Stephanie N. Langel, PhD

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CURRICULUM VITAE **Date Prepared: 3/26/21**

EDUCATION

PhD	**The Ohio State University** College of Veterinary Medicine Department of Veterinary Preventive Medicine Degree: Virology, immunology	2013-2018
MS	**Virginia Polytechnic and State University (Virginia Tech)** College of Agriculture and Life Sciences Department of Dairy Science Degree: Immunology	2011-2013
BS	**The Ohio State University** College of Food, Agricultural and Environmental Sciences Department of Animal Sciences Degree: Animal Sciences, Life Sciences (with Research Distinction)	2007-2011

PROFESSIONAL TRAINING

Postdoctoral fellowship	**Duke University School of Medicine** Duke Human Vaccine Institute	2019-current

RESEARCH EXPERIENCES

Postdoctoral scholar	**Duke University School of Medicine** Duke Human Vaccine Institute Mentor: Dr. Sallie R. Permar, MD, PhD	2019-current
Graduate Research Assistant	**The Ohio State University** College of Veterinary Medicine Food Animal Health Research Program Mentor: Dr. Linda J. Saif, PhD	2013-2018
Graduate Research Assistant	**Virginia Tech** Department of Dairy Science Mentor: Dr. Isis Kanevsky Mullarky, PhD	2011-2013
Undergraduate Research Assistant	**The Ohio State University** Department of Animal Sciences Mentor: Dr. Maurice Eastridge, PhD	2010-2011
Undergraduate Lab Assistant	**The Ohio State University** College of Veterinary Medicine Mentor: Dr. Walter Threlfall	2007-2011

BIOSECURITY TRAINING

Postdoctoral scholar	**Duke Regional Biocontainment Laboratory** Duke University School of Medicine BSL3 certified Pathogens: SARS-CoV-2	2020-current

Postdoctoral scholar	**Duke Human Vaccine Institute** BSL2 certified Pathogens: Rotavirus, HIV, influenza	2019-current
Graduate Research Assistant	**Plant and Animal Agrosecurity Research Center** BSL2+ Ag certified Pathogens: Porcine epidemic diarrhea virus (PEDV)	2015-2018
Graduate Research Assistant	**Food Animal Health Research Program** **Ohio State University College of Veterinary Medicine** BSL2 certified Pathogens: Rotavirus, PEDV, porcine delta coronavirus	2013-2018

AWARDS AND RECOGNITIONS

-Thrasher Pediatric Research Fund, Early Career Award *finalist* – 2021
-Derfner Foundation Award, Children's Hospital Miracle Network, Duke Dept. of Pediatrics – 2020
-Poster Winner, Duke Department of Molecular Genetics and Microbiology Annual Retreat – 2019
-American Society for Virology Annual Conference Student Travel Award – 2018
-USDA National Institute for Food and Agriculture (NIFA) Predoctoral Fellowship *awardee* – 2016
-USDA-NIFA Food Virology Collaborative (NoroCORE) predoctoral fellowship *nominee* – 2015
-Outstanding Diversity Program Award, The Ohio State University – 2014
-Women's Leadership in Agriculture Award, Ohio Farm Bureau – 2013
-1st place poster, Immunology Section, *Conference for Research Workers in Animal Diseases* – 2012
-Outstanding Graduate Teaching Assistant Department of Dairy Science, Virginia Tech – 2012
-1st place poster presentation, Agriculture and Environmental Sciences Section, The Ohio State University Denman Undergraduate Research Symposium – 2011
-Top 20 University Senior, The Ohio State University – 2011
-Top 10 College Senior, The Ohio State University – 2011
-Outstanding Senior Department of Animal Sciences (1 award given), The Ohio State University – 2011

RESEARCH SUPPORT

Active

1. Bill and Melinda Gates Foundation: INV-022595 11/2020 – 11/2022
Total amount: **$2,226,115**
Maternal oral influenza and SARS-CoV-2 vaccination for generation of potently neutralizing secretory IgA antibodies in breast milk.
Role: Principal Investigator

2. Duke Precision Genomics COVID-19 Collaboratory Pilot Grant 10/2020-10/2021
Total amount: **$15,000**
Host factors that mediate protection from severe SARS-CoV-2 in young, adult and geriatric populations.
Role: Principal Investigator

3. Children's Miracle Network Hospitals Derfner Foundation Research Grants 07/2020 – 07/2021
Total amount: **$15,000**

Identification of IgA antibody Fc region glycans that impact passive transfer into breastmilk and mother-to-child transmission (MTCT) of HIV-1
Role: Principal Investigator

4. California National Primate Research Center (CNPRC) Pilot Grant 05/2020 – 05/2021
Total amount: **$50,000**
Host factors mediating protection from severe SARS-CoV-2 disease in infants and children using an infant/dam rhesus macaque model of SARS-CoV-2 infection
Role: Co-Investigator

5. NIH: NIAID Interdisciplinary Research Training Program in AIDS T32 09/2019 – 09/2021
Duke: AI007392-30
Determining the role of IgA glycans on mammary gland passive transfer and protection against mother-to-child transfer of HIV in breast milk.
Role: Postdoctoral fellow trainee

Completed

1. USDA: AFRI NIFA Fellows Program #60046830 02/15/2017 – 02/14/2019
Influence of gestational age of gilts and pregnancy hormones at PEDV exposure on the gut-mammary-sIgA axis and lactogenic immunity
Role: Predoctoral fellow trainee

EDITORIAL REVIEW ACTIVITIES

Time Period	Journal	Role
2020 – current	mSphere	Ad hoc reviewer
2020 – current	mBio	Ad hoc reviewer
2020 – current	Viruses	Ad hoc reviewer
2020 – current	Frontiers in Immunology	Ad hoc reviewer
2020 – current	PLoS One	Ad hoc reviewer
2019 – 2020	Archives of Virology	Ad hoc reviewer

ORGANIZATIONS AND PARTICIPATION

2018 American Society for Virology
2015 Society of Mucosal Immunology

PUBLICATIONS:

My name in **bold,** * indicates co-first author

Under review

1. Vlasova AN, Michael H, Paim FC, **Langel SN**, Miyazaki A, Fischer DD, Chepngeno J, Amimo J, Deblais L, Rajashekara G, Saif LJ. Escherichia coli Nissle 1917 enhances innate and adaptive immune responses to ciprofloxacin treated defined microbiota piglet model of human rotavirus infection. *Conditional acceptance.* mSphere (#0074-21)

Submitted

1. **Langel SN***, Kelly F*, Brass DM, Nagler A, Carmack D, Tu JJ, Travieso T, Goswami R, Permar SR, Blasi M, Palmer SM. E-cigarette flavoring diacetyl alters airway cell morphology, inflammatory and antiviral response, and susceptibility to SARS-CoV-2. J Clin Invest.

In preparation

1. **Langel SN**, Chang J, Steppe JT, Travieso T, Otero CE, Webster H, Williams L, Crowe J, Greenberg H, Blasi M, Permar SR. Maternal passive immunization with a rotavirus-neutralizing dimeric IgA antibody protects against rotavirus-induced diarrhea in suckling neonates.

Peer reviewed papers

1. Michael H, Paim FC, Miyazaki A, **Langel SN**, Fischer DD, Chepngeno J, Goodman SD, Rajashekara G, Saif LJ, Vlasova AN. Escherichia coli Nissle 1917 administered as a dextranomar microsphere biofilm enhances immune responses against human rotavirus in a neonatal malnourished pig model colonized with human infant fecal microbiota. PLoS One. 2021 Feb 16;16(2):e0246193. doi: 10.1371/journal.pone.0246193. PMID: 33592026

2. Srivastava V, Deblais L, Huang HC, Miyazaki A, Kandasamy S, **Langel SN**, Paim FC, Chepngeno J, Kathayat D, Vlasova AN, Saif LJ, Rajashekara G. Reduced rotavirus vaccine efficacy in protein malnourished human-fecal-microbiota-transplanted gnotobiotic pig model is part attributed to the gut microbiota. Benef Microbes. 2020 Dec 2;11(8):733-751. Doi:10.3920/BM2019.0139. PMID: 33245014

3. Otero CE, **Langel SN**, Blasi M, Permar SR. Maternal antibody interference contributes to reduced rotavirus vaccine efficacy in developing countries. PLoS Pathog. 2020 Nov 19;16(11):e1009010. Doi: 10.1371/journal.ppat.1009010. PMID: 33211756

4. Singh T, Heston SM, **Langel SN**, Blasi M, Hurst JH, Fouda GG, Kelly MS, Permar SR. Lessons from COVID-19 in children: Key hypotheses to guide preventative and therapeutic strategies. Clin Infect Dis. 2020 Nov 5;71(8):2006-2013. doi:10.1093/cid/ciaa547. PMID:32382748

5. **Langel SN,** Otero CE, Martinez DR, Permar SR. Maternal gatekeepers: How maternal antibody Fc characteristics influence passive transfer and infant protection. PLoS Pathog. 2020 March 26;16(3):e1008303. doi: 10.1371/journal.ppat.1008303. PMID: 32214394

6. Michael H, **Langel SN**, Miyazaki A, Paim FC, Chepngeno J, Alhamo MA, Fischer DD, Srivastava V, Kathayat D, Deblais L, Rajashekara G, Saif LJ, Vlasova AN. Front Immunol. 2020 Feb 14;11:196. Doi: 10.3389/fimmu.2020.00196. PMID: 32117313

7. **Langel SN**, Wang Q, Vlasova AN, Saif LJ. Host factors affecting generation of immunity against porcine epidemic diarrhea virus in pregnant and lactating swine and passive protection of neonates. Pathogens. 2020 Feb 18;9(2):130. doi:10.3390/pathogens9020130. PMID: 32085410

8. **Langel SN**, Paim FC, Alhamo MA, Vlasova AN, Saif LJ. Oral vitamin A supplementation of porcine epidemic diarrhea virus infected gilts enhances IgA and lactogenic immune protection of nursing piglets. Vet Res. 2019 Nov 29;50(1):101. doi: 10.1186/s13567-019-0719-y. PMID: 31783923

9. **Langel SN**, Paim FC, Alhamo MA, Buckley A, Van Geelen A, Lager KM, Vlasova AN, Saif LJ. Stage of Gestation at Porcine Epidemic Diarrhea Virus Infection of Pregnant Swine Impacts Maternal Immunity and Lactogenic Immune Protection of Neonatal Suckling Piglets. Front Immunol. 2019 Apr 24;10:727. doi: 10.3389/fimmu.2019.00727. PMID: 31068924

10. Annamalai T, Lu Z, Jung K, **Langel SN**, Tuggle CK, Dekkers JCM, Waide EH, Kandasamy S, Saif LJ. Infectivity of GII.4 human norovirus does not differ between T-B-NK+ severe combined immunodeficiency (SCID) and non-SCID gnotobiotic pigs, implicating the role of NK cells in

mediation of human norovirus infection. Virus Res. 2019 Jul 2;267:21-25. doi: 10.1016/j.virusres.2019.05.002. PMID: 31054932

11. Lin CM, Ghimire S, Hou Y, Boley P, **Langel SN**, Vlasova AN, Saif LJ, Wang Q. Pathogenicity and immunogenicity of attenuated porcine epidemic diarrhea virus PC22A strain in conventional weaned pigs. BMC Vet Res. 2019 Jan 11;15(1):26. doi: 10.1186/s12917-018-1756-x. PMID: 30634958.

12. Miyazaki A, Kandasamy S, Husheem M, **Langel SN**, Paim FC, Chepngeno J, Alhamo MA, Fisher DD, Huang HC, Srivastava V, Kathayat D, Deblais L, Rajashekara G, Saif LJ, Vlasova AN. Protein deficiency reduces efficacy of oral attenuated human rotavirus vaccine in a human infant fecal microbiota transplanted gnotobiotic pig model. Vaccine. 2018 Oct 8;36(42):6270-6281. doi: 10.1016/j.vaccine.2018.09.008. PMID: 30219368

13. Kumar A, Vlasova AN, Deblais L, Huang HC, Wijeratne A, Kandasamy S, Fischer DD, **Langel SN,** Paim FC, Alhamo MA, Shao L, Saif LJ, Rajashekara G. Impact of nutrition and rotavirus infection on the infant gut microbiota in a humanized pig model. 2018 Jun 22;18(1):93. doi:10.1186/s12876-018-0810-2. PMID: 29929472

14. Huang HC, Vlasova AN, Kumar A, Kandasamy S, Fischer DD, Deblais L, Paim FC, **Langel SN**, Alhamo MA, Rauf A, Shao L, Saif LJ, Rajashekara G. Effect of antibiotic, probiotic, and human rotavirus infection on colonization dynamics of defined commensal microbiota in a gnotobiotic pig model. Benef Microbes. 2018 Jan 29;9(1):71-86. doi: 10.3920/BM2016.0225. PMID: 29022385

15. Fischer DD, Kandasamy S, Paim FC, **Langel SN**, Alhamo MA, Shao L, Chepngeno J, Miyazaki A, Huang HC, Kumar A, Rajashekara G, Saif LJ, Vlasova AN. Protein Malnutrition Alters Tryptophan and Angiotensin-Converting Enzyme 2 Homeostasis and Adaptive Immune Responses in Human Rotavirus-Infected Gnotobiotic Pigs with Human Infant Fecal Microbiota Transplant. Clin Vaccine Immunol. 2017 Aug 4;24(8):e00172-17. doi: 10.1128/CV.00172-17. PMID: 28637803

16. Kandasamy S, Vlasova AN, Fischer DD, Chattha KS, Shao L, Kumar A, **Langel SN**, Rauf A, Huang HC, Rajashekara G, Saif LJ. Unraveling the Differences between Gram-Positive and Gram-Negative Probiotics in Modulating Protective Immunity to Enteric Infections. Front Immunol. 2017 Mar 27;8:334. doi: 10.3389/fimmu.2017.00334. PMID: 28396664

17. Vlasova AN, Paim FC, Kandasamy S, Alhamo MA, Fischer DD, **Langel SN**, Deblais L, Kumar A, Chepngeno J, Shao L, Huang HC, Candelero-Rueda RA, Rajashekara G, Saif LJ. Protein Malnutrition Modifies Innate Immunity and Gene Expression by Intestinal Epithelial Cells and Human Rotavirus Infection in Neonatal Gnotobiotic Pigs. mSphere. 2017 Mar 1;2(2):e00046-17. doi: 10.1128/mSphere.00046-17. PMID: 28261667

18. Paim FC, **Langel SN**, Fischer DD, Kandasamy S, Shao L, Alhamo MA, Huang HC, Kumar A, Rajashekara G, Saif LJ, Vlasova AN. Effects of *Escherichia coli* Nissle 1917 and Ciprofloxacin on small intestinal epithelial cell mRNA expression in the neonatal piglet model of human rotavirus infection. Gut Pathog. 2016 Dec 13;8:66. doi: 10.1186/s13099-016-0148-7. PMID: 27999620

19. Vlasova AN, Shao L, Kandasamy S, Fischer DD, Rauf A, **Langel SN**, Chattha KS, Kumar A, Huang HC, Rajashekara G, Saif LJ. *Escherichia coli* Nissle 1917 protections gnotobiotic pigs

against human rotavirus by modulating pDC and NK-cell responses. Eur J Immunol. 2016 Oct;46(10):2426-2437. doi: 10.1002/eji.201646498. PMID: 27457183

20. **Langel SN**, Paim FC, Lager KM, Vlasova AN, Saif LJ. Lactogenic immunity and vaccines for porcine epidemic diarrhea virus (PEDV): Historical and current concepts. Virus Res. 2016 Dec 2;226:93-107. doi: 10.1016/j. virusres.2016.05.016. PMID: 27212686

21. **Langel SN**, Wark WA, Garst SN, James RE, McGilliard ML, Petersson-Wolfe CS, Kanevsky-Mullarky I. Effect of feeding whole compared with cell-free colostrum on calf immune status: The neonatal period. J. Dairy Sci. 2016 May;99(5):3979-3994. doi: 10.3168/jds.2014-8422. PMID: 26923041

22. Kandasamy S, Vlasova AN, Fischer DD, Kumar A, Chattha KS, Rauf A, Shao L, **Langel SN**, Rajashekara G, Saif LJ. Differential Effects of *Escherichia coli* Nissle and *Lactobacillus rhamnosus* Strain GG on Human Rotavirus Binding, Infection, and B Cell immunity. J Immunol. 2016 Feb 15;196(4):1780-9. doi: 10.4049/jimmunol.1501705. PMID: 26800875

23. Shao L, Fischer DD, Kandasamy S, Rauf A, **Langel SN**, Wentworth DE, Stucker KM, Halpin RA, Lam HC, Marthaler D, Saif LJ, Vlasova AN. Comparative In Vitro and In Vivo Studies of Porcine Rotavirus G9P[13] and Human Rotavirus Wa G1P[8]. J Virol. 2015 Oct 14;90(1):142-51. doi: 10.1128/JVI.02401-15. PMID: 26468523

24. **Langel SN**, Wark WA, Garst SN, James RE, McGilliard ML, Petersson-Wolfe CS, Kanevsky-Mullarky I. Effect of feeding whole as compared to cell-free colostrum on calf immune status: Vaccination response. J. Dairy Sci. 2015 Jun;98(6):3729-40. doi: 10.3168/jds.2015-9892. PMID: 25795487

Book Chapters

1. Infectious Diseases of Livestock. Chapter 66. Transmissible gastroenteritis. Vlasova AN, **Langel SN**, Saif LJ. 2018. Oxford University press.

2. Infectious Diseases of Livestock. Chapter 67. Porcine respiratory coronavirus infection. Vlasova AN, **Langel SN**, Saif LJ. 2018. Oxford University press.

Selected Abstracts

1. **Langel SN**, Otero CE, Eudailey J, Webster H, Chang J, Blasi M, Permar S. Engineering dimeric IgA antibodies for passive transfer into breast milk and protection against human rotavirus in neonates. *Keystone Symposium: From B Cell Biology to New Treatments, February 2-6, Santa Fe, NM* (*oral and poster presentation)

2. **Langel SN**, Otero CE, Eudailey J, Webster H, Chang J, Blasi M, Permar S. Development of a recombinant vectored maternal rotavirus-specific IgA antibody for transfer into breast milk. *Duke Department of Molecular Genetics and Microbiology Annual Retreat, Durham, N.C. (June 2019)*

3. **Langel SN**, Eudailey J, Webster H, Chang J, Blasi M, Permar S. Development of a recombinant vectored maternal rotavirus-specific IgA antibody for transfer into breast milk. *Duke/Duke-NUS 2019 Infectious Disease Symposium, Durham, N.C.*

4. **Langel SN**, Eudailey J, Webster H, Chang J, Blasi M, Permar S. Development of a recombinant vectored maternal rotavirus-specific IgA antibody for transfer into breast milk. *Duke Department of Pediatrics 2019 Research Retreat, Durham, N.C.*

5. **Langel SN,** Vlasova AN, Paim FC, Alhamo MA, Buckley A, Van Geelen A, Lager K, Saif LJ. Gestational age impacts mucosal immunity and the gut-mammary-secretory IgA axis in porcine epidemic diarrhea virus (PEDV)-infected pregnant swine and lactogenic immune protection of their piglets. *American Society for Virology Annual Meeting, College Park, Maryland (July 14-18th, 2018)*

6. **Langel SN,** Vlasova AN, Paim FC, Alhamo MA, Saif LJ. Oral Vitamin A supplementation of porcine epidemic diarrhea virus (PEDV)-infected gilts enhances the gut-mammary gland-secretory IgA axis and passive protection in nursing piglets. *International Congress of Mucosal Immunology Meeting, Washington D.C. (2017)*

7. **Langel SN,** Paim FC, Alhamo MA, Lager K, Wang Q, Vlasova AN, Saif LJ. Defining the gut-mammary-secretory IgA axis during porcine epidemic diarrhea virus (PEDV) infection in pigs. *XIVth International Nidovirus Symposium, Kansas City, Missouri (2017)*

8. **Langel SN,** Chimelo Paim F, Rauf A, Thavamathi A, Vlasova AN, Lager KM, Saif LJ. 2015. Defining the gut-mammary-sIgA axis during porcine epidemic diarrhea virus (PEDV) infection in pigs. *The Ohio State University College of Veterinary Medicine Research Day, Columbus, Ohio (April 2015)*

9. **Neal SM,** Wark W, Garst SN, Petersson-Wolfe CS, Kanevsky-Mullarky I. Deciphering the impact of maternal cells in neonatal health and immune development. *Conference for Research Workers in Animal Diseases*. *Chicago, Illinoi*s (2012)

10. **Neal SM,** Pempek JA, Bowen WS, Eastridge ML. Effects of Alternative Housing and Feeding Systems on the Behavior and Performance of Dairy Heifer Calves. *The Ohio State University Denman Undergraduate Research Symposium, Columbus, Ohio (2011)*

INVITED SEMINARS

Date	Location	Topic
3/2021	Virginia Tech Department of Dairy Science Graduate Student seminar	From cows to humans: what comparative mammary gland immunology teaches us about raising healthy babies.
2/2021	North Carolina State University College of Veterinary Medicine Infectious Disease seminar	Exploiting the gut-mammary axis to protect against enteric and respiratory disease in suckling infants
1/2021	Ohio State University ANIMSCI 2700 lecture	Finding your path as an Animal Sciences major; an alumni perspective
9/2020	Virtual Placental-Interface Seminar	Mechanisms of transplacental antibody transfer and implications during viral disease
4/2020	Duke Center for Human Systems Immunology ('Immunology for Quants')	The immunobiology of SARS-CoV-2
4/2020	Duke Center for Human Systems Immunology ('Immunology for Quants')	Trafficking of Immune Cells
3/2020	National Autonomous University of Nicaragua Infectious Disease Symposium	Transfer of maternal immune protection across the placenta and in breast milk

6/2019	Duke Fertility Center/Reproductive, Endocrinology and Infertility fellows seminar	Maternal-fetal immune tolerance
5/2019	Duke Board of Visitors	Enhancing breast milk immunity for infant protection

TEACHING EXPERIENCE

2020-current	Co-organizer of 'Immunology for Quants' bi-weekly (Duke Department of Biostatistics and Bioinformatics, Center for Human Systems Immunology)
2017-current	Podcast Host, 'Immune', a monthly podcast about the host defense systems that protect against disease. (www.microbe.tv/immune).
2013-2014	Creator/Coordinator, After-School Animal Sciences (Animal Science Lessons for 6th-8th graders), Columbus Collegiate Academy and Champion Middle School (Columbus City)
2013-2014	Podcast Host, 'Ag Sci Today', a podcast highlighting agricultural research. (http://www.agscitoday.com).
2012	Graduate Teaching Assistant, Virginia Tech Dairy Challenge Team, Virginia Tech
2011-2012	Graduate Teaching Assistant, Dairy Enterprise Management I/II, Virginia Tech
2011	Undergraduate Teaching Assistant, Introduction to Animal Sciences, The Ohio State University

LEADERSHIP

2020-current	Immunology for Quants seminar series (immunology seminars for Duke's Department of Biostatistics and Bioinformatics) co-coordinator
2019-current	Duke Human Vaccine Institute bi-weekly seminar series co-coordinator
2016-2017	President, OARDC Scholars Association, The Ohio State University
2014-2018	Member, Wooster Science Café Planning Committee, The Ohio State University
2014-2015	Vice President, OARDC Scholars Association, The Ohio State University
2014-2015	Member, OARDC Diversity Committee, The Ohio State University
2013-2014	Secretary, OARDC Scholars Association, The Ohio State University
2012-2013	Vice President, Dairy, Animal and Poultry Science Graduate Student Club, Virginia Tech
2011-2013	Delegate, Virginia Tech Graduate Student Association, Virginia Tech

MEDIA COVERAGE

Print interviews

1. 'Are the COVID-19 vaccines safe during pregnancy? Experts weigh in.' American Association of Medical Colleges. https://www.aamc.org/news-insights/are-covid-19-vaccines-safe-during-pregnancy-experts-weigh
2. 'No, There Isn't Evidence That Pfizer's Vaccine Causes Infertility'. New York Times. https://www.nytimes.com/2020/12/10/technology/pfizer-vaccine-infertility-disinformation.html
3. '2020 Nobel Prize in Medicine Goes to Scientists Who Discovered Hepatitis C Virus. New York Times. https://www.nytimes.com/2020/10/05/health/nobel-prize-medicine-hepatitis-c.html