

Cynthia A. Leifer, PhD

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Department of Microbiology and Immunology
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EDUCATION

- 1993 BS, University of Maryland, College Park
2000 PhD, Weill Graduate School of Medical Sciences, Cornell University, New York City
Thesis Title: Heat shock protein 90 mediates macrophage responses to Taxol and bacterial lipopolysaccharide”

ACADEMIC AND PROFESSIONAL POSITIONS

- 2000-2002 Postdoctoral research associate, Laboratory of Retroviral Research, Center for Biologics Evaluation and Research, Food and Drug Administration
Research Focus: therapeutic activity of, and receptor for, CpG DNA
- 2002-2005 Postdoctoral research associate, Immune Targeting Section, Experimental Immunology Branch, National Cancer Institute, National Institutes of Health
Research Focus: Cell biology of the CpG DNA receptor Toll-like receptor 9
- 2005-2012 Assistant Professor, Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University
- 2012-present Associate Professor, Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University

AWARDS

- 1998 Vincent duVigneaud Award of Excellence, Annual Student Symposium at Weill Graduate School
1999 Vincent duVigneaud Prize, Annual Student Symposium at Weill Graduate School
Julian R. Rachele Award of Excellence for Best Paper by a Graduate Student, Weill Graduate School
2000 Distinguished Graduate Student Commencement Speaker, Weill Graduate School (2000)
2004 Outstanding Poster, Fellows and Young Investigators Retreat, National Cancer Institute (2004)
Fellows Award for Research Excellence, National Institutes of Health (2004)
2007 Professional Development Award, Cornell University ADVANCE Program (2007)
2009 AAI 2009 Junior Faculty Travel Award (2009)
Professional Development Award, Cornell University ADVANCE Program (2009)
2012 Pfizer Animal Health Award, Cornell University (2012)
2013 Phi Zeta Vet Honor Society, Honorary Member (2013)

Teaching Experience

TRAINING

Inaugural Provost's Seminar on Teaching (2013)

University-wide (nomination by the Dean) ½ day workshop on cognitive science and methodologies to improve classroom learning

Faculty Institute for Diversity (2014)

University-wide (nomination by the Dean) three-day workshop to discuss diversity, syllabus development, new pedagogical techniques, and networking

COURSES***BIOMS 3150 Basic Immunology (Undergraduate Course, offered every year)***

Enrollment 90-100 undergraduate and first year graduate students
2013 lecturer (7.5 hours)

VETMI 7050 Advanced Immunology Lectures (Graduate Course, offered on even years)

Enrollment 10-20 graduate and advanced undergraduate students
2006 lecturer (2 hours)
2008 course director and lecturer (13 hours)
2010 course director and lecturer (40 hours)
2012 course director and lecturer (25 hours)
2014 course director and lecturer (25 hours)

VETMI 7190 Immunology of Infectious Diseases (Graduate Course offered on odd years)

Enrollment 10-20 mainly graduate students
2009 lecturer (2 hours)
2011 lecturer (2 hours)
2013 lecturer (2 hours)

VTMED 5400 Foundation Course IV: Host, Agent, and Defense (foundation course of second-year veterinary curriculum)

Enrollment 90-110 veterinary students
2008 full-time tutor (47 hours), lecturer (2 hours), review sessions (3 hours)
2009 substitute small group tutor (6 hours), lecturer (2 hours)
2010 full-time tutor (52 hours), lecturer (4 ½ hours), review sessions (5 hours)
2011 substitute tutor (6 hours), lecturer (9 hours)
2012 lecturer (10 hours), substitute tutor (6 hours)
2013 lecturer (10 hours), substitute tutor (6 hours)

BIOMI 3210: The Normal Microbes of the Human Body in Health and Disease

Enrollment 50 undergraduates
2011 lecture (2 hours)
2012 lecture (2 hours)
2013 lecture (2 hours)
2014 lecture (2 hours)

VISITING PROFESSORSHIPS***University of Buffalo Biomedical Engineering 101***

2011 lecture (1.5 hours)

INSERM, France***Invited Course lecturer Ecole Normale Supérieure de Lyon, France***

2013 lecture

TRAINING OF SCIENTISTS***Thesis Committee member for Cornell University graduate students*****Major Advisor:**

Chia-hsin Ju (Comparative Biomedical Sciences 2006-2010, currently a post-doctoral fellow at Stanford)
James Brooks (Immunology 2006-2011, currently a scientist at a biotech company)
Sid Sinha (Molecular and Integrative Physiology 2012-2014 Master's degree)

Minor Advisor

Jin Leng (Immunology, 2008), MiJeong Kim (CBS, 2010), Susanne Moessmer (CBS, 2011), Norah Smith (Immunology, 2012), Weishan Huang (Pharmacology 2013), Lu Huang (Immunology and Infectious Diseases), Beth Licitra (DVM/PhD-CBS), Jennifer Cassano (CBS), Nora Springer (Immunology and Infectious Diseases), Philip Houtz (Entomology)

Rotation Student Advisor

Karen Hoelzer (CBS), Lisa Blum (Immunology), Philip Houtz (entomology), Nora Springer (CBS), Erika Gruber (CBS)

Undergraduate Students

Brenna Brady (2006, 2011 PhD University of Pennsylvania, currently post-doctoral fellow at NIH)
Erik Fisher (2008, Medical School Weill Cornell Medical College)
Diana Jiang (2012)
Clarice Lin (2012-present, SILS Undergraduate Research)
Alesandra Tomasi (2013-present)
Joseph Matagrano (2013)
Andrew Eng (2013-present)
HeeJin Cheon (2013-present, winner Biology Research Fellows Program, and SILS Undergraduate Research)
Drhumil Patel (2013)
Gregory Poorman (2013)
Nicholas Hatter (2013)
Justin Im (2014)

Postdoctoral and student trainingVeterinary Students

Catarina Ruksznis (2010 Veterinary Investigator Program, currently at Cornell College of Veterinary Medicine)
Jessica Brown (2011 Veterinary Leadership Summer Program, 2012 DVM Univ. of Georgia Veterinary School)
Molly Benner (2012 Veterinary Leadership Summer Program, currently at LSU college of Veterinary Medicine)
Emma Ehrlich (2014 Veterinary Leadership Summer Program)

Postdoctoral Fellows

Akiko Kimura (2006-2007, currently a physician in Japan)
Anna Chockalingam (2006-2011, in industry)
Maroof Hasan (2009-2011, currently a postdoctoral fellow at Univ. of Texas Southwestern)
William Rose (2009-2012, postdoctoral fellow Pfizer)
Chia-Hsin Ju (2011, currently a post-doctoral fellow at Stanford)

Research Associate

Fernando Botelho (2011-2013, seeking a position)

Faculty mentoring

Erica Behling-Kelly
Gerlinde Van derWalle
Katie Kelly

Part of group mentoring: Natasha Kuprios, Carolyn Sevier, Tracy Stokol, Erica Behling-Kelly, Motoko Mukai, Gerlinde Van derWalle

Service

COMMITTEE MEMBERSHIP

Graduate School

Field of Immunology Executive Committee (2006-2012)

College of Veterinary Medicine

Syllabus Committee (2009-2010)

Clinical Pathology Search Committee (2011)

Committee on the Status of Faculty Women (2011-present, Chair 2013)

Curriculum Design Group, Block IV Host, Agent, and Defense (2012-present)

College Research Council (2012-present, Co-chair 2014-present)

Anatomic Pathology Search Committee (2013)

CVM Diversity Committee (2013-)

Cornell University

Cornell University Education Policy Committee (2011-present)

Faculty mentor, Cornell Sloan Mentoring Program for minority students (2014-present)

GRANT REVIEW

National Cancer Institute Subcommittee I-Career Development (2006, 2007, 2010)

National Institute of Allergy and Infectious Disease, ZAI1 PA-I (C1) Innate Immune receptors and adjuvant discovery (2009)

NIAID, Cooperative Study Group for Autoimmune Disease Prevention (2012)

NIAID, CMI-A (2012)

NIAID, III (2012)

National Cancer Institute: Tumor Immunology (2013)

SCIENTIFIC JOURNAL REVIEW

British Journal of Dermatology

Infection and Immunity

Journal of Biological Chemistry

Journal of Experimental Medicine

Journal of Immunoassay and Immunochemistry (Editorial Board, 2011-present)

Journal of Immunology (Associate Editor, 2014-present)

Journal of Leukocyte Biology

PLOS One

PLOS Pathogens

Proceedings of the National Academy of Sciences

Medicinal Research Reviews

Veterinary Immunology and Immunopathology

PROFESSIONAL MEMBERSHIP

American Association of Immunologists

American Heart Association

American Society for Biochemistry and Molecular Biology

Society for Mucosal Immunology

Research

SCIENTIFIC PRESENTATIONS

Chaired Sessions at Scientific Conferences

Experimental Biology 2008/American Association of Immunologists, Session: TLRs and Signaling

Invited External Lectures

- 2014 ÉCOLE Normale Supérieure de Lyon, Lyon France
- 2013 McGowan Institute for Regenerative Medicine, University of Pittsburgh
- 2012 The Scripps Research Institute
University of Rochester
Weill Medical College, Cornell Microbiology and Immunology Retreat
- 2011 University of Texas Southwestern Medical Center, Department of Immunology
National Institutes of Health, National Cancer Institute, Experimental Immunology Branch
National Institutes of Health, National Institute of Allergy and Infectious Diseases, Laboratory of Parasitic Diseases
Roswell Park Cancer Center, Department of Immunology
- 2010 University of Michigan, Department of Microbiology and Immunology
Fox Chase Cancer Center
Vertex Pharmaceuticals
- 2009 McMaster University, Hamilton Ontario, Canada, Infection and Immunity Program
University of Connecticut School of Medicine, Department of Immunology
Penn State University College of Medicine, Department of Microbiology and Immunology
SUNY Upstate, Department of Microbiology and Immunology
- 2008 Harvard University, Frontiers in Mucosal Immunology 2008: Immunological Aspects of Host-microbe Interactions at Mucosal Surfaces
USDA, Agricultural Research Service, Animal Parasitic Diseases Lab
- 2007 Boston University Medical Center, Department of Microbiology
- 2006 Albany Medical College, Center for Immunology and Microbial Diseases
NIAID/NIH, Laboratory of Parasitic Diseases
- 2005 Virginia Commonwealth University, Department of Microbiology and Immunology
Harvard Medical School and Children's Hospital, Division of Gastroenterology
University of Maryland Medical and Dental School, Department of Microbial Pathogenesis
Case Western Reserve University, Department of Ophthalmology and Visual Sciences
Cornell University, Department of Microbiology and Immunology

Lectures (Internal)

- 2013 BBS Symposium, Scientific Street Smarts, mentoring lecture
- 2012 Keck Biomembrane Retreat, Cornell University
Pfizer Animal Health Award Lecture

Cornell Entrepreneurship 2012 (Held at the Johnson Business School)

- 2011 Infection and Pathobiology Seminar Series, College of Veterinary Medicine
- 2010 Graduate Student Recruitment, College of Veterinary Medicine
Department of Microbiology and Immunology Research Meeting
- 2009 Graduate Student Recruitment, College of Veterinary Medicine
Department of Microbiology and Immunology Research Meeting
Gut Group, College of Veterinary Medicine
- 2008 Graduate Student Recruitment, College of Veterinary Medicine
Graduate Student Orientation, College of Veterinary Medicine
- 2007 Provost visit to the Department of Microbiology and Immunology
Graduate Student Orientation, College of Veterinary Medicine
Department of Microbiology and Immunology Research Meeting
- 2006 Infection and Pathobiology Retreat
Graduate Student Recruitment, College of Veterinary Medicine
- 2005 Graduate Student Orientation, College of Veterinary Medicine

PUBLICATIONS

Book Chapter

Leifer CA., JC Brooks. 2011. Regulation of Nucleic Acid Sensing Toll-like receptors in Systemic Lupus Erythematosus. Systemic Lupus Erythematosus. Edited by Hani Almoallim. Published by Intech. ISBN 978-953-307-868-7.

Invited Reviews

Leifer, CA, WA Rose, F Botelho. 2013. Traditional biochemical assays for studying Toll-like receptor 9. Journal of Immunoassays and Immunochemistry. 34:1-15.

Peer-Reviewed Articles

Singh A, T Rahman, M Malik, AJ Hickey, **CA Leifer CA**, KR Hazlett, TJ Sellati 2013. Discordant results obtained with Francisella tularensis during in vitro and in vivo immunological studies are attributable to compromised bacterial structural integrity. PLoS One 8:e58513.

Scalfone LK, HJ Nel, LF Gagliardo, JL Cameron, S Al-Shokri, **CA Leifer**, PG Fallon, JA Appleton. 2013. Participation of MyD88 and interleukin-33 as innate drivers of Th2 immunity to Trichinella spiralis 81:1354-1363

Rose WA, K Sakamoto, **CA Leifer**. 2012. TLR9 is important for protection against intestinal damage and for intestinal repair. Scientific Reports 2:574.

Rose WA, K Sakamoto, CA Leifer. 2012. Multifunctional role of dextran sulfate sodium for in vivo modeling of intestinal diseases. BioMed Central Immunology 13:41.

Knežević J, 10, Pavlinić D, Rose III WA, **Leifer CA**, Bendelja K, Gabrilovac J, Parcina M, Lauc G, Kubarenko AV, Petricevic B, Vrbanec D, Bulat-Kardum L, Bekeredjian-Ding I, Pavelić J, Dembić Z, Weber ANR. 2012. Functional consequences of rare TLR9 gene mutation R892W. J Biol Chem 287:24544-24553.

- Brooks J, W Sun, G Chiosis, **CA Leifer**. 2012. Heat shock protein gp96 regulates TLR9 proteolytic processing and conformational stability. *Biochem Biophys Res Comm*. 421:780-784.
- Chockalingam A, WA Rose II, M Hasan, C Ju, **CA Leifer**. 2012. Cutting Edge: A Toll-like receptor 9 cytoplasmic tyrosine motif is selectively required for proinflammatory cytokine production. *Journal of Immunology* 188:527-530.
- Hasan M, C Ruksznis, Y Wang, **CA Leifer**. 2011. Negative regulation of TLR3 signaling by an antimicrobial peptide. *Journal of Immunology*, 187: 5653-5659. *Evaluated by Faculty of 1000, which reviews the top 2% of published articles in biology and medicine.
- Leifer CA** and R Dietert. 2011. Developmental immunotoxicology and innate immunity. *Toxicological and Environmental Chemistry*. 93: 1463-1485.
- Chockalingam A, J Brooks, J Cameron, **CA Leifer**. 2011. Negative regulation of Signaling by a Soluble Form of Toll-like receptor 9. *European Journal of Immunology* 41:2176-2184. *Featured by the Journal and in the *Cornell Chronicle*.
- Ju CJ, A Chockalingam, JL Lopez, **CA Leifer**. 2009. Intestinal epithelial cells respond directly to *Toxoplasma gondii* and secrete inflammatory mediators via TLR2. *J Immunol* 183:7420-7427.
- Bowdish DME, K Sakamoto, S Mukhopadhyay, **CA Leifer**, K Tryvaggson, S Gordon, DG Russell. 2009. Macrophage receptor with collagenous structure binds mycobacterial trehalose dimycolate and in concert with CD14, initiates TLR2 signaling. *PLOS Pathogens* 5(6):e1000474.
- Chockalingam A, JC Brooks, JL Lopez, LK Blum, **CA Leifer**. 2009. TLR9 traffics through the Golgi to localize to endolysosomes and respond to CpG DNA. *Immunol Cell Biol* 87:209-217.
- Dubey JP, GV Velmurugana, A Chockalingam, HF Pena, L Nunes de Oliveira, **CA Leifer**, SM Gennari, LMG Bahia Oliveira, C Su. 2008. Genetic diversity of *Toxoplasma gondii* isolates from chickens from Brazil. *Vet Parasitol* 157:299-305.
- Semnani RT, Goel P, **CA Leifer**, S Mostböck, H Sabzevari, TB Nutman. 2008. Inhibition of TLR3 and TLR4 function and expression in human dendritic cells by helminth parasites. *Blood* 112: 1290-1298.
- Leifer CA***, JC Brooks, K Hoelzer, JL Lopez, MN Kennedy, A Mazzoni, DM Segal. 2006. Cytoplasmic targeting motifs control localization of Toll-like receptor 9. *J Biol Chem* 281: 35585-35592. *This work was conceived and initiated as a postdoctoral fellow, but the bulk of the experiments and work was performed at Cornell with a Graduate Student (JCB), a rotation student (KH) and a technician (JLL). I served as the corresponding author.
- Work performed prior to arrival at Cornell:*
- Mazzoni A, RP Siraganian, **CA Leifer**, DM Segal. 2006. Dendritic cell modulation by mast cells controls the Th1/Th2 balance in responding T cells. *J Immunol* 177: 3577-3581.
- Wang ZY, D Yang, Q Chen, **CA Leifer**, DM Segal, SB Su, RR Caspi, ZO Howard, JJ Oppenheim. 2006. Induction of dendritic cell maturation by pertussis toxin and its B subunit differentially initiate Toll-like receptor 4-dependent signal transduction pathways. *Exp Hematol* 34:1115-1124.
- Bafica, A., CA Scanga, CG Feng, **CA Leifer**, A Cheever, A Sher. 2005. TLR9 regulates Th1 responses and cooperates with TLR2 in mediating optimal resistance to *Mycobacterium tuberculosis*. *J Exp Med* 202:1715-1724.

- Leifer CA**, MN Kennedy, A Mazzoni, CW Lee, MJ Kruhlak, DM Segal. 2004. TLR9 is localized in the ER prior to stimulation. *J Immunol* 173: 1179-1183.
- Kennedy MN, GED Mullen, **CA Leifer**, CW Lee, A Mazzoni, KN Dileepan, DM Segal. 2004. A complex of soluble MD2 and lipopolysaccharide serves as an activating ligand for Toll-like receptor 4. *J Biol Chem* 279: 34698-34704.
- Bell JK, GED Mullen, **CA Leifer**, A Mazzoni, DR Davies, DM Segal. 2003. Leucine-rich repeats and pathogen recognition in Toll-like receptors. *Trends Immunol* 24: 528-533.
- Huang LY, J Aliberti, **CA Leifer**, DM Segal, A Sher, DT Golenbock, B Golding. 2003 Heat-killed *Brucella abortus* induces TNF and IL-12p40 by distinct MyD88-dependent pathways: TNF, unlike IL-12p40 secretion, is Toll-like receptor 2 dependent. *J Immunol* 171: 1441-1446.
- Leifer CA**, D Verthelyi, DM Klinman. 2003. Heterogeneity in the human response to immunostimulatory CpG Oligodeoxynucleotides. *J Immunotherapy* 26: 313-319.
- Mullen GE, MN Kennedy, A Visintin, A Mazzoni, **CA Leifer**, DR Davies, DM Segal. 2003. The role of disulfide bonds in the assembly and function of MD-2. *Proc Natl Acad Sci USA* 100: 3919-3924.
- Mazzoni A, **CA Leifer**, GE Mullen, MN Kennedy, DM Klinman, DM Segal. 2003. Cutting Edge: Histamine Inhibits IFN- α Release from Plasmacytoid Dendritic Cells. *J Immunol* 170: 2269-2273.
- Biragyn A, PA Ruffini, **CA Leifer**, E Klyushnenkova, A Shakhov, O Chertoc, AK Shirakawa, JM Farber, DM Segal, JJ Oppenheim, LW Kwak. 2002. Toll-Like receptor 4-dependent activation of dendritic cells by beta-defensin 2. *Science* 298: 1025-1029.
- Klinman DM, F Takeshita, I Gursel, **C Leifer**, KJ Ishii, D Verthelyi, M Gursel. 2002. CpG DNA: Recognition by and activation of monocytes. *Microbes Infect* 4: 897-901.
- Takeshita F*, **CA Leifer***, I Gursel, KJ Ishii, S Takeshita, M Gursel, DM Klinman. 2001. Cutting edge: Role of Toll-like receptor 9 in CpG DNA-induced activation of human cells. *J Immunol* 167: 3555-3558 *co-first author.
- Under maiden name Byrd*
- Byrd-Leifer CA**, EF Block, K Takeda, S Akira, A Ding. 2001. The role of MyD88 and TLR4 in the LPS-mimetic activity of Taxol. *Eur J Immunol* 31: 2448-2457.
- Byrd C**, W Bornmann, H Erdjument-Bromage, P Tempst, N Pavletich, N Rosen, C Nathan, A Ding. 1999. Heat shock protein 90 mediates macrophage activation by Taxol and bacterial lipopolysaccharide. *Proc Natl Acad Sci USA* 96: 5645-5650.
- Zizi M, **C Byrd**, R Boxus, and M Colombini. 1998. The voltage-gating process of the voltage-dependent anion channel is sensitive to ion flow. *Biophysical J* 75: 704-713.
- Gulbins E, R Bissonnette, A Mahboubi, S Martin, W Nishioka, T Brunner, G Baier, G Baier-Bitterlich, **C Byrd**, F Lang, R Kolesnick, A Altman, and D Green. 1995. Fas-induced apoptosis is mediated via a ceramide-initiated RAS signaling pathway. *Immunity* 2: 341-351.

SCIENTIFIC MEETING PRESENTATIONS

2012 New York Upstate Immunology Conference

- 2011 Toll 2011 Decoding Innate Immunity, Italy, *Regulation of Toll-Like Receptor 9 Signaling by a Soluble Receptor Antagonist*
- 2009 AAI 2009, *Early Intestinal Epithelial Response to Toxoplasma gondii Infection*
- 2008 New York Upstate Immunology Conference, *Toll-Like Receptor 9 traffics through the Golgi to localize to endolysosomes and respond to CpG DNA*
- 2006 New York Upstate Immunology Conference, *Identification of Toll-like receptor 9 localization motifs*
- 2005 Dendritic cells Keystone Conference, *TLR9 localization motifs*
- 2004 *Fellows and Young Investigators Retreat, National Cancer Institute, *TLR9 is retained in the ER prior to stimulation. *Best Poster Award*
- 2003 Immunology Interest Group Retreat, NIH, *TLR9 uses a novel mechanism to traffic to CpG containing vesicles.*
Phagocyte Gordon Conference, *Motifs in the TIR domain of TLR9 control localization.*
- 2002 Activating Immunity with CpG Oligos. 2nd International Symposium, *Role of Toll like receptor 9 in CpG-DNA induced activation of human cells.*
- 2001 Immunology Interest Group Retreat, NIH, *Role of Toll like receptor 9 in CpG-DNA induced activation of human cells.*
Keystone Symposium, Macrophage Activation and Deactivation: Links Between Innate and Acquired Immunity, *Mixtures of CpG ODN optimally activate human PBMC.*
- 2000 Immunology Interest Group Retreat, NIH, *Mixes of CpG Oligonucleotides optimally activate human PBMC.*
- 1999 *Vincent duVigneaud Symposium, Weill Graduate School of Medical Sciences, *Lipopolysaccharide-mimetic, Ips gene-dependent effects of Taxol are mediated by a heat shock protein. *Best Poster Award*
Heat Shock Proteins in Women's Health, *Lipopolysaccharide-mimetic, Ips gene-dependent effects of Taxol mediated by a heat shock protein.*
- 1998 International Endotoxin Society Meeting, *Identification of new Taxol targets: Role in Taxol's LPS-mimetic effects.*
*Vincent duVigneaud Symposium, Weill Graduate School of Medical Sciences, *The identification of Taxol-binding proteins in mouse macrophages. *Best Talk Award*
- 1997 Vincent duVigneaud Symposium, Weill Graduate School of Medical Sciences, *The identification of Taxol-binding proteins using affinity chromatography.*

FUNDINGCurrent

- 2008-13 National Institute Allergy and Infectious Diseases
RO1: Toll-like receptor 9: trafficking and signaling (PI), no cost extension
- 2009-14 National Institute of Allergy and Infectious Diseases,
U19: Immune Mechanisms that Control Ectromelia Virus Infection (Co-Project Leader)

2012-14 National Institute of Allergy and Infectious Diseases,
RO3: Toll-like receptor 9 proteolytic processing and signaling (PI), no cost extension

Completed

- 1997 The Astor Prize Fellowship (1 year award)
- 1998 The Astor Prize Fellowship (1 year award)
- 1999 Cancer Research Institute Pre-doctoral Fellowship (1 year award)
- 2000 Oak Ridge Institute for Science and Education (ORISE) fellowship, FDA (2 year award)
- 2002 Cancer Research Training Award (CRTA), National Cancer Institute (3 year award)
- 2005-08 National Cancer Institute, K22 (3 year non-mentored transition career award), Enhancing Immunotherapy through Toll-Like Receptors (PI)
- 2008 Affinito-Stewart Grant from the President's Council for Cornell Women, Developing a model to study mucosal immunity (PI)
- 2008 Cornell Collaborative Research Program with Dr. Bettina Wagner, Detection and induction of type-I Interferon in cattle (PI)
- 2009-10 ARRA supplement for RO1: Toll-like receptor 9: Trafficking and Signaling (PI)
- 2009-10 Harry M. Zweig Memorial Fund for Equine Research with Dr. Bettina Wagner, Analysis of the innate immune response to EHV-1 infection (Co-PI)