. Temporal and spatial regulation of the phosphatidate phosphatases lipin 1 and 2. *J. Biol. Chem.* 283: 29166-29174.
4. Han, G.-S., L. O' Hara, G.M. Carman, and S. Siniosoglou. 2008. An unconventional diacylglycerol kinase that regulates phospholipid synthesis and nuclear membrane growth. *J. Biol. Chem.* 283: 20433-20442.
5. Han, G.-S., L. O' Hara, S. Siniosoglou, and G.M. Carman. 2008. Characterization of the yeast *DGK1*-encoded CTP-dependent diacylglycerol kinase. *J. Biol. Chem.* 283: 20443-20453.
6. Chang, Y.-F., and G.M. Carman. 2008. CTP synthetase and its role in phospholipid synthesis in the yeast *Saccharomyces cerevisiae*. *Prog. Lipid Res.* 47: 333-339.
7. Nadra, K., A.-S. de Preux Charles, J.-J. Médard, W.T. Hendriks, G.-S. Han, S. Grès, G.M. Carman, J.-S. Saulnier-Blache, M.H.G. Verheijen, and R. Chrast. 2008. Phosphatidic acid mediates demyelination in *Lpin1* mutant mice. *Genes Dev.* 22, 1647-1661.
8. Soto, A., and G.M. Carman. 2008. Regulation of the *Saccharomyces cerevisiae* *CKI1*-encoded choline kinase by zinc depletion. *J. Biol. Chem.* 283: 10079-10088.
9. Havriluk, T., F. Lozy, S. Siniosoglou, and G.M. Carman. 2008. Colorimetric determination of pure Mg^{2+} -dependent phosphatidate phosphatase activity. *Anal. Biochem.* 373: 392-394.
10. Carman, G.M., and S.A. Henry. 2007. Phosphatidic acid plays a central role in the transcriptional regulation of glycerophospholipid synthesis in *Saccharomyces cerevisiae*. *J. Biol. Chem.* 282: 37293-37297.
11. Han, G.-S., S. Siniosoglou, and G.M. Carman. 2007. The cellular functions of the yeast lipin homolog Pah1p are dependent on its phosphatidate phosphatase activity. *J. Biol. Chem.* 282: 37026-37035.
12. Carman, G.M., and W.-I. Wu. 2007. Lipid phosphate phosphatases from *Saccharomyces cerevisiae*. *Methods. Enzymol.* 434: 305-315.
13. Choi, H.-S., and G.M. Carman. 2007. Respiratory deficiency mediates the regulation of *CHO1*-encoded phosphatidylserine synthase by mRNA stability in *Saccharomyces cerevisiae*. *J. Biol. Chem.* 282: 31217-31227.
14. Chang, Y.-F., S.S. Martin, E.P. Baldwin, and G.M. Carman. 2007. Phosphorylation of human CTP synthetase 1 by protein kinase C. Identification of Ser⁴⁶² and Thr⁴⁵⁵ as major sites of phosphorylation. *J. Biol. Chem.* 282: 17613-17622.

15. Choi, M.-G., and G.M. Carman. 2007. Phosphorylation of human CTP synthetase 1 by protein kinase A. Identification of Thr⁴⁵⁵ as a major site of phosphorylation. *J. Biol. Chem.* 282: 5367-5377.
16. Carman, G.M., and G.-S. Han. 2007. Regulation of phospholipid synthesis in *Saccharomyces cerevisiae* by zinc depletion. *Biochim. Biophys. Acta.* 1771: 322-330.
17. Carman, G.M., and G.-S. Han. 2006. Roles of phosphatidate phosphatase enzymes in lipid metabolism. *Trends Biochem. Sci.* 31: 694-699.
18. O'Hara, L., G.-S. Han, S. Peak-Chew, N. Grimsey, G.M. Carman, and S. Siniossoglou. 2006. Control of phospholipid synthesis by phosphorylation of the yeast lipin Pah1p/Smp2p Mg²⁺-dependent phosphatidate phosphatase. *J. Biol. Chem.* 281: 34537-34548.
19. Kersting, M.C., and G.M. Carman. 2006. Regulation of the *Saccharomyces cerevisiae* *EK11*-encoded ethanolamine kinase by zinc depletion. *J. Biol. Chem.* 281: 13110-13116.
20. Han, G.-S., W.-I. Wu, and G.M. Carman. 2006. The *Saccharomyces cerevisiae* lipin homolog is a Mg²⁺-dependent phosphatidate phosphatase enzyme. *J. Biol. Chem.* 281: 9210-9218.
21. Chang, Y.-F., and G.M. Carman. 2006. Casein kinase II phosphorylation of the yeast phospholipid synthesis transcription factor Opi1p. *J. Biol. Chem.* 281: 4754-4761.
22. Han, G.-S., A. Sreenivas, M.-G. Choi, Y.-F. Chang, S.S. Martin, E.P. Baldwin, and G.M. Carman. 2005. Expression of human CTP synthetase in *Saccharomyces cerevisiae* reveals phosphorylation by protein kinase A. *J. Biol. Chem.* 280: 38328-38336.
23. Carman, G. M. 2005. Regulation of phospholipid synthesis in yeast by zinc. *Biochem. Soc. Trans.* 33: 1150-1153.
24. Han, S.-H., G.-S. Han, W.M. Iwanyshyn, and G.M. Carman. 2005. Regulation of the *PIS1*-encoded phosphatidylinositol synthase in *Saccharomyces cerevisiae* by zinc. *J. Biol. Chem.* 280: 29017-29024.
25. Chang, F.S., G.-S. Han, G.M. Carman, and K.J. Blumer. 2005. A WASp-binding type II phosphatidylinositol 4-kinase is required for actin polymerization-dependent endosome motility. *J. Cell Biol.* 171: 133-142.
26. Choi, M.-G., V. Kurnov, M.C. Kersting, A. Sreenivas, and G.M. Carman. 2005. Phosphorylation of the yeast choline kinase by protein kinase C. Identification of Ser²⁵ and Ser³⁰ as major sites of phosphorylation. *J. Biol. Chem.* 280: 26105-26112.
27. Kersting, M.C., H.-S. Choi, and G.M. Carman. 2004. Regulation of the yeast *EK11*-encoded ethanolamine kinase by inositol and choline. *J. Biol. Chem.* 279: 35353-35359.
28. Iwanyshyn, W.M., G.-S. Han, and G.M. Carman. 2004. Regulation of phospholipid synthesis in *Saccharomyces cerevisiae* by zinc. *J. Biol. Chem.* 279: 21976-21983.
29. Choi, H.-S., A. Sreenivas, G.-S. Han, and G.M. Carman. 2004. Regulation of phospholipid synthesis in the yeast *cki1Δ eki1Δ* mutant defective in the Kennedy pathway. The *CHO1*-encoded phosphatidylserine synthase is regulated by mRNA stability. *J. Biol. Chem.* 279: 12081-12087.

30. Han, G.-S., C.N. Johnston, and G.M. Carman. 2004. Vacuole membrane topography of the *DPP1*-encoded diacylglycerol pyrophosphate phosphatase catalytic site from *Saccharomyces cerevisiae*. *J. Biol. Chem.* 279: 5338-5345.
31. Carman, G.M., and M.C. Kersting. 2004. Phospholipid synthesis in yeast: regulation by phosphorylation. *Biochem. Cell Biol.* 82: 62-70.
32. Han, G.-S., and G.M. Carman. 2004. Assaying lipid phosphate phosphatase activities. *Methods Mol. Biol.* 284: 209-216.
33. Han, G.-S., and G.M. Carman. 2004. Phospholipid synthesis in yeast, in *Encyclopedia of Biological Chemistry* (W.J. Lennarz and M.D. Lane, eds), Elsevier, Oxford. 3: 321-325.
34. McEntire, J.C., G.M. Carman, and T.J. Montville. 2004. Increased ATPase activity is responsible for acid sensitivity of nisin-resistant *Listeria monocytogenes* ATCC 700302. *Appl. Environ. Microbiol.* 70: 2717-21.
35. Oshiro, J., G.-S. Han, and G.M. Carman. 2003. Diacylglycerol pyrophosphate phosphatase in *Saccharomyces cerevisiae*. *Biochim. Biophys. Acta* 1635: 1-9.
36. Oshiro, J., G.-S. Han, W.M. Iwanyshyn, K. Conover, and G.M. Carman. 2003. Regulation of the yeast *DPP1*-encoded diacylglycerol pyrophosphate phosphatase by transcription factor Gis1p. *J. Biol. Chem.* 278: 31495-31503.
37. Choi, M.-G., T.-S. Park, and G.M. Carman. 2003. Phosphorylation of *Saccharomyces cerevisiae* CTP synthetase at Ser⁴²⁴ by protein kinases A and C regulates phosphatidylcholine synthesis by the CDP-choline pathway. *J. Biol. Chem.* 278: 23610-23616.
38. Sreenivas, A., and G.M. Carman. 2003. Phosphorylation of the yeast phospholipid synthesis regulatory protein Opi1p by protein kinase A. *J. Biol. Chem.* 278: 20673-20680.
39. Park, T.-S., D.J. O'Brien, and G.M. Carman. 2003. Phosphorylation of CTP synthetase on Ser³⁶, Ser³³⁰, Ser³⁵⁴, and Ser⁴⁵⁴ regulates the levels of CTP and phosphatidylcholine synthesis in *Saccharomyces cerevisiae*. *J. Biol. Chem.* 278: 20785-20794.
40. Han, G.-S., A. Audhya, D.J. Markley, S.D. Emr, and G.M. Carman. 2002. The *Saccharomyces cerevisiae* *LSB6* gene encodes phosphatidylinositol 4-kinase activity. *J. Biol. Chem.* 277: 47709-47718.
41. Yu, Y., A. Sreenivas, D.B. Ostrander, and G.M. Carman. 2002. Phosphorylation of *Saccharomyces cerevisiae* choline kinase on Ser³⁰ and Ser⁸⁵ by protein kinase A regulates phosphatidylcholine synthesis by the CDP-choline pathway. *J. Biol. Chem.* 277: 34978-34986.
42. Sreenivas, A., M.J. Villa-Garcia, S.A. Henry, and G.M. Carman. 2001. Phosphorylation of the yeast phospholipid synthesis regulatory protein Opi1p by protein kinase C. *J. Biol. Chem.* 276: 29915-29923.
43. Fernandez, F., J.S. Rush, D.A. Toke, G.-S. Han, J.E. Quinn, G.M. Carman, J.-Y. Choi, D.R. Voelker, M. Aebi, and C.J. Waechter. 2001. The *CWH8* gene encodes a dolichyl pyrophosphate phosphatase with a lumenally oriented active site in the endoplasmic reticulum of *Saccharomyces cerevisiae*. *J. Biol. Chem.* 2001 276: 41455-41464.

44. Han, G.-S., C.N. Johnston, X. Chen, K. Athenstaedt, G. Daum, and G.M. Carman. 2001. Regulation of the *Saccharomyces cerevisiae* *DPP1*-encoded diacylglycerol pyrophosphate phosphatase by zinc. *J. Biol. Chem.* 276: 10126-10133.
45. Pierrugues, O., C. Brutesco, J. Oshiro, M. Gouy, Y. Deveaux, G.M. Carman, P. Thuriaux, and M. Kazmaier. 2001. Lipid phosphate phosphatases in *Arabidopsis*. Regulation of *AtLPP1* in response to stress. *J. Biol. Chem.* 276: 20300-20308.
46. Yu, Y., H.H. Mu, B.P. Wasserman, and G.M. Carman. 2001. Identification of the maize amyloplast stromal 112-kD protein as a plastidic starch phosphorylase. *Plant Physiol.* 125: 351-359.
47. Mu, H.H., Y. Yu, B.P. Wasserman, and G.M. Carman. 2001. Purification and characterization of the maize amyloplast stromal 112-kD starch phosphorylase. *Arch. Biochem. Biophys.* 388: 155-164.
48. Furneisen, J.M., and G.M. Carman. 2000. Enzymological properties of the *LPP1*-encoded lipid phosphatase from *Saccharomyces cerevisiae*. *Biochim. Biophys. Acta* 1484: 71-82.
49. Shih, C., G.M. Carman, and B.P. Wasserman. 2000. Ripening-associated proteolysis of a 27-kDa major intrinsic protein (MIP27) in tomato fruit. *J. Food Biochem.* 24: 213-224.
50. Wu, W.-I., and G.M. Carman. 2000. Kinetic analysis of sphingoid base inhibition of yeast phosphatidate phosphatase. *Methods Enzymol.* 312: 373-380.
51. Oshiro, J., S. Rangaswamy, X. Chen, G.-S. Han, J.E. Quinn, and G.M. Carman. 2000. Regulation of the *DPP1*-encoded diacylglycerol pyrophosphate (DGPP) phosphatase by inositol and growth phase. Inhibition of DGPP phosphatase activity by CDP-diacylglycerol and activation of phosphatidylserine synthase activity by DGPP. *J. Biol. Chem.* 275: 40887-40896.
52. Balboa, M.A., J. Balsinde, D.A. Dillon, G.M. Carman, and E.A. Dennis. 1999. Proinflammatory macrophage-activating properties of the novel phospholipid diacylglycerol pyrophosphate. *J. Biol. Chem.* 274: 522-526.
53. Kim, K.-H., and G.M. Carman. 1999. Phosphorylation and regulation of choline kinase from *Saccharomyces cerevisiae* by protein kinase A. *J. Biol. Chem.* 274: 9531-9538.
54. Kent, C., and G.M. Carman. 1999. Interactions among pathways for phosphatidylcholine metabolism, CTP synthesis and secretion through the Golgi apparatus. *Trends Biochem. Sci.* 24: 146-150.
55. Faulkner, A., X. Chen, J. Rush, B. Horazdovsky, C.J. Waechter, G.M. Carman, and P.C. Sternweis. 1999. The *LPP1* and *DPP1* gene products account for most of the isoprenoid phosphate phosphatase activities in *Saccharomyces cerevisiae*. *J. Biol. Chem.* 274: 14831-14837.
56. Kim, K., K.-H. Kim, M.K. Storey, D.R. Voelker, and G.M. Carman. 1999. Isolation and characterization of the *Saccharomyces cerevisiae* *EK11* gene encoding ethanolamine kinase. *J. Biol. Chem.* 274: 14857-14866.
57. Jasinska, R., Q.-X. Zhang, C. Pilquill, I. Singh, J. Xu, J. Dewald, D.A. Dillon, L.G. Berthiaume, G.M. Carman, D.W. Waggoner, and D.N. Brindley. 1999. Lipid phosphate phosphohydrolase-1 degrades exogenous glycerolipid and sphingolipid phosphate esters. *Biochem. J.* 340: 677-686.

58. Park, T.-S., D.B. Ostrander, A. Pappas, and G.M. Carman. 1999. Identification of Ser⁴²⁴ as the protein kinase A phosphorylation site in CTP synthetase from *Saccharomyces cerevisiae*. *Biochemistry* 38: 8839-8848.
59. Toke, D.A., M.L. McClintick, and G. M. Carman. 1999. Mutagenesis of the phosphatase sequence motif in diacylglycerol pyrophosphate phosphatase from *Saccharomyces cerevisiae*. *Biochemistry* 38: 14606-14613.
60. Carman, G.M. and S.A. Henry. 1999. Phospholipid biosynthesis in the yeast *Saccharomyces cerevisiae* and interrelationship with other metabolic processes. *Prog. Lipid Res.* 38: 361-399.
61. Pappas, A., T.-S. Park, and G.M. Carman. 1999. Characterization of a novel dUTP-dependent activity of CTP synthetase from *Saccharomyces cerevisiae*. *Biochemistry* 38: 16671-16677.
62. Toke, D.A., W. L. Bennett, D. A. Dillon, W.-I. Wu, X. Chen, D.B. Ostrander, J. Oshiro, A. Cremesti, D.R. Voelker, A.S. Fischl, and G.M. Carman. 1998. Isolation and characterization of the *Saccharomyces cerevisiae* *DPP1* gene encoding diacylglycerol pyrophosphate phosphatase. *J. Biol. Chem.* 273: 3278-3284.
63. Kim, K.-H., D.R. Voelker, M.T. Flocco, and G.M. Carman. 1998. Expression, purification, and characterization of choline kinase, product of the *CKI* gene from *Saccharomyces cerevisiae*. *J. Biol. Chem.* 273: 6844-6852.
64. Toke, D.A., W.L. Bennett, J. Oshiro, W.-I. Wu, D.R. Voelker, and G.M. Carman. 1998. Isolation and characterization of the *Saccharomyces cerevisiae* *LPP1* gene encoding a Mg²⁺-independent phosphatidate phosphatase. *J. Biol. Chem.* 273: 14331-14338.
65. Pappas, A., W.-L. Yang, T.-S. Park, and G.M. Carman. 1998. Nucleotide-dependent tetramerization of CTP synthetase from *Saccharomyces cerevisiae*. *J. Biol. Chem.* 273: 15954-15960.
66. Ostrander, D.B., D.J. O'Brien, J.A. Gorman, and G.M. Carman. 1998. Effect of CTP synthetase regulation by CTP on phospholipid synthesis in *Saccharomyces cerevisiae*. *J. Biol. Chem.* 273: 18992-19001.
67. Stukey, J., and G.M. Carman. 1997. Identification of a novel phosphatase sequence motif. *Protein Science.* 6: 469-472.
68. Dillon, D.A., X. Chen, G.M. Zeimet, W.-I. Wu, D.W. Waggoner, J. Dewald, D.N. Brindley, and G.M. Carman. 1997. Mammalian Mg²⁺-independent phosphatidate phosphatase (PAP2) displays diacylglycerol pyrophosphate phosphatase activity. *J. Biol. Chem.* 272: 10361-10366.
69. Carman, G.M. 1997. Phosphatidate phosphatases and diacylglycerol pyrophosphate phosphatases in *Saccharomyces cerevisiae* and *Escherichia coli*. *Biochim. Biophys. Acta.* 1348: 45-55.
70. Riedel, B., M. Morr, W.-I. Wu, G.M. Carman, J.B. Wissing. 1997. Metabolism of diacylglycerol pyrophosphate by suspension cultured *Catharanthus roseus* cells. Identification and characterization of diacylglycerol pyrophosphate phosphatase in plants. *Plant Sci.* 128: 1-10.

71. Wu, W.-I., Y. Liu, B. Riedel, J.B. Wissing, A.S. Fischl, and G.M. Carman. 1996. Purification and characterization of diacylglycerol pyrophosphate phosphatase from *Saccharomyces cerevisiae*. *J. Biol. Chem.* 271: 1868-1876.
72. Wu, W.-I., and G.M. Carman. 1996. Regulation of phosphatidate phosphatase activity from the yeast *Saccharomyces cerevisiae* by phospholipids. *Biochemistry.* 35: 3790-3796.
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