

Curriculum Vitae – May 2014

I. Personal:

Anne Walter, Ph.D.
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II. Education

Grinnell College, Grinnell, Iowa, A.B., 1973, Biology

University of British Columbia, Vancouver BC, M.Sc., 1977, Zoology

- Thesis: Total Body Water and Partitioning of Salt Excretion in Glaucous-winged Gulls, *Larus glaucesens*.

Duke University, Durham, N.C., Ph.D., 1981, Physiology and Pharmacology

- Thesis: Nonelectrolyte Permeability of Lipid Bilayer Membranes.

Research Areas: I study membrane biophysics in particular the functional consequences of particular lipids or hydrophobic compounds using fluorescent indicators of membrane structure, fluidity and packing density. We consider the effects of detergents, natural hydrophobic compounds, mixtures of lipids and fatty acids as well as the aqueous conditions (pH, ionic strength, temperature) to understand the requirements for bilayer formation and the properties of those bilayers. More recently I've developed a small project to characterize isozymes (affinity and turnover rates) from animals living in different environments as a function of temperature. Other projects include developing laboratory experiments with mathematical components for the Mathematics of Biology course (Math 236) and for the new Summer Bridge Integrated Science course (ID 150).

III. Employment and Teaching Experience

2010- Paul & Mildred Hardy Distinguished Professor of Science
2009-10 Fulbright-Nehru Visiting Lecturer, Zoology, Madras Christian College, India
2001-present: Professor, Biology Dept., St. Olaf College, Northfield, MN 55057
1994-01: Associate Professor, Biology Dept., St. Olaf College, Northfield, MN 55057
1991-94: Associate Professor, Physiology & Biophysics, Wright State University, Dayton, OH
1987-91: Assistant Professor, Physiology & Biophysics, Wright State University, Dayton, OH
1984-87: Senior Staff Fellow, Laboratory of Mathematical Biology, NCI, NIH, Bethesda, MD
1981-84 : Guest Worker, Staff Fellow, LKEM, NIH, Bethesda, MD 20298.

Courses taught at St. Olaf:

Animal Physiology (Bio 247)
Integrated Introduction to Chemistry and Biology (ChBi 127)
Cell Physiology (Bio 341)
Equatorial Biology (Bio 288)
Human Biology (general education) (Bio 123)
Issues in Biology (general education and for the SSS Program) (Bio 121)
Introductory Biology: Cells and Genetics (for majors) (Bio 125)
Neuroscience Seminar (Bio 385)
Writing – Biology South India Program
Medical Terminology (nursing, physical therapy, physician's assistant)

Independent Research and Study in topics from alternative medicine to membrane properties

Undergraduate Research Students mentored in the last three years:

- Xiaojing Yang: "Develop a method of using the microplate reader to determine the activity of lactate dehydrogenase in relation to temperature". (Fall 2010)

- Ryan Johnsen: “Red Beet Tonoplasts: developing parameters for a microplate based H⁺ ATPase assay” (Spring 2011)
- Andrew Kaul: IS (Bio 298) *Indian Eco Policy* (fall, 2011)
- Andrew Kaul: IS (Bio 298) *Global Forest Status* (fall 2011)
- Kristine Elwood, IR (Bio 398) *LDH and Physical Environment* (fall 2011)
- Yunxiang Dai, IR (Bio 398) *Enzyme Kinetics* (fall 2011)
- Andrew Knutson IS (Bio 298) *Renal Sodium Control* (spring 2012)
- Hannah Stellkamp IR (Bio 398) *LDH in Invertebrates* (spring 2012)
- Evan Anderson IR (Bio 398) *Lipid Mixture Behavior* (spring & summer 2012)
- Emma Lee IR (Bio 398) *LDH Kinetics* (fall 2012)
- Grace Tabatai IS (Bio 298) *MVTs of Lipid Membranes* (fall 2012)
- Tomaz Manzoni IS (Bio 298) *The Evolution of Cooperation* (fall 2013)
- Karly Boll, Taylor Keller, John Inglis IS (Bio 298) *Biology of Regeneration* (spring 2014)

Internships – serve as faculty sponsor for approximately 2-4 per year

IV. Professional Activity

A. Publications in refereed journals

1. Vandiver, R. and A. Walter. “Experimenting with Mathematical Biology”. submitted August 2014.
2. Walter, A., Kuehl*, G., Barnes*, K., and VanderWaerdt*, G. 2000. The vesicle to micelle transition of phosphatidylcholine vesicles induced by nonionic detergents: Effects of sodium chloride, sucrose and urea. *Biochimica Biophysica Acta* 1508:20-33.
3. Lin, L., Shroyer, L., Rote, N.S., Walter, A.W., Lyden, T.W. and Ng, A.K.: IgM antiphospholipid antibodies react against cytoskeleton-like structures in cultured endothelial cells. *Am. J. Reprod. Immunol.* 33:97-107,1995.
4. Obringer, A.R., Rote, N.S., and Walter, A.: Antiphospholipid antibody binding to bilayer coated glass microspheres. *Journal of Immunological Methods.* 185:81-93, 1995.
5. Grubbs, R.D. and Walter, A.: Determination of cytosolic Mg²⁺ activity and buffering in BC3H-1 cells with Mag-Fura-2. *Molecular and Cellular Biochemistry* 136: 11-22, 1994.
6. Walter, A., Yeagle, P.L., and Siegel, D.P.: Diacylglycerol and hexadecane increase divalent cation-induced lipid mixing rates between phosphatidylserine LUV. *Biophysics Journal* 66:366-376, 1994.
7. Walter, A. and Siegel, D.P.: Divalent cation-induced lipid mixing between phosphatidylserine liposomes studied by stopped-flow fluorescence measurements: Effects of temperature, comparison of barium and calcium and perturbation by DPX. *Biochemistry*, 32:3271-3281, 1993.
8. Harris, A.L., Walter, A., Zimmerberg, J., Paul, D., Goodenough, D.: Formation of ion channels by connexin 32 reconstituted into liposomes and bilayers. *Molecular Brain Research*, 15:269-280, 1992.
9. Rote, N.S., Walter, A., Lyden, T.W.: Antiphospholipid antibodies--Lobsters or red herrings. *Am. J. Reprod. Immunol.*, 28:31-37, 1992.
10. Downing, L.A., Bernstein, J.M., and Walter, A.: Active respiratory syncytial virus purified by affinity chromatography: Characterization of binding and elution requirements. *J. Virol. Meth.*, 38:215-228, 1992.
11. Walter, A., Vinson, P.K., Kaplun, A., and Talmon, Y.: Intermediate structures in the cholate-phosphatidylcholine vesicle-micelle transition. *Biophysical Journal*, 60:1315-1325, 1991.
12. Walter, A., Suchy, S.E., and Vinson, P.K.: Solubility properties of the alkyl methyl glucamide surfactants. *Biochimica Biophysica Acta*,1029:67-74, 1990.
13. Miguel, M.G., Eidelman, O., Ollivon, M., Walter, A.: Temperature dependence of the vesicle micelle transition of egg phosphatidylcholine and octyl-glucoside. *Biochemistry*, 28:8921-8928, 1989.
14. Vinson, P., Talmon, Y., Walter, A.: Lamellar-micellar transition of egg phosphatidylcholine-octylglucoside mixtures visualized by cryoelectron microscopy. *Biophysical Journal*, 56:669-681, 1989.
15. Harris, A.L., Walter, A., Zimmerberg, J.: Transport-specific purification of a large membrane channel incorporated into lipid vesicles. *J. Membrane Biology.*, 109:243-250, 1989.
16. Eidelman, O., Blumenthal, R. and Walter A.: The composition of octylglucoside phosphatidylcholine mixed micelles. *Biochemistry*, 27:2839-2846, 1988.

17. Puri, A., Winick, J., Lowy, R.J., Covell, D., Eidelman, O., Walter, A., Blumenthal, R.: Activation of vesicular stomatitis virus fusion with cells by pretreatment at low pH. *J. Biol. Chem.*, 263:4749-4753, 1988.
18. Ollivon, M., Eidelman, O., Blumenthal, R. and Walter, A.: Micelle-vesicle transitions of egg phosphatidylcholine and octylglucoside. *Biochemistry*, 27:1695-1703, 1988.
19. Blumenthal, R., Bali-Puri, A., Walter, A., Covell, D. and Eidelman, O.: pH-dependent fusion of vesicular stomatitis virus with Vero cells: measurement of kinetics and extent of fluorescence dequenching. *J. Biol. Chem.* 262:13614-13619, 1986.
20. Ollivon, M., Walter, A., and Blumenthal, R.: Sizing and separation of liposomes, biological vesicles and viruses by HPLC. *Anal. Biochem.*,152:262-274, 1986.
21. Walter, A. and Gutknecht, J.: Permeability of small nonelectrolytes through lipid bilayer membranes. *J. Membrane Biology*, 90:207-217, 1986.
22. Walter, A., Steer, C.J. and Blumenthal, R.: Polylysine induces pH-dependent fusion of acidic phospholipid vesicles: A model for polycation-induced fusion. *Biochim. Biophys. Acta*, 861:319-330, 1986.
23. Walter, A., Margolis, D., Mohan, R. and Blumenthal, R.: Apocytochrome c induces pH-dependent vesicle fusion. *Membrane Biochem.* 6:217-237, 1986.
24. Walter, A. and Gutknecht, J.: Fatty acid permeability of lipid bilayer membranes. *J. Memb. Biol.*, 77:255-264, 1984.
25. Sutcliffe, J., Blumenthal, R., Walter, A. and Foulds, J.: *Escherichia coli* outer membrane protein K is a porin. *J. Bacteriology*, 156:867-872, 1983.
26. Gutknecht, J. and Walter, A.: Anion and proton transport through lipid bilayers and red-cell membranes. In Zadunaisky, J.A. (Ed.): *Chloride Transport in Biological Membranes*. New York, Academic press, pp 91-109, 1982.
27. Gutknecht, J. and Walter, A.: SCN⁻ and HSCN transport through lipid bilayer membranes. *Biochim. Biophys. Acta*, 685:233-240, 1982.
28. Walter, A., Hastings, D. and Gutknecht, J.: Monocarboxylic acid permeability through lipid bilayer membranes: Role of chemical reactions in the unstirred layers. *J. Gen. Physiol.*, 79:917-933, 1982.
29. Gutknecht, J. and Walter, A.: Histamine, theophylline and tryptamine transport through lipid bilayer membranes. *Biochim. Biophys. Acta*, 649:149-154, 1982.
30. Gutknecht, J. and Walter, A.: Hydroxyl ion permeability of lipid bilayer membranes. *Biochim. Biophys. Acta*, 645:151-162, 1981.
31. Gutknecht, J. and Walter, A.: Transport of nitric and hydrofluoric acids through lipid bilayer membranes. *Biochim. Biophys. Acta*, 644:153-156, 1981.
32. Gutknecht, J. and Walter, A.: Transport of protons and hydrochloric acid through lipid bilayer membranes. *Biochim. Biophys. Acta*, 641:183-188, 1981.
33. McIntosh, T.J., Robertson, J.D., Ting-Beall, H.P. Walter, A. and Zampighi, G.: On the structure of hemocyanin channel in lipid bilayers. *Biochim Biophys. Acta*, 601:289-301, 1980.
34. Gutknecht, J. and Walter, A.: Transport of auxin (indoleacetic acid) through lipid bilayer membranes. *J. Membrane Biol.*, 56:65-72, 1980.
35. Gutknecht, J. and Walter, A.: Coupled transport of protons and halide ions through lipid bilayer membranes containing a long-chain secondary amine. *J. Membrane Biol.*, 47:59-76, 1979.
36. Walter, A. and Hughes, M.R.: Total body water volume and turnover rate in fresh water and sea water adapted Glaucous-winged gulls, *Larus glaucescens*. *Comp. Biochem. Physiol.*, 61A:233-237, 1978.

B. Invited Papers and Chapters:

1. Walter, A. Cellular and Biochemical Responses of Ectotherms to Warming: a review with respect to climate change. Submitted, 2010.
2. Walter A. and Downing, L.A. Respiratory syncytial virus interactions with host cell membranes: an enigma among the paramyxoviridae. Chapter 14. In: *Viral Fusion Mechanisms*, J. Bentz (editor). CRC Press, 1993.
3. Walter, A., Lesieur, S., Blumenthal, R., and Ollivon, M. Size characterization of liposomes by HPLC. Chapter 16. In: *Liposome Technology*, 2nd edition, G. Gregoriadis (editor). C.R.C. Press, 1993.
4. Walter, A. Vesicle-micelle transitions in surfactant phospholipid systems. In: *Proceedings of the Indo-US Workshop: Membrane Structure and Function - the State of the Art*, (editors B.P. Gaber and K.R.K. Easwaran). Adenine Press, Schenectady, 1992.

5. Walter, A., Eidelman, O., Ollivon, M. and Blumenthal, R. Functional Reconstitution of Viral Envelopes. In: Cellular Membrane Fusion: Fundamental Mechanisms and Applications of Membrane Fusion Techniques, J. Wilschut and Dick Hoekstra (editors), Marcel Dekker, Inc., New York, Chapter 18, pg 395-418, 1991.
6. Walter, A. Membrane solubilization with and reconstitution from surfactant solutions: a comparison of phosphatidylserine and phosphatidylcholine interactions with octyl glucoside. *Molecular and Cellular Biochemistry* 97:145-156, 1990.
7. Walter, A. 'Introducing Membranes' - a review of "Biomembranes Molecular Structure and Function" by Robert B. Gennis. In: *BioScience* 40:310, 1990.
8. Blumenthal, R., Bali-Puri, A., Walter, A. and Eidelman, O. pH-dependent fusion of vesicular stomatitis virus with Vero cells: Studies of mechanisms based on an allosteric model. In: *Molecular Mechanisms of Membrane Fusion* (S. Ohki, editor), 1988.

C. Popular writing.

Walter, A. and Swift, M. Reflections on an Even-Numbered Semester. *The MCC Magazine*, 2010.

Walter, A. Early Mornings and Late Evenings at MCC. *Kampasina, the Madras Christian College Staff Wives and Women Staff Association annual publication*, 2010.

D. Recent (last three years) Presentations (student authors are indicated by *)

Yang, X.* and A. Walter. 2011. Using a microplate reader to determine the activity of lactate dehydrogenase in relation to temperature. *Journal of the Minnesota Academy of Science* 74:27.

Dai, Y.* and A. Walter. 2012. Temperature effects on activity of lactate dehydrogenase of the bluegill (*Lepomis macrochirus*). *Journal of the Minnesota Academy of Science* 75:12.

Walter, A. and Rebecca Vandiver. 2013. "Putting the Math into Biology and the Bio into Mathematics: Creating an Interdisciplinary Undergraduate Concentration in Mathematical Biology " at the 17th Iowa Physiological Society Meeting (Sept 2013)

E. Selected Honors and Awards

- o Fulbright-Nehru Visiting Lecturer 2009 (placed at Madras Christian College 2009-10)
- o Melby Lecturer, "Old Questions, New Methods: a paradigm shift in how we think about cell membranes and other biological entities" 13 March 2008, St. Olaf College
- o Lilly International Grant to travel to India with five students for a service program at ICSA, Chennai – August 2005
- o Convocation Speaker, "Anticipation of Things Not Yet Imagined" Sept 9, 1998, St. Olaf College
- o Margaret Oakley Dayhoff Memorial Award in Biophysics, Biophysical Society; 1990
- o Affair of the Heart Award, Miami Valley Chapter of American Heart Association; 1988
- o National Kidney Foundation Research Fellowship; 1981-1982

E. Memberships in Professional Societies:

The Biophysical Society
The Society of General Physiologists
American Society for Biochemistry and Molecular Biology
Sigma Xi
Minnesota Academy of Sciences

V. **College Activities (last 10 years)**

A. College Committees

1. Faculty Review Committee (2002-2006)
2. Institutional Review Board (Human subjects protection) (2002-present) (Acting IRB Director 2008)

B. Off Campus Studies

1. Co-Advisor to the Biology in South India Program (1995-present)
2. Faculty Leader: Environmental Studies in Australia (spring 2006)
3. Faculty Leader: Equatorial Biology (interim 2014)

C. Special Task Forces/Duties

1. Paracollege Review (1995)
2. Member of Committee to explore Science Facilities (1994-1996)
3. Faculty Shepherd for Science Facilities Project (1998-2001)
4. Member of the Building Design Team (2002-2009)
5. Member of the Green Building Task Force (2004-2009)
6. Member of Nursing Task Force I & II (2003-2004)
7. Team Physics – to integrate biology & chemistry into physics curricula (2002-present)
8. Biology-Mathematics Task Force – (2007-2010), (2011-present)
10. Diversity Task Force for Strategic Planning (member 2011-12)
12. Advising Task Force (member 2012-present)
13. Hardy Chair activities—
 - Science Symposium on Water -- 2011
 - 2013 Social Science Conference – Natural Science – planning & administration
 - FNSM Honors Day Poster Session – 2013
 - FNSM Science Symposium 2013-4 “Big Data”

D. Administrative

1. Chair, Department of Biology (2002-2009)
2. Radiation Safety Officer (1994-2006)

E. Miscellaneous

1. Chapel Talks To Open Women’s History Month (27 Feb 2003), Lilly Group Oct 2005, Service of Thanksgiving for Science Facilities (12 Apr 2007)
2. Numerous presentations to prospective students and parents (minilectures, labs, panels)
3. Building Dedication Committee (2007-08)
4. MidStates Science and Mathematics Consortium meeting on Sustainability (Oct 2009), organizing committee
5. Hosted the Twin Cities Regional BioGab meeting here with Jennifer Bankers-Fulbright from Augsburg College, Sept 17)
6. Cohosted with Jenny Klein a “2011 Biophysical Society Local Networking Event” (October 28, 2011) with guests (students and faculty from multiple colleges and Universities in Minnesota & Wisconsin).
7. Served on the Minnesota Academy of Sciences meeting planning committee and helped host the meeting held here on April 21, 2012.

F. Development Activities

1. EIN course (spring summer 2004)
2. CILA – regular attendance at CILA presentations
3. Pew Bridges workshop summer 2003
4. ACM FaCE Conference on Diversity in Liberal Arts Colleges (Colorado College, Sept 2007)
5. MidStates Sustainable Campuses Symposium host (St. Olaf, October 2010)
6. Language-Science Working Group member (2011-present); on-going conversation. Hosted a “Shared Interest Lunch” series (supported by the provost).
7. CILA presentation with Diane LeBlanc. “Closing Academic and Social Gaps through Writing” (2012).
8. Indian Identities Today – Mutual Interest Lunch (reading & discussing “India: A Sacred Geography” by Diana Eck
9. ORC workshop, June 2013

G. Program grant writing and program activities

1. HHMI grant writing group 2003
2. LI-COR grant for DNA sequencer (submitted and funded)
3. Merck/AAAS funds for student research at the interface of Biology and Chemistry, co-authored with Mary Walczak. Funded for three years in 2001 and again in 2005.
4. NSF S-STEM “Biologists for the Future” PI funded for five years (2007-2012)
5. NSF UBM program CoPI with Steve McKelvey submitted but not funded.

6. Fulbright-Hays 2010 Group Projects Abroad, Type I: Short-Term Seminar Project "*Indian Identities Today*", coPI with DeAne Lagerquist, Mary Griep, and Dana Gross
7. Submitted NSF S-STEM proposal #1154246 "Biologists for the Future: the next generation" (coPIs Diane Angell and Kathy Glampe. Not funded (2011)
8. Submitted NSF S-STEM proposal "Biologists for the Future: making career connections" (coPIs Diane Angell and Kathy Glampe. Not funded (2012).
9. Society for General Physiologists Traveling Scholar Program grant – funded (2012).
10. Elsevier Foundation Grant "Women in STEM: Expanding the Network of Support Beyond St. Olaf College" coPI with Mary Walczk and Dana Gross. pending
11. NSF-IUSE proposal on developing a Mathematical Biology Community. CoPI with Rebecca Vandiver. in preparation.

VI. External Community Service

- Research Day Judge , University of Wisconsin Eau Claire, 2003 & 2004
- Program Reviewer Brigham Young University, spring 2004
- Program Reviewer Southwest State University of Minnesota spring 2005
- Program Reviewer Smith College, fall 2006
- Review NSF graduate fellowship proposals, 2005
- Review NRSA post doctoral and graduate fellowships proposals, 2007
- Review Fulbright-Nehru grants October, 2010, October, 2011, October 2013.
- Review PhD thesis for the University of Madras (2012)
- Program Reviewer Skidmore College, fall 2014
- Fulbright Ambassador Program, 2015-