

CURRICULUM VITAE

Steven P. Schwendeman, Ph. D.

Current Position

- 2011 - present Ara G. Paul Professor, Department of Pharmaceutical Sciences
College of Pharmacy
The University of Michigan, Ann Arbor, MI
- 2011 - present Department Chair, Department of Pharmaceutical Sciences
College of Pharmacy
The University of Michigan, Ann Arbor, MI
- 2012 - present Biomaterials and Drug Delivery Thrust Leader
Biointerfaces Institute, NCRC
The University of Michigan, Ann Arbor, MI
- 2013 - present Professor of Biomedical Engineering
College of Engineering
University of Michigan, Ann Arbor, MI

Previous Experience

- 2008 - 2010 Professor, Department of Pharmaceutical Sciences
College of Pharmacy
The University of Michigan, Ann Arbor, MI
- 2002 - 2008 Associate Professor, Department of Pharmaceutical Sciences
College of Pharmacy
The University of Michigan, Ann Arbor, MI
- 2007 - 2008 Visiting Scientist (sabbatical leave)
Laboratory of Philippe Le Bouteiller
Department of Immunology
INSERM 563, CHU Purpan, Toulouse, France
- 2000 - 2002 Assistant Professor, Department of Pharmaceutical Sciences
College of Pharmacy
The University of Michigan, Ann Arbor, MI
- 1995 - 2000 Assistant Professor, Division of Pharmaceutics
College of Pharmacy
The Ohio State University, Columbus, OH

Education

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|-------------|---|
| 1983 - 1986 | The University of Michigan, Ann Arbor, MI
B.S.E. with Honors in Chemical Engineering |
| 1987 - 1992 | The University of Michigan, Ann Arbor, MI
Ph.D. and M.S. in Pharmaceutics, College of Pharmacy
(co-thesis advisors: Robert J. Levy, M.D. and Gordon L. Amidon, Ph.D.) |
| 1992 - 1995 | Massachusetts Institute of Technology, Cambridge, MA
Postdoctoral Fellow, Department of Chemical
Engineering (postdoctoral advisor: Robert Langer, Sc.D.) |

Honors and Awards

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|----------------|--|
| 1984 | Dean's List |
| 1987 | Warner Lambert Fellow |
| 1988 - 1990 | National Institutes of Health Pharmacological Track Training Grant
Recipient |
| 1990 - 1992 | Pharmaceutical Manufacturers' Association Foundation Advanced
Predoctoral Fellow |
| 1993, 1995 | Temporary Advisor to the World Health Organization
Program for Vaccine Development |
| 1993 - 1995 | Individual National Research Service Award
(National Institutes of Health postdoctoral fellowship) |
| 1996 - 1998 | Pharmaceutical Research and Manufacturers of America
Foundation Research Starter Grant Recipient |
| 2002 | Young Investigator Research Achievement Award, Controlled
Release Society |
| 2003 - 2006 | Board of Scientific Advisors, Controlled Release Society |
| 2004 - 2007 | Editor, <i>Pharmaceutical Research</i> |
| 2003 - 2008 | Member, NIH Biomaterials and Biointerfaces (BMBI) study section |
| 2007 - present | Associate Editor of the Americas, <i>Journal of Controlled Release</i> |
| 2010 | Consumer & Diversified Products Outstanding Paper Award (with
KG Desai), Controlled Release Society |
| 2010 - present | Member, College of CSR (Center for Scientific Review) Reviewers,
NIH |
| 2011 - present | Ara G. Paul Endowed Professorship in Pharmaceutical Sciences |

Professional Societies

- American Association of Pharmaceutical Scientists
- Controlled Release Society
- American Association for Dental Research
- American Association for the Advancement of Science

Tau Beta Pi
Rho Chi (faculty advisor: 1998-2000)

Professional Service

Journal reviewer for:

Pharm. Res.
J. Pharm. Sci.
J. Controlled Release
Int. J. Pharm.
Eur. J Pharm.
Biotechniques
Biomaterials
Proceed. Natl. Acad. Sci. USA
Nature
Nat. Biotechnol.
Nat. Materials
Biotech. Bioeng.
Expert Rev. Vaccines
Tibtech
Adv. Drug Del. Rev.
Curr. Opin. Drug Del.
Biomacromolecules
J. Appl. Polym. Sci.

Journal advisory boards:

J. Pharm. Sci. (2001 – present)
Pharmaceutical Research (2004 – 2007)
J. Controlled Release (2005 – present)

Grant reviewer for:

World Health Organization (1995)
Australian Research Council (1996, 2000)
National Institutes of Health
 ad hoc member of VISA, 2000-2001
 member of special emphasis panel (SSS-L), Drug Delivery and Drug
 Discovery, 6/03
 member of special emphasis panel (SSS-2), Drug Delivery, 7/03
 member, BMBI, 2003 - 2008
 ad hoc member, GDD, 6/09
 ad hoc member, site visit team for Purdue University Cancer Center (Cancer
 Center Support Grant, P30), 9/09 & 9/14
 member, special emphasis panel on “Transforming Biomedicine at the
 Interface of the Life and Physical Sciences”, 10/10
National Science Foundation (2001-2002)

Patents

1. Jacobs, A. and Schwendeman, S. P., Delivery system (controlled-release of NaF from dental trays), US Patent no. 5,924,863, 1999.
2. Schwendeman, S. P. and Cui, C., Biocompatible polymeric delivery systems having functional groups attached to the surface thereof, US Patent no. 6,326,021, 2001.
3. Schwendeman, S. P., Zhu, G., Bentz, H., Hubbell, J., Jiang, W., Shenderova, A., and Kang, J., Methods for stabilizing biologically active agents encapsulated in biodegradable controlled-release polymers, US Patent no. 6,743,446, 2004.*
4. Schwendeman, S. P. and Jiang, W., Polymer compositions that stabilize and control the release of formaldehyde-treated vaccine antigens, US Patent App. SN 10/417,841, April 17, 2003, withdrawn.
5. Cui, C., Schwendeman, S. P. and Stevens, V., Antigen-polymer compositions, US Patent App. SN 10/617,078, July 10, 2003.
6. Schwendeman, S. P., Zhu, G., Bentz, H., Hubbell, J., Jiang, W., Shenderova, A., and Kang, J., Methods for stabilizing biologically active agents encapsulated in biodegradable controlled-release polymers, US Patent App. SN 11/863,088, September 27, 2007. 61/294,666
7. Schwendeman, S. P., Kang, J. and Reinhold, S., Methods for encapsulation of biomacromolecules in polymers, US Patent no. 8,017,155, 2011.*
8. Schwendeman, S. P. and Desai, K.G.H., Active self-healing biomaterial system, US Patent App., January 13, 2012.*
9. Mallery, S. P., Larsen, P., Stoner, G., Schwendeman, S. and Desai, K. G., Controlled release mucoadhesive systems, WO2012068147, May 24, 2012.**
10. Schwendeman, S. P., Doty, A., Shah, R., Pisupati, K., Giles, M., Chang, R. S., and Schwendeman, A., Efficient aqueous encapsulation and controlled release of bioactive agents, US provisional patent filed.*

* Patents optioned to Ektapharm, LLC from UM and OSU.

** Patent optioned to Serona Therapeutics from OSU and UM.

Teaching

- | | | |
|----------------------|-------|--|
| Eng. 103 (U of M) | 3 cr. | Introduction to Computer Programming (student instructor), 1986. |
| P'ceut. 332 (U of M) | 3 cr. | Introduction to Pharmaceutics (teaching assistant), 1990. |
| P'ceut. 757 (U of M) | 3 cr. | Transport (guest lecturer), 1992, 2001. |

ICE 491 (MIT)	3 cr.	Integrated Chemical Engineering (instructor), 1993.
Pharmacy 403 (OSU)	3 cr.	Pharmaceutics 1, co-instructed annually to undergraduate professional students, 1996-1998.
Pharmacy 622 (OSU)	3 cr.	Drug Delivery 2, taught annually to graduate professional students, 1999-2000.
Pharmacy 805 (OSU)	3 cr.	Controlled Drug Delivery, taught every other year to graduate students in pharmaceutics, 1996-2000.
P'ceut. 462 (U of M)	3 cr.	Physical Pharmacy and Biopharmaceutics, co-instructed annually to graduate professional students, 2001- 2012.
P'ceut. 762 (U of M)	3 cr.	Drug Delivery Systems, co-instructed every other year to graduate students in the pharmaceutical sciences, 2001-2003.
P'ceut. 752 (U of M)	2 cr.	Controlled Drug delivery, taught every other year to graduate students in the pharmaceutical sciences, 2005-2009.
P'ceut 701 (U of M)	3 cr.	Physical Chemical Concepts of Drug Development and Delivery, co-instructed every other year to graduate students in the pharmaceutical sciences, 2011-present.
P'ceut 703 (U of M)	3 cr.	Advanced Physical Chemical Concepts of Drug Development and Delivery, co-instructed every other year to graduate students in the pharmaceutical sciences, 2012-present.

Graduate Students, Postdocs, Visiting Scientists

Ph.D. Advisor for:

Tianhong Zhou, Ph.D. granted 12/98, at Takeda
Gaozhong Zhu, Ph.D. granted 9/99, at Transkaryotic Therapies (Shire)
Anna Shenderova, Ph.D. granted 6/00, at Cerenis Therapeutics
(co-advised with W. L. Hayton)
Juan Wang, Ph.D. granted 8/00, at Portola
Wenlei Jiang, Ph. D. granted 8/01, at FDA
Chengji Cui, Ph.D. granted 12/03, at Johnson & Johnson
Guanbing Ding, Ph.D. granted 8/05, at Impax Labs
David Gu, Ph.D. granted 12/08, at McKinsey
Li Zhang, Ph.D. granted 12/08, at UCSD
Sam Reinhold, Ph.D. granted 8/09, at Upsher-Smith
Andreas Sophocleous, Ph.D. granted 8/09, at GSK
Yajun Liu, Ph.D. granted 5/13, at Merck
Ronak Shah (current)
Brittany Bailey (current)
Karthic Pisupati (current)
Amy Doty (current)
Rae Sung Chang (current)
J. Max Mazzara (current)
Kellisa Hansen (current)

Kari Nieto (current)
Morgan Giles (current)

Masters Advisor for:

Julia Marinina, M.S. granted 12/99
Longsheng Lai
Kiarri Kershaw, M.S. granted 12/04

Postdoctoral Advisor for:

Jichao Kang, Ph.D., at MedImmune (AstraZeneca)
Lei Li, Ph.D., at Bristol-Meyers Squibb
Mangesh Deshpande, Ph.D., at Dr. Reddy's
Ying Zhang, Ph.D., at DuPont
Christian Wishke, Ph.D., at Helmholtz-Zentrum Geesacht
K. G. H. Desai, Ph.D., at GSK
Xiao Wu, Ph.D.
Vesna Milacic, Ph.D. (current)
Gwangseong Cheng (current)

Assistant Research Scientists:

Ying Zhang, Ph.D.
K. G. H. Desai, Ph.D. (current)

Lab Manager:

Karl Oslon, B.S.

Pharm. D. Students:

Shodai Ota

Visiting Scientists:

Yanqiang Zhang, Ph.D.
Fuzheng Ren, Ph.D.
Samer Kadous, Pharm. D.

Ph.D. Thesis Committee

Melanie Frangione (OSU)
Jean Weaver (OSU)
Hong Mei (OSU)
Pål Johansen (outside reviewer for ETH, Zürich, Switzerland, 1998)
Sarita Naik (U of M)
Megen Frost (U of M)
Alessandra Ennett (U of M)
Ron Kelly (U of M)
Barbara Spong (U of M)
Hiro Tsumi (U of M)
John Chung (U of M)
Jennifer Sheng (U of M)

Linh Luong (U of M)
Qinyi Yan (U of M)
Dilara Jappar (U of M)
Hee Sun Chung (U of M)
Jonathan Miller (U of M)
Xinyuan Zhang (U of M)
Kai Feng (U of M)
Lilly Roy (U of M)
Deanna Mudie (U of M)
Byumseok Koh (U of M)
Wenyi Cai (U of M)
Neal Huang (U of M)
Haili Ping (U of M)
Suzanne Fredenberg (Opponent for University of Lund, Sweden, 2011)
Elizabeth Brisois (U of M)
Yehua Xie (U of M)
Rui Kuai (U of M)

Consultantships

1994 - 1995	Osteoarthritis, Cambridge, MA
1994 - 1997	Archtek, Golden, CO
1998	Scios, Inc., Mountain View, CA
1998 - 1999	Orthogene, Sausalito, CA
2000	Baxter, Deerfield, IL
2001 - 2003	Patterson, Belknap, Webb & Tyler, New York, NY (expert witness for Takeda and Abbot (TAP))
2003 - 2004	X-Cell Medical, Inc., New York, NY
2004 - 2007	Conor Medsystems, Inc., Menlo Park, CA
2004	McKinsey and Company, New York, NY
2004	Inamed, Santa Barbara, CA
2004	Medtronic, Shoreview, MN
2006 - 2007	Nellcor Division of Tyco Healthcare, Pleasanton, CA
2006 - 2007	Patterson, Belknap, Webb & Tyler, New York, NY (expert witness for Takeda and Abbott (TAP))
2006 - 2008	Quinn & Emanuel, NY (expert witness for Connetics)
2007 - 2010	Amylin, La Jolla, CA
2007 - 2010	Alkermes, Cambridge, MA
2008	Merck, West Point, PA
2008	Kai Pharmaceuticals, South San Francisco, CA
2008	Cerenis Therapeutics, Toulouse, France
2010 - 2011	McAndrews, Held, & Malloy, Chicago, IL
2011	Takeda, Deerfield, NY
2011 - 2013	DLA Piper, LLC, NY, NY
2012 - 2013	Allergan, Irvine, CA

2013 - 2014 MedImmune, Gaithersburg, MD
2013 - present Ektapharm, LLC (co-founder)

Research Support (total direct costs)

Past

Stabilizing proteins for delivery from biodegradable polymer implants, 4/95 - 3/96, \$10,000, OSU Seed Grant, PI.

Surgically implanted regional cytotoxic and chemopreventive therapy, 8/95 - 7/97, \$60,000, OSU Cancer Center, Co-I, PI: G. Wjientes.

Maintaining protein structure in biodegradable polymer microspheres, 1/97 - 12/98, \$25,000*, PhRMA Foundation Research Starter Grant, PI.

Gift for studies with PLGA systems encapsulating BMP-2, Orthogene, \$33,333.

Gift for Encapsulation studies, Novartis, \$10,000.

Release profiles of candidate drugs from SC MEDDS, 9/1/99 - 12/31/99, \$12,718*, iMEDD, Co-I (3% time commitment), PI: W. Hayton.

Intraocular polymer drug delivery implants, 4/95 - 5/00, \$71,000*, Cleveland Clinic Foundation, PI (5%).

Evaluation of protein antigen structure in biodegradable polymer microspheres 9/1/98 - 5/31/00, \$10,599*, Corixa, PI.

In vivo assessment of controlled release of IM 862, a novel angiostatic agent, OSU Comprehensive Cancer Center Seed Grant 10/1/99 - 9/30/00, \$35,000, Co-I, PI: S. R. Mallery.

Responsive drug delivery systems using artificial muscle, OSU Interdisciplinary Bioengineering Seed Grant, 5/1/99 - 4/30/01, \$50,000, PI. **

Responsive drug delivery using artificial muscle, Edison Biotechnology Center, 10/1/99 - 9/30/01, \$100,000*, Co-PI, PI: M. Madou.**

Phase 2: Center for Industrial Sensors and Measurements, NSF, 6/1/00 - 5/31/03, \$900,000, Co-PI, PI: M. Madou.**

Lesional chemotherapeutic management for oral AIDS-KS, 1 R01 DE 12183-01, 1/97 - 12/01, \$748,188, NIH/NIDCR, Co-I (10%), PI: S.R. Mallery.

Structural and conformational aspects in peptide vaccines, 1 R01 AI 40302-02, 4/97 - 3/02, \$686,403, NIH/NAIDS, Co-I (0%), PI: P.T.P. Kaumaya.

Time release ophthalmic drug delivery insert, NIH/NEI, 7/1/01 - 6/30/02, \$1,100,000*, 1 R43EY12916-01, Co-I (10%), PI: B. Cohan.

Characterization of Novel PLGA Delivery Systems for Stabilizing Proteins, 7/1/02 - 6/30/04, \$149,584*, Novartis, PI (5%).

Protein stability in polymer delivery systems, 1 R01 HL 68345-01, 2/1/01 - 1/31/06, \$750,000, NIH/NHLBI, PI (20%).

Protein stability in polymer delivery systems – research supplement for underrepresented minorities, 6/1/03 – 1/31/06, \$78,493, NIH/NHLBI, PI (5% WOC).

Stability of peptides in PLGA-glucose microspheres, Novartis, 11/1/05 – 2/29/08, \$220,542 *, PI (5%).

Role of Oxidants & Angiogenesis in Kaposi's Sarcoma, R01 CA 095901, 4/01/03 - 3/31/08, \$1,250,000, NIH/NCI, Co-I (5%), PI: S. R. Mallery.

Controlled release of a hydrophobic drug from PLGA microspheres, Merck, 12/1/06 – 12/31/08, \$181,394*, PI (8%).

Self-microencapsulation without organic solvents, Upjohn/Valteich (U of M College of Pharmacy), 6/1/07 – 12/31/08, \$15,000, PI (WOC).

PLGA microsphere delivery of hydrophobic drugs, 11/1/06 – 3/1/10, \$181,000 *, Merck, PI (8%).

Mucoadhesive patch delivery of fenretinide and berry anthocyanins for oral cancer chemoprevention, 7/1/09 – 2/28/10, \$50,000, Ohio State University Comprehensive Cancer Center, Co-I (WOC), PI: Mallery.

Mucoadhesive patch delivery of fenretinide and berry anthocyanins for oral cancer chemoprevention, 10/1/09 – 9/30/10, \$100,000, Fanconi Anemia Research Foundation, Co-I (WOC), PI: Mallery.

Stability of proteins in polymer delivery systems, 9/1/07 – 8/31/12, R01 HL 68345, \$875,000, NIH/NHLBI, PI (20%).

Stability of proteins in Polymer delivery Systems – research supplement, 7/15/09 – 6/30/12, R01 HL 68345, \$297,000 *, NIH/NHLBI, PI (WOC)

Self-microencapsulation in polymer delivery systems without organic solvents, 7/15/09 – 6/30/12, R21 EB 008873, \$275,000, NIH/NIBIB, PI (15%)

Chemoprevention of head & neck cancer using controlled release polymers, 12/1/08 – 11/30/13, R01 CA 120609, \$1,250,000, NIH/NCI, Co-I (5%), PI: Mallery.

Organic solvent-free microencapsulation of GLP-1 receptor agonists in poly(lactic-co-glycolic acid) for development of a 1-month GLP-1 injectable depot, 7/1/13 – 6/30/14, Coulter Foundation, \$103,750, PI (9%).

Current

Development of design criteria for mucoadhesive polymer excipients for use in nasal drug formulations, 9/1/11 – 12/31/14, \$510,000*, Dow Chemical Company, PI (5%).

Evaluation of locally delivered fenretinide and black raspberries for oral cancer, 9/1/12- 8/31/17, R01 CA 171329, \$1,250,000, NIH/NCI, Co-I (5%), PI: Mallery.

In vitro-in vivo correlations of parenteral microsphere drug products, 9/15/13 – 9/14/15, U01 FD005014, \$500,000*, US FDA, PI (15%).

Analytical comparison of innovator product and follow-on biologics to aid biosimilars regulatory guidelines development, 4/1/2014 – 3/31/2015, U01 FD004275-03, \$127,000*, US FDA, Co-PI (2.5%).

Eradication of solid tumors using implantable drug delivery systems with controlled intratumoral disposition, 10/1/2014 – 9/30/2017, \$138,600*, US – Israel Binational Science Foundation, Co-PI (WOC).

* Total costs of project

** Role of SPS on project ceased upon moving to the Univ. of Mich from Ohio State Univ.

Publications

1. Schwendeman, S. P., Amidon, G. L., Meyerhoff, M. E. and Levy, R. J., Modulated drug release using iontophoresis through heterogeneous cation-exchange membranes: membrane preparation and influence of resin cross-linkage, *Macromolecules*, **25**, 2531-2540 (1992).
2. Schwendeman, S. P., Amidon, G. L. and Levy, R. J., Determinants of the modulated release of antiarrhythmic drugs by iontophoresis through polymer membranes, *Macromolecules*, **26**, 2264-2272 (1993).
3. Schwendeman, S. P., Amidon, G. L., Labhasetwar, V. and Levy, R. J., Modulated drug release using iontophoresis through heterogeneous cation-exchange membranes II: influence of cation-exchanger content on membrane resistance and characteristic times, *J. Pharm. Sci.*, **83**, 1482-1494 (1994).
4. Chen, W., Schwendeman, S. P., Labhasetwar, V. and Levy, R. J., Techniques in cardiovascular drug delivery-surfactant derivatization, polymer implants and iontophoresis, in *Polymer Site-specific Pharmacotherapy*, Domb, A. J. (ed.), Wiley, New York, 1994, pp. 221-242.
5. Labhasetwar, V., Underwood, T., Schwendeman, S. P. and Levy, R. J., Iontophoresis for modulation of cardiac drug delivery in dogs, *Proc. Natl. Acad. Sci. USA*, **92**, 2612-2616 (1995).
6. Schwendeman, S. P., Labhasetwar, V. and Levy, R. J., Model features of a cardiac iontophoretic drug delivery implant, *Pharm. Res.*, **12**, 790-795 (1995).
7. Schwendeman, S. P., Costantino, H. R., Gupta, R. K., Siber, G. R., Klibanov, A. M. and Langer, R., Stabilization of tetanus and diphtheria toxoids against moisture-induced aggregation, *Proc. Natl. Acad. Sci. USA*, **92**, 11234-11238 (1995).
8. Labhasetwar, V., Schwendeman, S. P., Nguyen, T., Underwood, T. and Levy, R. J., Iontophoresis for modulating cardiac drug delivery of antiarrhythmic agents, in *Molecular Intervention and Local Drug Delivery in Cardiovascular Disease*, Edelman, E. R. (ed.), W. B. Saunders, Philadelphia, 1995, pp. 383-398.
9. Mooney, D., Kaufmann, P. M., Sano, K., Schwendeman, S. P., McNamara, K., Schloo, B., Vacanti, J. P. and Langer, R., Localized delivery of epidermal growth factor

- improves the survival of transplanted hepatocytes, *Biotech. Bioeng.*, **50**, 422-429 (1996).
10. Schwendeman, S. P., Cardamone, M., Brandon, M. R., Klibanov, A. and Langer, R., The stability of proteins and their delivery from biodegradable polymer microspheres, in *Microparticulate Systems for the Delivery of Proteins and Vaccines*, Cohen, S. and Bernstein, H. (eds.), Marcel Dekker, New York, 1996, pp. 1-49.
 11. Schwendeman, S. P., Costantino, H. R., Gupta, R. K., Tobio, M., Chang, A. C., Alonso, M. J., Siber, G. R. and Langer, R., Strategies for stabilizing tetanus toxoid toward the development of a single-dose tetanus vaccine, *Dev. Biol. Stand.*, **87**, 293-306 (1996).
 12. Costantino, H. R., Schwendeman, S. P., Griebenow, K., Klibanov, A. M. and Langer, R., On the secondary structure and aggregation of lyophilized tetanus toxoid, *J. Pharm. Sci.*, **85**, 1290-1293 (1996).
 13. Schwendeman, S. P., Costantino, H. R., Gupta, R. K. and R. Langer, Progress and challenges for peptide, protein, and vaccine delivery from implantable polymeric systems, in *Controlled Drug Delivery: Challenges and Strategies*, Park, K. (ed.), The American Chemical Society, Washington, D. C., 1997, pp. 229-267.
 14. Shenderova, A., Burke, T. G. and Schwendeman, S. P., Stabilization of 10-hydroxycamptothecin in poly(lactide-co-glycolide) microsphere delivery vehicles, *Pharm. Res.*, **14**, 1406-1414 (1997).
 15. Schwendeman, S. P., Tobio, M., Joworowicz, M., Alonso, M. J. and Langer, R., New strategies for the microencapsulation of tetanus vaccine, *J. Microencapsulation*, **15**, 299-318 (1998).
 16. Costantino, H. R., Schwendeman, S. P., Langer, R. and Klibanov, A. M., Deterioration of lyophilized pharmaceutical proteins, *Biochemistry (Moscow)*, **63**, 357-363 (1998).
 17. Zhou, T., Lewis, H., Foster, R. E. and Schwendeman, S. P., Development of a multiple-drug delivery implant for intraocular management of proliferative vitreoretinopathy, *J. Controlled Release*, **55**, 281-295 (1998).
 18. Shenderova, A., Burke, T. G. and Schwendeman, S. P., An acidic microclimate in poly(lactide-co-glycolide) microspheres stabilizes camptothecins, *Pharm. Res.*, **16**, 241-248 (1999).
 19. Cook, V. L., Bertone, A. L., Kowalski, J. J., Schwendeman, S. P., Ruggles, A. J. and Weisbrode, S. E., Biodegradable drug delivery systems for gentamicin release and treatment of synovial membrane infection, *Vet. Surg.*, **28**, 233-241 (1999).

20. Wang, J. and Schwendeman, S. P., Mechanisms of solvent evaporation encapsulation processes: predicting evaporation rate, *J. Pharm. Sci.*, **10**, 1090-1099 (1999).
21. Tobio M, Schwendeman S. P., Guo, Y., McIver, J. , Langer, R. and Alonso, M. J., Improved immunogenicity of a core-coated tetanus toxoid delivery vehicle, *Vaccine*, **18**, 618-622 (1999).
22. Zhu, G., Mallery, S. R. and Schwendeman, S. P., Stabilization of proteins encapsulated in injectable poly(lactide-co-glycolide), *Nat. Biotechnol.*, **18**, 52-57 (2000).
23. Zhu, G. and Schwendeman, S. P., Stabilization of proteins encapsulated in cylindrical poly(lactide-co-glycolide) implants: mechanism of stabilization by basic additives, *Pharm. Res.*, **17**, 350-356 (2000).
24. Schwendeman, S. P., Shenderova, A., Zhu, G. and Jiang, W., Stability of encapsulated substances in poly(lactide-co-glycolide) delivery systems, in *Handbook of Pharmaceutical Controlled Release Technology*, D. Wise (ed.), Dekker (New York), 2000.
25. Marinina, J., Shenderova, A., Mallery, S. R. and Schwendeman, S. P., Stabilization of vinca alkaloids encapsulated in poly(lactide-co-glycolide) microspheres, *Pharm. Res.*, **17**, 677-683 (2000).
26. Jiang, W. and Schwendeman, S. P., Formaldehyde-mediated aggregation of formalinized antigens: comparison of untreated and formalinized model protein antigens, *Biotech. Bioeng.*, **70**, 507-517 (2000).
27. Mallery, S. R., Pei, P., Kang, J., Zhu, G., Ness, G. M. and Schwendeman S. P., Sustained angiogenesis enables in vivo transplantation of mucocutaneous derived AIDS-related Kaposi's sarcoma cells in murine hosts, *Carcinogenesis*, **21**, 1647-1653 (2000).
28. Mallery, S. R., Pei, P., Kang, J., Ness, G. M., Ortiz, R., Touhalisky, J. E. and Schwendeman, S. P., Controlled-release of doxorubicin from poly(lactide-co-glycolide) microspheres significantly enhances cytotoxicity against cultured AIDS-related Kaposi's sarcoma cells, *Anticancer Res.*, **20**, 2817-2825 (2000).
29. Frangione-Beebe, M., Albrecht, B., Dakappagari, N., Rose, R. T., Brooks, C. L., Schwendeman, S. P., Lairmore, M. D. and Kaumaya, P. T. P., Enhanced immunogenicity of a conformational epitope of human T-lymptropic virus type 1 using a novel chimeric peptide, *Vaccine*, **19**, 1068-1081 (2000).

30. Jiang, W. and Schwendeman, S. P., Stabilization and controlled release of bovine serum albumin encapsulated in poly(lactide) and poly(ethylene-glycol) microsphere blends, *Pharm. Res.*, **18**, 878-885 (2001).
31. Frangione-Beebe, M., Rose, R. T., Kaumaya, P. T. P. and Schwendeman, S. P., Microencapsulation of a synthetic peptide epitope for HTLV-1 in biodegradable poly(D, L-lactide-co-glycolide) microspheres using a novel encapsulation technique, *J. Microencapsulation*, **18**, 663-677 (2001).
32. Jiang, W. and Schwendeman, S. P., Stabilization of a model formalinized protein antigen encapsulated in PLGA-based microspheres, *J. Pharm. Sci.*, **90**, 1558-1569 (2001).
33. Cui, C. and Schwendeman, S. P., Surface-entrapment of polylysine in poly(lactide-co-glycolide) microparticles, *Macromolecules*, **34**, 8426-8433 (2001).
34. Kang, J. and Schwendeman, S. P., Comparison of the effects of Mg(OH)₂ and sucrose on the stability of bovine serum albumin encapsulated in poly(D,L-lactide-co-glycolide) implants, *Biomaterials*, **23**, 239-245 (2002).
35. Schwendeman, S. P., Recent advances in the stabilization of proteins encapsulated in injectable PLGA delivery systems, *Crit. Rev. Ther. Drug Carr. Sys.*, **19**, 73-98 (2002).
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93. Reinhold, S. and Schwendeman, S. P., A new method of preparing protein controlled release polymers, *AAPS Journal*, **10**, #6212 (2008).
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97. Devineni, D., Schwendeman, S. P. and Carpenter, J., Development of freeze-dried formulations for protein delivery by PLGA microspheres and millicylinders, AAPS National Biotechnology Conference, #2025 (2010).
98. Shah, R. and Schwendeman, S., Exploring a biomimetic approach for the delivery of growth factors, AAPS National Biotechnology Conference, #2009 (2010).
99. Holpuch, A. S., Desai, K. G., Phelps, M. P., Han, B., Schwendeman, S. P., Mallery, S. R., Evaluation of a fenretinide mucoadhesive patch for local intraoral delivery, *J. Dent. Res.*, **90**, #146204 (2011).
100. Milacic, V. and Schwendeman, S. P., Protein release behavior of injectable implants prepared from PLGA-PEG block copolymers and PLGA/PLGA-PEG blends, CRS Meeting, #830 (2011).

101. Desai, K.-G., Sophocleous, A. M., Mazzara, J. M., Tong, L., Cheng, J., Olsen, K. F. and Schwendeman, S. P., Leuprolide sorption to PLGA-COOH provides controlled in vitro-in vivo peptide release: a new and facile approach to prepare low-cost injectable depots, CRS Meeting, #253 (2011).
102. Liu, Y. and Schwendeman, S., Mapping microclimate pH inside protein-encapsulated PLGA microspheres using confocal laser scanning microscopy, AAPS Meeting, #1184 (2011).
103. Desai, K. G. H. and Schwendeman, S. P. Aqueous-based microencapsulation of tetanus toxoid in PLGA microspheres: a new and facile approach for controlled release of vaccine antigens, AAPS National Biotechnology Conference, #2006 (2012).
104. Mazzara, J. M., Self-healing kinetics of microneedle-formed holes in PLGA films, CRS Meeting, #204 (2012).
105. Shah, R. and Schwendeman, S. P., A biomimetic approach to active self-healing microencapsulation of proteins in PLGA, AAPS Meeting, #3143 (2012)
106. Liu, Y., Ghassemi, A., Hennink, W. and Schwendeman, S. P., Investigation of the pH distribution kinetics in degrading microspheres in hydrophilic poly(D,L-lactide-co-hydroxymethyl glycolide) and PLGA by confocal laser scanning microscopy, AAPS Meeting, #2008 (2012).
107. Bailey, B. and Schwendeman, Desai, K. G. and Schwendeman, S. P., Self-healing microencapsulation of vaccine antigens in small PLGA microspheres, AAPS Meeting, #4219 (2012).
108. Schwendeman, S. P., Desai, K. H. and Mazzara, J. M., Aqueous microencapsulation of large molecules in PLGAs, CRS Meeting, #9 (2013).

Invited Lectures

1. Iontophoretic drug delivery through polymer membranes, Dow Corning, Midland, Michigan (2/92).
2. Slow-release systems for tetanus vaccine, Meeting of the Programme for Vaccine Development, The World Health Organization, Geneva, Switzerland (3/93).
3. Study on stabilizing tetanus toxoid for encapsulation in polylactic/glycolic acid microspheres, Meeting of the Working Group on Single-dose Tetanus Vaccines (WHO Global Programme for Vaccines and Immunization), The Food and Drug Administration, Bethesda, Maryland (2/95).
4. Development of clinically useful controlled release implants, Proctor & Gamble, Cincinnati, Ohio (2/96).
5. Development of clinically useful controlled release implants, Mitsubishi Kasei Corp., Kashima, Japan (7/96).
6. Development of clinically useful controlled release implants, Suntory Limited, Gunma, Japan (7/96).

7. Stability of protein antigens in biodegradable polymer microspheres, Colorado Biopharmaceutical Delivery Conference, Breckenridge, CO (7/97).
8. Stability of proteins in injectable PLGA delivery systems, Scios, Inc., Mountain View, CA (5/98).
9. Stability of proteins in injectable PLGA delivery systems, Alkermes, Inc., Boston, MA (7/98).
10. Stability of proteins in injectable PLGA delivery systems, ETH Zürich, Zürich. Switzerland (7/98).
11. Effect of microclimate and formulation on protein stability in injectable PLGA devices, Biopharm Conference East and West, Framingham, MA (East) and San Francisco, CA (West) (6/99).
12. Stabilization of proteins encapsulated in PLGA delivery systems, Baxter, Deerfield, IL (11/00).
13. Stabilization of proteins encapsulated in PLGA delivery systems, Novartis, Basel, Switzerland (11/00).
14. Stability of protein antigens encapsulated in PLGA microspheres, 28th International Symposium on Controlled Release of Bioactive Materials, San Diego, CA (6/01).
15. Stabilization of proteins encapsulated in PLGA delivery systems, Allergan, Irvine, CA (6/01).
16. New trends in PLGA microspheres, PARTICLES 2002, Orlando, FL (4/02).
17. New trends in PLGA microspheres, Shanghai Pharmaceutical Association, Shanghai, China (5/02).
18. New trends in PLGA microspheres, Secondary Military Medical University and Chinese Pharmaceutical Association, Shanghai, China (5/02).
19. Stability of proteins encapsulated in PLGA delivery systems, AAPS Conference on Advances in Pharmaceutical Processing, Parsippany, NJ (6/03).
20. Microclimate pH in poly(lactic-co-glycolic acid) and its effect on the stability of encapsulated proteins, Polymers for Advanced Technologies, ACS Division of Polymer Chemistry, Ft. Lauderdale, FL (9/03).
21. Beyond peptide delivery: meeting the challenges to control the release of biomacromolecules, Johnson & Johnson, Somerville, NJ (10/03).

22. Stabilization of proteins encapsulated in d,l-PLGA star polymer: characterization and potential solutions to stability and release issues, Novartis, Basel, Switzerland (10/03).
23. Beyond peptide delivery: meeting the challenges to control the release of biomacromolecules, University of Nebraska Health Sciences Center, Omaha, NE (12/03).
24. Beyond peptide delivery: meeting the challenges to control the release of proteins, Eighth European Symposium on Controlled Drug Delivery, Noordwijk aan Zee, The Netherlands (4/04).
25. Beyond peptide delivery: meeting the challenges to control the release of proteins, Conor Medsystems, Menlo Park, CA (5/04).
26. Beyond peptide delivery: meeting the challenges to control the release of proteins, The International Workshop on Pharmaceutics, Hangzhou, China (5/04).
27. Improving the stability of PLGA-encapsulated proteins, 31st International Symposium on Controlled Release of Bioactive Materials, Honolulu, HI (6/04).
28. Protein stability in poly(lactic-co-glycolic acid) delivery systems, 18th Symposium of the Protein Society, San Diego, CA (8/04).
29. Stabilization of proteins encapsulated in PLGA delivery systems, AAPS Annual Meeting and Exposition, Baltimore, MD (11/04).
30. New Trends in poly(lactic-co-glycolic acid) systems for delivery of biomacromolecules, AAPS Annual Meeting and Exposition, Baltimore, MD (11/04).
31. Beyond peptide delivery: meeting the challenges to control the release of proteins, Medtronic, Minneapolis, MN (11/04).
32. Formulation challenges to protein and peptide delivery from polymers, 32nd International Symposium on Controlled Release of Bioactive Materials, Miami, FL (6/05).
33. Stability of proteins encapsulated in poly(lactic-co-glycolic acid) delivery systems, Sociedade Brasileira de Bioquímica e biologia Molecular (SBBq) XXXIV Annual Meeting, Águas de Lindóia, Sp, Brazil (7/05).
34. Beyond peptide delivery: meeting the challenges to control the release of proteins, Pfizer, Groton, CN (7/05).
35. Improving the stability of PLGA-encapsulated growth factors, 2005 Biomedical Engineering Society (BMES) Meeting, Baltimore, MD (9/05).

36. Beyond peptide delivery: meeting the challenges to control the release of proteins, Conor Medsystems, Menlo Park, CA (9/05).
37. Beyond peptide delivery: meeting the challenges to control the release of proteins, U.S. Government's Science and Technical Expert Partnership (STEP) workshop entitled "Novel BioDelivery Technologies," The Mitre Corp., McLean, VA (3/06).
38. Beyond peptide delivery: meeting the challenges to control the release of proteins, Merck, West Point, PA (7/06).
39. Protein stability in PLGA, Short Course for the Controlled Release Society, Vienna, Austria (7/06).
40. Overcoming barriers to protein delivery with minimally invasive controlled release depots, 13th international symposium on recent advances in drug delivery systems, Salt Lake City, Utah (2/07).
41. Beyond peptide delivery: meeting the challenges to control the release of proteins, INSERM U563, Toulouse, France (3/07).
42. Beyond peptide delivery: meeting the challenges to control the release of proteins, CNRS, Toulouse, France (3/07).
43. Injectable biodegradable polymer depots for delivery of peptides and proteins, Amylin, La Jolla, CA (4/07).
44. Injectable biodegradable polymer depots for minimally invasive delivery of peptides and proteins, 20th American Peptide Society Symposium, Montreal, Canada (6/07).
45. Beyond peptide delivery: meeting the challenges to control the release of proteins, Genentech, South San Francisco, CA (7/07).
46. Stabilization and controlled release of proteins from poly(lactic-co-glycolic acid), ETH Zürich, Zürich, Switzerland (7/07).
47. New developments in poly(lactic-co-glycolic acid) delivery systems for peptides and proteins, University of Utrecht, Utrecht, Netherlands (4/08).
48. Overcoming barriers to development of injectable peptide and protein delivery depots, 2nd LTS Academy Meeting, West Caldwell, NJ (5/08).
49. Beyond peptide delivery: improving the controlled release of proteins, KIST and Korea University, Seoul, Korea (9/08).
50. Beyond peptide delivery: improving the controlled release of proteins, 2008 Korean Controlled Release Society Meeting, Jeju Island, Korea (9/08).

51. Rescue of murine ischemic hindlimbs with bFGF/VEGF delivery from pH-modified PLGA implants, 3rd International Conference on Tissue Engineering (Aegean Conferences), Rhodes, Greece (9/08).
52. Beyond peptide delivery: improving the controlled release of proteins, Wayne State University, Detroit, MI (3/09).
53. Poly(lactic-co-glycolic acid) delivery systems for peptides and proteins, Univ. of Colorado Health Sciences Center, Denver, CO (4/09).
54. Self-microencapsulation of large molecules without organic solvents, Purdue University, West Lafayette, IN (10/09).
55. Self-microencapsulation of large molecules without organic solvents, University of Nebraska Health Sciences Center, Omaha, NE (10/09).
56. Self-microencapsulation of large molecules without organic solvents, Wayne State University, Detroit, MI (12/09).
57. Shifting paradigms of controlled peptide and protein delivery, University of Pennsylvania, Philadelphia, PA (3/10).
58. Shifting paradigms of controlled peptide and protein delivery, Purdue University, West Lafayette, IN (4/10).
59. Advances in PLGA microsphere antigen delivery, Adjuvant 2010, Trinidad, Cuba (5/10).
60. Self-healing microencapsulation of large molecules without organic solvents, Genentech, South San Francisco, CA (7/10).
61. Injectable biodegradable polymer depots for minimally invasive delivery of peptides and proteins, Novo Nordisk, Copenhagen, Denmark (3/11).
62. Microsphere drug delivery systems for biologics—key challenges in drug loading and sustained release, AAPS Workshop - 46th Annual Ardent Conference: Pharmaceutical Development of Biologics: Fundamentals, Challenges, and Recent Advances, West Point, NY (3/11)
63. New injectable depots for controlled release of peptides and proteins, School of Pharmacy and Pharmaceutical Sciences, University of California at San Diego, San Diego, CA (4/11).
64. Self-microencapsulation of large molecules without organic solvents, 38th Annual Meeting and Exposition of the Controlled Release Society, National Harbor, MD (8/11).

65. New approaches for polymer delivery of vaccine antigens and therapeutic large molecules, Takeda, Deerfield, IL (8/11).
66. Microencapsulation of biomacromolecules in PLGA without organic solvents, Department of Pharmaceutical Chemistry, University of Kansas, Lawrence, KS (9/11).
67. Microencapsulation of biomacromolecules in PLGA without organic solvents, Department of Pharmaceutics and Pharmaceutical Chemistry, University of Utah, Salt Lake City, UT (1/12).
68. Development of design criteria for mucoadhesive polymer excipients for use in nasal drug formulations, Dow Chemical Co., Midland, MI (2/12).
69. Microencapsulation of biomacromolecules in PLGA without organic solvents, The 6th International Symposium on Intelligent Drug Delivery System, Seoul, South Korea (3/12).
69. Controlled release from PLGA: Short Course, Allergan, Irvine, CA (4/12).
70. Microencapsulation of biomacromolecules in PLGA without organic solvents, Dept. of Chemical Engineering, Northwestern University, Evanston, IL (5/12).
71. Microencapsulation of biomacromolecules in PLGA without organic solvents, Dept. of Pharmacy, University of Copenhagen, Copenhagen, Denmark (5/12).
72. Aqueous-based microencapsulation of biomacromolecules in PLGA, School of Pharmacy, Shanghai Jiao Tong University, Shanghai, China (10/12).
73. Aqueous-based microencapsulation of biomacromolecules in PLGA, School of Pharmacy, East China University Science and Technology, Shanghai, China (10/12).
74. Aqueous-based microencapsulation of biomacromolecules in PLGA, School of Pharmacy, Shanghai Second Medical University, Shanghai, China (10/12).
75. Aqueous-based microencapsulation of large molecules in PLGA, School of Pharmacy, Texas Tech University, Amarillo, TX (10/12).
76. Novel approaches to extend the duration of action of peptides and proteins, Endocrine Division, University of Michigan Medical School, Ann Arbor, MI (3/13).
77. Microencapsulation of biomacromolecules in PLGA without organic solvents, WE-Heraeus Seminar Series, Advanced Functional Polymers, Bad-Honnef, Germany (5/13).

78. Microencapsulation of biomacromolecules in PLGA without organic solvents, Dept. of Bioeng., Imperial College of London, London, UK (5/13).
79. Long-term controlled drug delivery: past and future perspectives, Keynote Lecture/39th International Aldosterone Congress, San Francisco, CA (6/13).
80. Aqueous microencapsulation of large molecules in PLGAs, 40th Annual Meeting and Exposition of the Controlled Release Society, Honolulu, HI (7/13).
81. Porous Healing PLGA Particles for Large Molecule Delivery, 10th International Conference and Workshop on Biological Barriers, Swaarbruecken, Germany (2/14).
82. Basic concepts in development of PLGA dosage forms, Modified Release Symposium, Amgen, Thousand Oaks, CA (3/14).
83. Microencapsulation of large molecules in PLGA without organic solvents, Modified Release Symposium, Amgen, Thousand Oaks, CA (3/14).
84. Microencapsulation of large molecules in PLGA without organic solvents, University of Wisconsin School of Pharmacy, Madison, WI (4/14).
85. Physical-chemical factors relevant for PLGA delivery of large molecules, Monash School of Pharmacy, Melbourne, Australia (4/14).
86. Microencapsulation of large molecules in PLGA without organic solvents, University of Queensland Dept of Chemistry, Brisbane, Australia (4/14).

Conference Presentations

1. Schwendeman, S. P., Amidon, G. L., Meyerhoff, M. E. and Levy, R. J., Characterization of the iontophoretic transport through heterogeneous cation-exchange membranes, AAPS Fifth Annual Meeting and Exposition, Las Vegas, NV (11/90).
2. Schwendeman, S. P., Levy, R. J., Murphy, H. A. and Amidon, G.L., Influence of the silicone rubber matrix on the iontophoretic transport through heterogeneous cation-exchange membranes, AAPS Sixth Annual Meeting and Exposition, Washington, DC (11/91).
3. Schwendeman, S. P., Amidon, G. L. and Levy, R. J., Modulatable drug release using iontophoresis through heterogeneous cation-exchange membranes, AAPS Sixth Annual Meeting and Exposition, Washington, DC (11/91).
4. Schwendeman, S. P., Amidon, G. L., Labhasetwar, V. and Levy, R. J., Modulated release of d-sotalol using iontophoresis through heterogeneous cation-exchange

- membranes, 19th International Symposium on Controlled Release of Bioactive Materials, Orlando, FL (6/92).
5. Schwendeman, S. P., Amidon, G. L. and Levy, Modulated release of antiarrhythmics by iontophoresis through polymer membranes, AAPS Seventh Annual Meeting and Exposition, San Antonio, TX (11/92).
 6. Schwendeman, S. P., Gupta, R. K., Costantino, H. R., Siber, G. R. and Langer, R., Stability of tetanus vaccine for encapsulation in bioerodible polymer microspheres, AAPS Eighth Annual Meeting and Exposition, Orlando, FL (11/93).
 7. Schwendeman, S. P., Lee, J. H., Gupta, R. K., Costantino, H. R., Siber, G. R., and Langer, R., Inhibition of moisture-induced aggregation of tetanus toxoid by protecting thiol groups, 21st International Symposium on Controlled Release of Bioactive Materials, Nice, France (7/94).
 8. Schwendeman, S. P., Costantino, H. R., Gupta, R. K., Tobio, M., Chang, A., Alonso, M. J., Siber, G. R. and Langer, R., Strategies for stabilizing tetanus toxoid for the development of a single-dose tetanus vaccine, Progress on the Stability of Vaccines, WHO Headquarters, Geneva, Switzerland (5/95).
 9. Schwendeman, S. P., Costantino, H. R., Gupta, R. K., Siber, G. R. and Langer, R., Mechanisms of moisture-induced aggregation of tetanus toxoid, 22nd International Symposium on Controlled Release of Bioactive Materials, Seattle, WA (7/95).
 10. Schwendeman, S. P., Gupta, R. K., Siber, G. R. and Langer, R., Pathways of inactivation of tetanus toxoid in the presence of polylactide 2000, AAPS Tenth Annual Meeting and Exposition, Miami, FL (11/95).
 11. Schwendeman, S. P. and Schwendeman, D. W., Integrated nonsteady-state Nernst-Planck equations describe iontophoretic drug transport through ion-exchange membranes, 23rd International Symposium on Controlled Release of Bioactive Materials, Kyoto, Japan (7/96).
 12. Shenderova, A., Burke, T. G. and Schwendeman, S. P., Characterization of the microclimate in PLGA microspheres with a camptothecin probe, AAPS Eleventh Meeting and Exposition, Seattle, WA (10/96).
 13. Zhu, G., Mallery, S. R., Clark, Y. M., Shenderova, A. and Schwendeman, S. P., Stabilization of proteins encapsulated in injectable poly(lactide-co-glycolide) delivery vehicles, 27th Annual Meeting of the AADR, Minneapolis, MN (3/98).
 14. Wang, J. and Schwendeman, S. P., Mechanisms of solvent evaporation encapsulating processes: predicting solvent evaporation rate, 25th International Symposium on Controlled Release of Bioactive Materials, Las Vegas, NV (6/98).

15. Zhu, G., Mallery, S. R., Clark, Y. M., Shenderova, A. and Schwendeman, S. P., Stabilization of proteins encapsulated in injectable poly(lactide-co-glycolide) delivery vehicles, Gordon Research Conference on Orthopedics and Bioengineering, Proctor Academy, NH (7/98).
16. Zhu, G. and Schwendeman, S. P., Stabilization of proteins encapsulated in PLGA microspheres by adjusting polymer microclimate pH, 27th International Symposium on Controlled Release of Bioactive Materials, Paris, France (7/00).
17. Jiang, W. and Schwendeman, S. P., Effect of excipients on the structure, antigenicity and aggregation of tetanus toxoid, 28th International Symposium on Controlled Release of Bioactive Materials, San Diego, CA (6/01).
18. Jiang, W. and Schwendeman, S. P., Mechanisms of histidine inhibition of tetanus toxoid aggregation, 28th International Symposium on Controlled Release of Bioactive Materials, San Diego, CA (6/01).
19. Cui, C., Stevens, V. S. and Schwendeman, S. P., Enhanced immunogenicity of a synthetic human chorionic gonadotropin peptide antigen from encapsulated & surface-conjugated PLGA microspheres, 29th International Symposium on Controlled Release of Bioactive Materials, Seoul, Korea (7/02).
20. Kang, J. and Schwendeman, S. P., Determination of diffusion coefficient in PLGA microspheres by laser scanning confocal microscopy, 29th International Symposium on Controlled Release of Bioactive Materials, Seoul, Korea (7/02).
21. Jiang, W. and Schwendeman, S. P., Stabilization of tetanus toxoid encapsulated in PLGA microspheres, 29th International Symposium on Controlled Release of Bioactive Materials, Seoul, Korea (7/02).
22. Cui, C. and Schwendeman, S. P., Stability of a synthetic human chorionic gonadotropin (hCG) antigen in PLGA microspheres, AAPS Annual Meeting and Exposition, Toronto, Canada (11/02).
23. Cui, C., Kershaw, K. and Schwendeman, S. P., Surface-entrapment of heparin in PLGA, 30th International Symposium on Controlled Release of Bioactive Materials, Glasgow, Scotland (7/03).
24. Ding, A. G. and Schwendeman, S. P., Predicting acidic microclimate pH in thin poly(lactide-co-glycolide) 50/50 films., 30th International Symposium on Controlled Release of Bioactive Materials, Glasgow, Scotland (7/03).
25. Lai, L. and Schwendeman, S. P., Optimization of stability and release of bovine serum albumin encapsulated in base-neutralized PLGA millicylinders, AAPS Annual Meeting and Exposition, Salt Lake City, UT (11/03).

26. Kang, J. and Schwendeman, S. P., Dynamics of the transition between open and isolated pores in PLGA and its effect on the controlled release of Proteins, 31st International Symposium on Controlled Release of Bioactive Materials, Honolulu, HI (6/04).
27. Zhong, Y., Ding, A. G., Zhu, G., Pei, P., Chen, R., Mallery, S. R., Mooney, D. J. and Schwendeman, S. P., Stabilization of basic fibroblast growth factor encapsulated in injectable PLGA implants enhances angiogenesis in vivo, 32nd International Symposium on Controlled Release of Bioactive Materials, Miami, FL (6/05).
28. Zhang, L. and Schwendeman, S. P., Controlled release of angiogenic growth factors from poly(lactide-co-glycolide) implants for therapeutic angiogenesis AAPS Annual Meeting and Exposition, Atlanta, GA (11/08).
29. Aqueous remote loading of protein therapeutics in PLGA microspheres, 5th FIP Pharmaceutical Sciences World Congress, Melbourne, Australia (4/14).
30. Importance of Regulatory Research Funding for Long Acting Release (LAR) Drug Products, FDA Public Forum, FDA, Silver Spring, MD (5/14).

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