

Christopher R. Lupfer, Ph.D.

Department of Biology
Missouri State University
Temple Hall, Room 254
901 S National Ave,
Springfield, MO 65897

ChristopherLupfer@MissouriState.edu

Work: 901-836-6887

Cell: 901-461-9215

Education:

- 2005-2009: Oregon State University, Corvallis, OR
 - Ph.D. Genetics
- 2001-2004: Brigham Young University- Idaho, Rexburg, ID
 - B.S. Biology
- 1997-2001: Glendale Community College, Glendale, AZ

Research and Employment:

- 2015-present: Assistant Professor, Department of Biology, Missouri State University, Springfield, MO
 - Immune regulation and Hyperinflammation during viral bacterial coinfections
 - Regulation and activation mechanisms of NOD-like receptors
- 2014: Adjunct Assistant Professor, Department of Biology, Rhodes College, Memphis, TN.
- 2009-2015: Postdoctoral Fellow, St. Jude Children's Research Hospital, Memphis, TN
 - The role of NOD-Like Receptor proteins in innate and adaptive immunity to viral and bacterial infection.
- 2005-2009: Graduate Research Assistant, OSU, Corvallis, OR
 - Antiviral drug and vaccine development for influenza A virus.
 - Host protein interactions and their role in respiratory syncytial virus infection.
- 2005: Tandem Labs, Salt Lake City, UT
 - Pharmacokinetics testing by GC/MS and LC/MS.
- 2004-2005: Lab One, Salt Lake City, UT
 - Human Toxicology testing by GC/MS.

Teaching Experience:

- 2015-present: Assistant Professor, Department of Biology, Missouri State University, Springfield, MO
 - Biology 210-Elements of Microbiology (Lecture and Lab)
An introductory course in microbiology for allied health students. Content includes introduction to microbial growth requirements and genetics, chemical

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and physical control of microbes and examination of infectious diseases as well as basic laboratory techniques.

- Biology 310-Microbiology (Lecture and Lab)
Majors required course on basic microbiology, including a survey of organisms and mechanisms for survival and replication; standard laboratory techniques in microbiology, discovery of unknown microbe project.
 - Biology 511/611-Immunology (Lecture and Lab)
Intermediate course on basic and applied immunology covering innate and adaptive immunology and recent discoveries in the field; basic laboratory techniques for immunology and group research project.
 - Biology 520/620-Pathogenic microbiology (Lecture)
Intermediate to advanced course on pathogenic organisms, mechanisms of pathogenesis, and host responses to infections.
- 2014-Adjunct Assistant Professor in the Department of Biology at Rhodes College, Memphis, TN.
- Biology 130-Biology I (Lecture)
Freshman level introductory course covering general concepts of biochemistry, cellular and molecular biology, and genetics.
 - Biology 380-Topics in Biomedical Science (Lecture)
A topics based course with instruction focused on the innate immune system response to virus infection.
- 2008-TA in the Department of Biology at Oregon State University, Corvallis, OR.
- Biology 211 -Principles of Biology (Lab)
Laboratory course instruction for 1st year biology majors

Publications:

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- Lupfer C**, Stokes KL, Kuriakose T, Kanneganti TD. (2017) Deficiency of the NOD-like receptor NLRC5 results in decreased CD8⁺ T cell function and impaired viral clearance. **J. Virology**. 91(17)
- Lupfer C** and Anand PK. (2016) Integrating Inflammasome Signaling in Sexually Transmitted Infections. *Trends Immunol.* pii: S1471-4906(16)30094-1. doi: 10.1016/j.it.2016.08.004.
- Qi X, Man SM, Malireddi RK, Karki R, **Lupfer C**, Gurung P, Neale G, Guy CS, Lamkanfi M, Kanneganti TD. (2016) Cathepsin B modulates lysosomal biogenesis and host defense against *Francisella novicida* infection. **J Exp Med**. 213(10):2081-97
- Lupfer C**, Malik A, Kanneganti TD. (2015) Inflammasome control of viral infection. *Curr Opin Virol*. 12:38-46.
- Youm YH, Nguyen KY, Grant RW, Goldberg EL, Bodogai M, Kim D, D'Agostino D, Planavsky N, **Lupfer C**, Kanneganti TD, Kang S, Horvath TL, Fahmy TM, Crawford PA, Biragyn A, Alnemri E, Dixit VD. (2015) The ketone metabolite β -hydroxybutyrate blocks NLRP3 inflammasome-mediated inflammatory disease. **Nature Medicine**. 21(3):263-9.
- Lupfer C**, Anand PK, Liu Z, Stokes K, Vogel P, Lamkanfi M, Kanneganti TD. (2014) Reactive oxygen species regulate caspase-11 expression and activation of the non-canonical NLRP3 inflammasome during enteric pathogen infection. **PLOS Pathogens**. DOI: 10.1371/journal.ppat.1004410

- Lupfer C**, Thomas PG, Kanneganti TD. (2014) NOD2 dependent DC activation is necessary for innate immunity and optimal CD8⁺ T cell responses to influenza A virus infection. **J. Virology**. 88(16):8946-55
- Lupfer C**, Kanneganti TD. (2013) Unsolved Mysteries in NLR Biology. *Front Immunol*. 4:285.
- Lupfer C**, Kanneganti TD. (2013) The expanding role of NLRs in antiviral immunity. **Immunological Reviews**. 255(1):13-24.
- Lupfer C**, Thomas PG, Anand PK, Vogel P, Milasta S, Martinez J, Huang G, Green M, Kundu M, Chi H, Xavier RJ, Green DR, Lamkanfi M, Dinarello CA, Doherty PC & Kanneganti TD. (2013) Receptor interacting protein kinase 2-mediated mitophagy regulates inflammasome activation during virus infection. **Nature Immunology**. 14(5):480-8.
- Reese KA, **Lupfer C**, Johnson RC, Mitev GM, Mullen VM, Geller BL, Pastey M. (2013) A Novel Lactococcal Vaccine Expressing a Peptide from the M2 Antigen of H5N2 Highly Pathogenic Avian Influenza A Virus Prolongs Survival of Vaccinated Chickens. *Vet Med Int*. 2013:316926.
- Lupfer C**, Kanneganti TD. (2012) The role of inflammasome modulation in virulence. *Virulence*. 3(3). 1-9
- Lupfer C**, Kanneganti TD. (2011) Chapter 4: The Role of Inflammasomes in Viral Infection. I. Couillin et al. (eds.), *The Inflammasomes*, Progress in Inflammation Research, DOI 10.1007/978-3-0348-0148-5_4, © Springer Basel AG 2011
- Ellebedy AH, **Lupfer C**, Ghoneim HE, DeBeauchamp J, Kanneganti TD, Webby RJ. (2011) Inflammasome-independent role of the apoptosis-associated speck-like protein containing CARD (ASC) in the adjuvant effect of MF59. **Proc Natl Acad Sci U S A**. 108(7):2927-32
- Lupfer C**, Besnouin D, Tepper SE, Maselko M, Patton KM, Pastey M. (2011) Increased survivorship and altered cytokine profile from treatment of influenza A H1N1-infected mice with ekybion: a drug complex of natural extracts and inorganic compounds. *Evidence Based Complementary and Alternative Medicine*. 2011;2011:192079.
- Lupfer C**, Pastey MK. (2010) Decreased replication of human respiratory syncytial virus treated with the proteasome inhibitor MG-132. *Virus Research* 149(1):36-41.
- Lupfer C**, Patton KM, and Pastey MK (2010) Treatment of human respiratory syncytial virus infected Balb/C mice with the proteasome inhibitor bortezomib (Velcade, PS-341) results in increased inflammation and mortality. **Toxicology** 268(1-2):25-30.
- McKenzie E, **Lupfer C**, Banse H, Hinchcliff K, Love S, Nelson S, Davis M, Payton M, and Pastey M (2010) Hypogammaglobulinemia in racing Alaskan sled dogs. *Journal of Veterinary Internal Medicine*. 24(1):179-84
- Lupfer C**, Stein D, Mourich DV, Tepper SE, Iversen PL, and Pastey M (2008) Inhibition of influenza A H3N8 virus infections in mice by morpholino oligomers. *Archives of Virology* 153(5):929-37
- Ge Q, Pastey M, Kobasa D, Puthavathana P, **Lupfer C**, Bestwick RK, Iverson PL, Chen J, and Stein D (2006) Inhibition of multiple subtypes of influenza A virus in cell cultures with morpholino oligomers. *Antimicrobial Agents and Chemotherapy* 50:3724-3733

Conferences and Presentations:

- Angeline Rodriguez (U), Abbi Mabary (U) and Christopher Lupfer. (2016) Improving inflammation in bacterial coinfection by IL-1b regulation. Poster presentation at the 2016

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- Joint meeting of the Missouri and Missouri Valley Branches of the American Society of Microbiology, UMKC, Kansas City, KS, USA
- Abbi J. Mabary (U), Angeline E. Rodriguez (U), Sohnya Kleiman (U), and Christopher Lupfer. (2016) Generation of Yeast 2-Hybrid Clones to Examine the Role of Nucleotide Oligomerization and Binding Domain (NOD)-Like Receptors. Poster presentation at the 2016 Joint meeting of the Missouri and Missouri Valley Branches of the American Society of Microbiology, UMKC, Kansas City, KS, USA
- Abbi Mabary (U) Angeline Rodriguez (U) and Christopher Lupfer (2016) Generation of Yeast 2-Hybrid Clones to Examine the Role of Nucleotide Oligomerization and Binding Domain (NOD)-Like Receptors. Poster presentation at the 2016 CNAS Undergraduate Research Day, MSU, Springfield, MO, USA
- Angeline Rodriguez (U), Abbi Mabary (U) and Christopher Lupfer. (2016) Improving inflammation in bacterial coinfection by IL-1b regulation. Poster presentation at the 2016 CNAS Undergraduate Research Day, MSU, Springfield, MO, USA
- Angeline Rodriguez (U), Abbi Mabary (U), Andrea Taylor (U), Hanna Ingram (U) and Christopher Lupfer. (2016) Improving inflammation in bacterial coinfection by IL-1b regulation. Poster presentation at the 2016 Arkansas INBRE conference, Fayetteville, AR, USA
- Hazar Abysalamah (G) and Christopher Lupfer. (2016) Sodium Pyruvate Alters the Immune Response to Influenza A Virus Infections in Macrophages. Poster presentation at the 2016 Arkansas INBRE conference, Fayetteville, AR, USA
- Lupfer C, Stokes KL, and Kanneganti T-D. (2015) NLRC5 regulates MHC-I expression and immunity during viral infection. Oral presentation at Immunology 2015, the annual meeting of the American Association of Immunologists, New Orleans, LA
- Lupfer C, Stokes KL, and Kanneganti T-D. (2015) NLRC5 regulates MHC-I expression and immunity during viral infection. Poster presented at the Innate Immunity and Determinants of Microbial Pathogenesis, 43rd Keystone Symposia, Olympic Valley, CA
- Lupfer C, Thomas PG, Doherty PC, Kanneganti T-D. (2012) T cell intrinsic role of NOD2 in cellular immunity to virus infection. Oral presentation given at the Viral Immunity and Host Gene Influence, 40th Keystone Symposia, Keystone, CO
- Lupfer C and Pастey M. (2008) Ubiquitin and human respiratory syncytial virus: a small protein with a big role. Oral presentation given at the 27th Annual American Society for Virology Conference, Cornell University, Ithaca, NY
- Lupfer C and Pастey M. (2007) Reduction of HRSV Egress and Protein Production in Multiple Cell Lines by Treatment with Proteasome Inhibitor MG132. Poster presented at the 6th International Respiratory Syncytial Virus Symposium, Marco Island, FL
- Lupfer C, et al. (2007) Inhibition of Influenza A Virus Replication in Mice with a “NEU” Drug. Poster presented at the 26th Annual American Society for Virology Conference, OSU, Corvallis, OR
- Lupfer C and Pастey M. (2007) Ubiquitin is Essential for Human Respiratory Syncytial Virus Syncytia Formation and Budding. Poster presented at the 26th Annual American Society for Virology Conference, OSU, Corvallis, OR
- Lupfer C, Klomp A, McMahon B, and Pастey M. (2007) Production of Avian Influenza H5N1 and H7N2 Monoclonal Antibodies Using Standard Hybridoma Protocol. Poster displayed at the 3rd Annual Avian Influenza Control and Prevention Conference, University of Maryland, College Park, MD

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Lupfer C, et al. (2006) Inhibition of Several Subtypes of Influenza A Virus with Antisense Morpholino Oligomers. Poster presented at the 46th American Society for Microbiology ICAAC Conference, San Francisco, CA

Scholarly activities and memberships:

- 2015-present: Invited reviewer for Oncotarget
- 2015-present: Invited reviewer for The Journal of Immunology
- 2015-present: Invited reviewer for PLoS One
- 2015-present: Invited reviewer for Molecular Immunology
- 2016-present: Invited reviewer for Scientific Reports
- 2016-present: Invited reviewer for Microorganisms

- 2016-present: Member, American Society for Microbiology
- 2014-present: Member, American Association of Immunologists
- 2007-present: Member, American Society for Virology

Funding and Awards:

- Faculty Research Grant, Missouri State University, 2017 (PI)(\$7,500): Hyperinflammation during coinfection contributes to disease severity during viral-bacterial coinfections.
- American Association of Immunologists, 2015, AAI Trainee Abstract Award
- NIH Extramural Loan Repayment Grant, 2011-2013 (\$15,000): The role of IL-1beta signaling during influenza/bacterial coinfections
- Oregon Lottery Scholarship, 2008-2009
- American Society for Virology, 2008, 27th general meeting, Student Travel Award
- American Society for Microbiology, 2006, 46th ICAAC conference, Student Travel Award

Service and Leadership:

- 2017-present: Pre-Medical Committee Member
- 2016-present: Pre-Medical Club Faculty Advisor
- 2016-present: Greater Ozarks Centers for Advanced Professional Studies (GO-CAPS) advisory team
- 2016-present: Science Olympiad.
- 2011-2015: Volunteer tour guide at St. Jude Children's Research Hospital
- 2008-2009: Assistant Scout Master, Boy Scouts of America
- 2008: Head of the Molecular and Cell Biology Journal Club, Oregon State University

References:

Curriculum Vitae for Christopher R. Lupfer

Dr. Alicia Mathis, PhD
Professor and Chair
Department of Biology
Missouri State University
901 S. National Ave
Springfield, MO 65897
AliciaMathis@MissouriState.edu

Dr. Thirumala-Devi Kanneganti, PhD
Member, Immunology Department
St. Jude Children's Research Hospital
262 Danny Thomas Pl., MS351
Memphis, TN 38018
Thirumala-Devi.Kanneganti@stjude.org

Dr. Carolyn Jaslow, PhD
Professor and Chair
Department of Biology
Rhodes College
2000 North Parkway
Memphis, TN 38112-1690
CJASLOW@rhodes.edu

Dr. Manoj K. Pastey, DVM, PhD
Associate Professor, Molecular Virology & Immunology
Department of Biomedical sciences
College of Veterinary Medicine
Oregon State University
210 Dryden Hall
Corvallis, OR 97331
Manoj.Pastey@oregonstate.edu