

WENDY A. SMITH

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EDUCATION

Duke University, Durham, North Carolina (Ph.D., Zoology)
New College, Sarasota, Florida (A.B., Biology)

EMPLOYMENT HISTORY

2010-12;13-15;16-present Associate Chair, Dept. Biology, Northeastern University
2012-2013; 2015-2016 Interim Chair, Dept. Biology, Northeastern University
1991-present Associate Professor, Dept. Biology, Northeastern University
2009-2012 Director, Bioinformatics M.S. Program, Northeastern University
2008-2012 Graduate Coordinator, Dept. Biology, Northeastern University
1998-1999 Interim Associate Vice Provost for Undergraduate Education,
Northeastern University
1985-1991 Assistant Professor, Dept. Biology, Northeastern University
<1985 Postdoctoral Fellow, Dept. Biology, Univ. of N. Carolina
(Advisor: Dr. Lawrence I. Gilbert)
Postdoctoral Fellow, Dept. Pharmacology, Duke Univ. Med. School
(Advisor: Dr. P. Michael Conn)

HONORS

2006 Northeastern University Excellence in Teaching Award (1 of 2 Awards in 2006)
1992-1995 College of Arts + Sciences Distinguished Associate Professor

PUBLICATIONS

h-index = 22; i10-index = 37 <http://scholar.google.com/citations?user=rStfsDoAAAAJ&hl=en>

REFEREED ARTICLES (‡N.U. graduate student author; *N.U. undergraduate author)

1. Rosengaus, R., *Hays, N., *Biro, C., *Kemos, J., *Zaman, M., *Murray, J., *Gezahegn, B., **Smith, W.** (2017) Pathogen-induced maternal effects result in enhanced immune responsiveness across generations. *Ecology and Evolution*. 7(9): 2925–2935.
<http://dx.doi.org/10.1002/ece3.2887>
2. Kanost, M. R., Arrese, E. L., Cao, X., Chen, Y. R.,... (multiple authors including **Smith, W.A.**) (2016) Multifaceted biological insights from a draft genome sequence of the tobacco hornworm moth, *Manduca sexta*. *Insect Biochemistry and Molecular Biology* 76:118-47.
<http://dx.doi.org/10.1016/j.ibmb.2016.07.005>
3. Schwartz, L., Brown, C., McLaughlin, K., **Smith, W.**, and Bigelow, C. (2016) The myonuclear domain is not maintained in skeletal muscle during either atrophy or programmed cell death. *American Journal of Physiology* 311: C607-C615.
<http://dx.doi.org/10.1152/ajpcell.00176.2016>

4. ‡Delalio, L., and Smith, W.A. (2015) Direct effects of hypoxia and nitric oxide on ecdysone secretion by insect prothoracic glands. *Insect Biochemistry and Molecular Biology* 76: 56–66, <http://dx.doi.org/10.1016/j.jinsphys.2015.02.009>
5. Cheng, C.C., Ko, A., Chaieb, L., Koyama, T., Mirth, C.K., **Smith, W.A.**, and Suzuki, Y. (2014) The POU factor Ventral veins lacking/Drifter modulates ecdysone and juvenile hormone signaling to influence the timing of metamorphosis. *PLoS Genetics* 10(6): e1004425. <http://dx.doi.org/10.1371/journal.pgen.1004425>
6. **Smith, W.A.**, *Lamattina, A., and *Collins, M. (2014) Insulin signaling pathways in lepidopteran ecdysone secretion. *Frontiers in Physiology* 5:19. <http://dx.doi.org/10.3389/fphys.2014.00019>
7. Kemirembe, K., Liebmann, K., *Bootes, A., **Smith, W. A.**, and Suzuki, Y. (2012) Amino acids and TOR signaling promote prothoracic gland growth and the initiation of larval molts in the tobacco hornworm, *Manduca sexta*. *PLoSOne* 7 (9), e44429 <http://dx.doi.org/10.1371/journal.pone.0044429>
8. ‡Walsh A. L, and **Smith W.A.** (2011) Nutritional sensitivity of fifth instar prothoracic glands in the tobacco hornworm, *Manduca sexta*. *Journal of Insect Physiology* 57: 809-18. <http://dx.doi.org/10.1016/j.jinsphys.2011.03.009>
9. Myer A., Mason H. A., **Smith W.**, Brown C., Schwartz L. M. (2009) Differential control of cell death and gene expression during two distinct phases of hormonally-regulated muscle death in the tobacco hawkmoth *Manduca sexta*. *Journal of Insect Physiology* 55: 314-320. <http://www.sciencedirect.com/science/article/pii/S0022191008002746>
10. Nijhout, H. F., **Smith, W. A.**, Schahar, I., ‡Subramanian, S., Tobler, A., Grunert, L.W. (2007) The control of growth and differentiation of the wing imaginal disks of *Manduca sexta*. *Developmental Biology* 302: 569-576. <http://dx.doi.org/10.1016/j.ydbio.2006.10.023>
11. ‡Priester, J., and **Smith, W. A.** (2005) Inhibition of tyrosine phosphorylation blocks hormone-stimulated calcium influx in an insect steroidogenic gland. *Molecular and Cellular Endocrinology*. 229:185-92. <http://dx.doi.org/10.1016/j.mce.2004.07.002>
12. **Smith, W.**, ‡Priester, J., and *Morais, J. (2003) PTTH-stimulated ecdysone secretion is dependent upon tyrosine phosphorylation in the prothoracic glands of *Manduca sexta*. *Insect Biochem. Mol. Biol.* 33: 1317-1325. <http://dx.doi.org/10.1016/j.ibmb.2003.06.003>
13. Gilbert, L.I., Rybczynski, R., Song, Q., Mizoguchi, A., *Morreale, R., **Smith, W. A.**, Matubayahsi, H., Shionoya, M., Nagata, S., and Kataoka, H. (2000) Dynamic regulation of prothoracic gland ecdysteroidogenesis: *Manduca sexta* recombinant prothoracicotropic hormone and brain extracts have identical effects. *Insect Biochemistry and Molecular Biology* 30: 1079-1089. [http://dx.doi.org/10.1016/S0965-1748\(00\)00083-7](http://dx.doi.org/10.1016/S0965-1748(00)00083-7)
14. **Smith, W. A.**, ‡Koundinya, M., McAllister, T., and *Brown, A. (1997) An insulin receptor-like tyrosine kinase in the tobacco hornworm, *Manduca sexta*. *Archives of Insect Biochemistry and Physiology* 35: 99-110.
15. Watson, R. D., ‡Ackerman-Morris, S., **Smith, W. A.**, Watson, C., and Bollenbacher, W. E. (1996) Involvement of microtubules in prothoracicotropic hormone-stimulated ecdysteroidogenesis by insect (*Manduca sexta*) prothoracic glands. *Journal of Experimental Zoology* 276: 63-69.
16. ‡Girgenrath, S., and **Smith, W. A.** (1996) Investigation of presumptive mobilization pathways for calcium in the steroidogenic action of big PTTH. *Insect Biochemistry and Molecular Biology* 26: 455-463.

17. **Smith, W. A.**, ‡Varghese, A. H., ‡Healy, M. S., and Lou, K. J. (1996) Cyclic AMP is a requisite messenger in the action of big PTTH in the prothoracic glands of pupal *Manduca sexta*. *Insect Biochemistry and Molecular Biology* 26: 161-170.
18. **Smith, W. A.** (1995) Regulation and consequences of cellular changes in the prothoracic glands of *Manduca sexta* during the last larval instar: A review. *Archives of Insect Biochemistry and Physiology* 30: 271-293.
19. **Smith, W. A.** (1993) Second messengers and the action of PTTH in *Manduca sexta*. *American Zoologist* 33: 330-339.
20. **Smith, W. A.**, ‡Varghese, A. H., and Lou, K. J. (1993) Developmental changes in cyclic AMP-dependent protein kinase associated with increased secretory capacity of *Manduca sexta* prothoracic glands. *Molecular and Cellular Endocrinology* 90: 187-195.
21. ‡Keightley, D., and **Smith, W. A.** (1990) Involvement of translation and transcription in insect steroidogenesis. *Molec. Cell. Endocrinol.* 74: 229-237.
22. **Smith, W. A.**, and Sedlmeier, D. (1990) Neurohormonal control of ecdysone production: comparison of insects and crustaceans. *J. Invert. Repr. Develop.* 18: 77-89.
23. **Smith, W. A.**, and Gilbert, L. I. (1989) Early events in peptide-stimulated ecdysteroid secretion by the prothoracic glands of *Manduca sexta*. *J. Exp. Zool.* 252: 264-270.
24. **Smith, W. A.**, and *Pasquarello, T. J. (1989) Developmental changes in phosphodiesterase activity and hormonal response in the prothoracic glands of *Manduca sexta*. *Molecular and Cellular Endocrinology* 63: 239-246.
25. Meller, V. H., Combest, W. L., **Smith, W. A.**, and Gilbert, L. I. (1988) A calmodulin-sensitive adenylate cyclase in the prothoracic glands of *Manduca sexta*. *Molecular and Cellular Endocrinology* 59: 67-76.
26. Gilbert, L. I., Combest, W. L., **Smith, W. A.**, Meller, V. H., and Rountree, D. B. (1988) Neuropeptides, second messengers, and insect molting. *Bioessays* 8: 153-158.
27. **Smith, W. A.**, Combest, W. L., and Gilbert, L. I. (1986) Involvement of cAMP-dependent protein kinase in prothoracicotropic hormone-stimulated ecdysone synthesis. *Molecular and Cellular Endocrinology* 47: 25-33.
28. **Smith, W. A.**, Watson, R. D., Gilbert, L. I., and Bollenbacher, W. E. (1986) The steroidogenic action of haemolymph stimulatory factor in *Manduca sexta*: Comparison with prothoracicotropic hormone. *Insect Biochemistry* 16: 781-787.
29. **Smith, W. A.**, and Gilbert, L. I. (1986) Cellular regulation of ecdysone synthesis by the prothoracic glands of *Manduca sexta*. *Insect Biochemistry* 16: 143-147.
30. **Smith, W. A.**, Bowen, M. F., Bollenbacher, W. E., and Gilbert, L. I. (1986) Cellular changes in the prothoracic glands of diapausing pupae of *Manduca sexta*. *Journal of Experimental Biology* 120: 131-142.
31. **Smith, W. A.**, Gilbert, L. I., and Bollenbacher, W. E. (1985) Calcium-cAMP interactions in the prothoracicotropic hormone stimulation of ecdysone synthesis. *Molecular and Cellular Endocrinology* 39: 71-78.
32. **Smith, W. A.**, Gilbert, L. I., and Bollenbacher, W. E. (1984) The role of cyclic AMP in the regulation of ecdysone synthesis. *Molecular and Cellular Endocrinology* 37: 285-294.
33. Bollenbacher, W. E., Granger, N. A., **Smith, W. A.**, and Gilbert, L. I. (1984) Neurohormonal regulation of molting and metamorphosis in the tobacco hornworm, *Manduca sexta*. In: *Biosynthesis, Metabolism, and Mode of Action of Invertebrate Hormones*. J. A. Hoffman and M. Porchet, Eds. Springer-Verlag: Heidelberg. pp. 78-91.

34. Warren, J. T., **Smith, W. A.**, and Gilbert, L. I. (1984) Simplification of the ecdysteroid RIA by the use of protein A from *Staphylococcus aureus*. *Experientia* 40: 393-394.
35. **Smith, W. A.**, and Conn, P. M. (1984) Microaggregation of the GnRH-receptor: relation to gonadotrope desensitization. *Endocrinology* 114: 553-559.
36. **Smith, W. A.**, and Conn, P. M. (1983) GnRH-mediated desensitization of the pituitary gonadotrope is not calcium-dependent. *Endocrinology* 112: 408-412.
37. **Smith, W. A.**, and H. F. Nijhout. (1983) In vitro stimulation of cell death in the molting glands of *Oncopeltus fasciatus* by 20-hydroxyecdysone. *Journal of Insect Physiology* 29: 169-176.
38. **Smith, W. A.**, Cooper, R. L., and Conn, P. M. (1982) Altered pituitary responsiveness to GnRH in middle-aged rats with 4-day estrous cycles. *Endocrinology* 111: 1843-1848.
39. **Smith, W. A.**, and Nijhout, H. F. (1982) Ultrastructural changes accompanying secretion and cell death in the molting glands of an insect (*Oncopeltus*). *Tissue and Cell* 14: 243-252.
40. **Smith, W. A.**, and Nijhout, H. F. (1982) Synchrony of juvenile hormone critical periods for internal and external development in last-instar larvae of *Oncopeltus fasciatus*. *Journal of Insect Physiology* 28: 797-803.
41. **Smith, W. A.**, and Nijhout, H. F. (1981) Effects of a juvenile hormone analog on the duration of the fifth instar in the milkweed bug, *Oncopeltus fasciatus*. *Journal of Insect Physiology* 27: 169-173.

BOOK CHAPTERS

42. **Smith, W.A.**, and Rybczynski, R. (2011) Prothoracicotropic hormone. In: Insect Endocrinology (L. I. Gilbert, editor), Academic Press, New York, pp. 1-62.
43. **Smith, W. A.**, Rountree, D.B., Bollenbacher, W.E., and Gilbert, L. I. (1987) Dissociation of prothoracic glands into hormone-responsive cells. In: Progress in Insect Neurochemistry and Neurophysiology, A. Borkovec and D. Gelman, eds. Humana Press: Clifton, NJ pp. 319-322.
44. **Smith, W. A.**, Rountree, D. B., Combest, W. L., and Gilbert, L. I. (1987) Neuropeptide control of ecdysone biosynthesis. In: Molecular Entomology, J. Law, ed. Alan R. Liss: New York. pp. 129-139.
45. **Smith, W. A.**, and Combest, W. C. (1985) Role of cyclic nucleotides in hormone action. In: Comprehensive Insect Physiology, Biochemistry, and Pharmacology (Vol. 8), G. Kerkut and L. I. Gilbert, eds. Pergamon: Oxford. pp. 263-299.
46. Conn, P. M., Bates, M. D., Rogers, D. C., Seay, S. G., and **Smith, W. A.** (1984) GnRH-receptor-effector-response coupling in the pituitary gonadotrope: a Ca²⁺-mediated system. In: The Role of Drugs and Electrolytes in Hormonogenesis. K. Fotherby and S. B. Pal, eds. Walter de Gruyter: Berlin. pp. 85-103.
47. **Smith, W. A.**, and Conn, P. M. (1983) Causes and consequences of altered gonadotropin secretion in the aging rat. In: Experimental and Clinical Interventions in Aging. R. F. Walker and R. C. Cooper, eds. Marcel Dekker: New York. pp. 3-26.

Ph.D. DISSERTATION

48. **Smith, W. A.** (1981) Hormonal regulation of cell death in the molting glands of the milkweed bug, *Oncopeltus fasciatus*. (Duke University)

CURRENTLY UNDER REVIEW

Sheel, A., Shao, R., Brown, C., Johnson, J., Hamilton, A., Sun, D., Oppenheimer, J., **Smith, W.**, Visconti, P., Markstein, M., Bigelow, C., and Schwartz, L. Acheron/larp6 is a novel survival protein that controls programmed cell death during development.

PRESENTATIONS AT MEETINGS (past 7 years)

1. Eastern Branch Entomological Society of America, Newport RI, March 18-21, 2017. *Gezahegn, B., *Hays, N., *Noonan, B., *Zaman, M., Smith W. Enhanced immune protein in the hemolymph of offspring of *Manduca sexta* mothers subjected to stress.
2. Eastern Branch Entomological Society Of America, Newport RI, March 18-21, 2017. Smith, W., Rosengaus, R., *Hays, N., *Zaman, M., *Winston, S., *Noonan, B., *Gezahegn, B., *Murray, J., *Ruditsky, A., and ‡Roesel, C. Maternal injury influences offspring gene expression and immune function in the tobacco hornworm *Manduca sexta*.
3. 75th Eastern New England Biological Conference, Suffolk University, Boston, MA, April 29, 2017. *Noonan, B., *Hays, N., *Gezahegn, B., *Thwin, K., *Ruditsky, A., *Ross, M., *Ramseyer, J., Smith, W., and Rosengaus, R. 2017. Investigation of transgenerational immune priming on bacterial clearance and immune protein regulation. (**AWARD sponsored by American Society of Biochemistry and Molecular Biology**)
4. 75th Eastern New England Biological Conference, Suffolk University, Boston, MA, April 29, 2017. *Zaman, M., *Winston, S., *Murray, J., *Hong, J., *Barnhart, J., Smith, W., and Rosengaus, R. 2017. Maternal injury in *Manduca sexta* demonstrates transgenerational influence on embryonic phenotype and gene expression.
5. National Conference for Undergraduate Research. Memphis, TN, April 8, 2017. *Gezahegn, G., *Murray, J., Rosengaus, R., and Smith, W. Enhanced immune-related protein in the hemolymph of offspring of *Manduca sexta* mothers subjected to stress.
6. International Congress of Entomology, Orlando, FL, September 26, 2016. Wendy Smith, Rebeca B. Rosengaus, Steve Vollmer, and ‡Chuck Roesel Molecular changes in *Manduca sexta* accompanying enhanced immune competency across generations.
7. Society of Integrative and Comparative Biology, Palm Beach, FL, January 2015. Smith, W.A., *MacArthur, J., *Siwak, J., *Stawnychy, M., ‡Subramanian, S. Ecdysteroid regulation of wing disc growth in *Manduca sexta*: Intersection with insulin signaling.
8. Entomological Society of America, Portland, OR, November 2014; Smith, W., Rosengaus, R., Vollmer, Transgenerational immunity in an insect model organism.
9. Society of Integrative and Comparative Biology, Austin, TX, January 2014; Ko, A., Cheng, C.C., Chaieb, L., Koyama, T., Mirth, C.K. Smith, W.A., and Suzuki, Y. The role of the POU factor Ventral veins lacking in the regulation of metamorphosis initiation.
10. Society of Integrative and Comparative Biology, San Francisco, CA, January 2013; ‡DeLalio, L., *Dion, S., *Bootes, A., Smith, W.A.: Direct effects of hypoxia and nitric oxide on the secretion of ecdysone by insect prothoracic glands.
11. Society of Integrative and Comparative Biology, Charleston, SC, January 2012; Kemirembe, K., Liebmann, K., Smith, W. A., and Suzuki, Y.: The effects of diet on the timing of larval molts in the tobacco hornworm, *Manduca sexta*.
12. Entomological Society of America, Knoxville, TN, November 2012; *Chancellor, A., Smith, W., Rosengaus, R. Transgenerational immunity in *Manduca sexta*.

13. Experimental Biology, Boston, 2011; *Olender, J., ‡Subramanian, S., Smith W. Effects of steroids on insulin signaling in a growing insect tissue. The FASEB Journal 25 (1 Supplement), 698.12
14. Northeastern's Research Expo/RISE: Members of my laboratory, including undergraduates, presented posters in 2007, 2008, 2009, 2010, 2011, 2012, 2013, and 2015

GRANTS AND FELLOWSHIPS

- 2017-2022 Howard Hughes Medical Institute
Northeastern Univ. Skills and Capacity for Inclusion (NU-SCI)
(\$1M direct costs, with Mary Jo Ondrechen as co-Director)
- 2015-2018 NSF REU Site
Biological Inquiry: from Molecules to Organisms
(\$336K direct+indirect costs, with Rebeca Rosengaus co-PI)
- 2013-2014 Northeastern University Tier 1 Research Award
An insect model for understanding the genetic basis of transgenerational immunity
(\$50K, with Rebeca Rosengaus, Steve Vollmer, Misha Sitkovsky)
- 1998-2004 NIH Research Grant; NIDDK R01 53392
Insect model for study of the insulin receptor
(\$626K direct+indirect costs)
- 1994-1997 USDA Research Grant, U.S. Department of Agriculture
A growth-factor-like mechanism of action for bombyxin in *Manduca sexta*
(\$180K direct+indirect costs)
- 1993 NIH Small Equipment Grant
(\$41K National Institutes of Health and \$11K Northeastern shared with 3 additional faculty members)
- 1986-1994 Research Grant, National Institutes of Health; NIDDK R01 37435, includes one competitive renewal
Regulation of endocrine cell response: An insect model
(\$947K direct+indirect costs)
- <1985 Postdoctoral Fellowship, National Institutes of Health
Predoctoral Fellowship, Cocos

TEACHING (past 7 years)

Cell and Molecular Biology (BIOL4707, formerly BIOL3407)

Semester (# students): **SP 17** (35), **FA 17** (33)

My objectives for this course stress utilization of primary literature to analyze and interpret data, postulate future studies, and remain informed beyond the classroom. The objective is reinforced by in-class activities, assignments, and assessments.

Cell Biology (BIOL2319) and Lab (BIOL2320) (formerly Regulatory Cell Biology)

Semester (# students): **SP 15** (35), **FA 13** (32), **SU 12** (39), **FA 11** (37), **SU 11** (32), **FA 10** (33)

I modified this class to include new labs, independent research projects, research "journal clubs" in the lab, and the use of clickers and other active learning techniques in the lecture. This course

was part of my regular teaching load during the academic year, and was taught for extra compensation in the summer.

Endocrinology (BIOL 5541)

Semester (# students): **SP 16** (11), **FA 16** (17), **SP 14** (28)

I re-designed this course from a strictly lecture format in the 1990's to an active class incorporating presentations and team-based case studies.

Topics in Cell Biology: Biology of Aging (BIOL7383) (new course)

Semester (# students): **SP 12** (13), **SP11** (5)

This graduate-level Topics class sprang from my familiarity with insulin-signaling and aging in invertebrate systems. However, the seminar was wide-ranging, using primary literature to study oxidative stress, cellular senescence, changes in hormonal and immune signaling, and other current theories of aging, in models from bacteria through humans.

Prior to 2007 my primary teaching responsibilities were Capstone in Biology, Entomology, Anatomy and Physiology, Regulatory Cell Biology, and various Graduate Research Seminars.

Recent Course and Curricular Innovation:

- Aided in the design and approval of new Cell and Molecular Biology major
- Oversaw curricular reform in accordance with the AAAS Vision and Change Report, including enhanced opportunities for research by all biology majors.
- Co-designed Capstone course for seniors in biology based on the integration of co-op work experience and academics (Experiential Education Capstone in Biology).
- As Graduate Coordinator (2006-2012), oversaw major changes in the Biology graduate curriculum, including development of new courses emphasizing graduate-level critical thinking and professional research skills.

SERVICE AND RECENT PROFESSIONAL DEVELOPMENT

Professional Service

2017-present Editorial Board, Archives of Insect Biochemistry and Physiology
(invited: March 2017)

2004-2007 Editorial Board, Journal of Experiment Zoology

2000 Member, NIH Tropical Medicine Ad Hoc Study Section

1999 Grant review panel NSF (Directorate of Undergraduate Education)

1991-1994 USDA National Research Initiative Grant Review Panel

1991-present Ad hoc proposal reviews for National Science Foundation (BIO Directorate)

1989-1995 Sigma Xi Grants-in-Aid of Research Committee

Professional Development

2017 REU Mentorship Workshop, University of Wisconsin (CIRTL)

2016 Northeastern University Research Mentoring Workshop

2013 National Academies Summer Institute on Undergraduate Education, Stony Brook, NY

2012 On-Line Course Design, Northeastern University CATLR (4 part series)