

Shipra Vaishnava Ph.D.

Molecular Microbiology & Immunology

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Academic Appointments

22-pres Esther Elizabeth Brintzenhoff Associate Professor MMI, Brown University

19-22 Manning Assistant Professor, MMI, Brown University

15-19 Assistant Professor, MMI, Brown University

Education & Training

11-15 Instructor, Immunology Department, UTSW Medical Center, Dallas, TX, US

06-11 Post-doc, Immunology Department, UTSW Medical Center, Dallas, TX, US

00-06 Ph.D. in Cellular Biology, University of Georgia, GA, US

97-99 M.Sc. in Biotechnology, MS University, Baroda, India

93-96 B.Sc. in Botany, Delhi University, Delhi, India

Honors & Awards

20 American Association of Immunologist (AAI) Public Policy Fellow

17 Kavli Fellow, National Academy of Sciences

11 Young IBD Investigator Award, Crohn's and Colitis Foundation of America

04 American Society of Tropical Medicine and Hygiene Scientific Award

Research Funding

Ongoing

1. NIH R01DK113265 04/01/18-

03/31/23

Role of epithelial cell intrinsic vitamin A metabolism in regulating immune function in the gut.

Role: PI

2. NIH R21AI168772 07/01/22-

06/30/24

Vitamin A metabolizing activity of the gut microbiome.

Role: PI

Pending

1. NIH R01DK131199 07/01/22-

06/30/27 Effect of dietary zinc on host-microbiome interaction in the gut.

Role: PI

Completed

1. DoD W81XWH1810281 08/01/18-

01/31/21

Mapping Gut microbiota composition *in-situ* using high-resolution spatial microdissection technique.

Role: PI

Award: \$200,000

2 NIH/NIGMS/COBRE 06/01/16- 02/28/19

Spatial and Functional Organization of Intestinal Microbiome.

- Role: Junior PI
Award: \$450,000
3. URI/COBRE Pilot Project Program 06/01/16- 5/31/17
Role of vitamin A metabolism in immunity against intestinal bacteria.
- Role: Co-PI
Award: \$50,000
4. CCFA Career development Award 01/01/14- 12/31/16
Bacteria regulated vitamin A metabolism in the intestine.
Role: PI
Award: \$270,000
5. Salomon Award, Brown University 02/01/16-
06/30/17
Regulation of gut microbiome biogeography.
Role: PI
Award: \$15,000

Publications

Assistant Professor Publications

(& Undergraduate Student, # Graduate Student, * Post-doctoral Fellow in my group)

24. Yunker, R.[#], Bonakdar, M.[#] and **Vaishnava, S.** (2022). Out of destruction comes new growth: Pore-forming antimicrobials make pancreas grow. *Cell Metabolism* 2022 Nov 1;34(11):1611-1613.
23. Bonakdar, M.[#], Czuba, L., Han, G.^{*}, Zhong, G., Luong, T., Isoherranen, N., and **Vaishnava, S.** (2022). Gut bacteria significantly expand vitamin A metabolic capacity of the mammalian host. *Cell Host & Microbe* 2022 Aug 10;30(8):1084-1092.
22. Han, G.^{*}, Luong, T., and **Vaishnava, S.** (2021). Low abundance members of the gut microbiome exhibit high immunogenicity *Gut Microbes*. 2022 Jan-Dec;14(1):2104086. doi: 10.1080/19490976.2022.2104086.
21. Duncan, K.[#], Carey-Ewend, K.[&], and **Vaishnava, S.** (2021). Spatial analysis of gut microbiome reveals a distinct ecological niche associated with the mucus layer. *Gut Microbes*. 2021 Feb 11:1-21. doi: 10.1080/19490976.2021.1874815.
20. Iyer, N.^{*}, Grizotte-Lake, M.[#], Duncan, K.[#], Gordon, S. R.[#], Palmer ACS, Calvin C, Zhong G, Isoherranen, N., and **Vaishnava, S.** (2020). Epithelium intrinsic vitamin A signaling co-ordinates pathogen clearance in the gut via IL-18. *PLoS Pathog.* 16(4): e1008360.
19. Iyer, N.^{*} and **Vaishnava, S.** (2019). Vitamin A at the interface of host-commensal-pathogen interactions. *PLoS Pathog.* 15(6): e1007750.
18. Grizotte-Lake, M.[#], Zhong G, Duncan, K.[#], Kirkwood, J., Iyer, N.^{*}, Smolenski, I, Isoherranen N, and **Vaishnava S** (2018). Commensals Suppress Intestinal Epithelial Cell Retinoic Acid Synthesis to Regulate Interleukin-22 Activity and Prevent Microbial Dysbiosis. *Immunity* 49(6):1103-1115.e6.
17. Grizotte-Lake, M.[#] and **Vaishnava, S.** (2018). Autophagy: Suicide prevention hotline for the gut epithelium. *Cell Host & Microbe* 23(2):147-148.
16. Iyer, N.^{*}, and **Vaishnava, S.** (2016). Alcohol Lowers Your (Intestinal) Inhibitions. *Cell Host & Microbe* 19, 131-133.
15. **Vaishnava, S.** (2016). The Intestinal Mucus Layer Comes of Age. *Trends in Immunology* 37, 3-4.

Post-doctoral Publications

14. Derebe, M.G., Zlatkov, C.M., Gattu, S., Ruhn, K.A., **Vaishnava, S.**, Diehl, G.E., MacMillan, J.B., Williams, N.S., and Hooper, L.V. (2014). Serum amyloid A is a retinol binding protein that transports retinol during bacterial infection. *eLife* 3, e03206.
13. Raetz, M., Hwang, S.H., Wilhelm, C.L., Kirkland, D., Benson, A., Sturge, C.R., Mirpuri, J., **Vaishnava, S.**, Hou, B., DeFranco, A.L., Yarovinsky, F., Hooper, L.V. (2013). Parasite-induced TH1 cells and intestinal dysbiosis cooperate in IFN-gamma-dependent elimination of Paneth cells. *Nature Immunology* 14, 136-142.
12. **Vaishnava, S.**, Yamamoto, M., Severson, K.M., Ruhn, K.A., Yu, X., Koren, O., Ley, R., Wakeland, E.K., and Hooper, L.V. (2011). The antibacterial lectin RegIIIgamma promotes the spatial segregation of microbiota and host in the intestine. *Science* 334, 255-258.
11. **Vaishnava, S.**, and Hooper, L.V. (2011). Eat your carrots! T cells are RARing to go. *Immunity* 34, 290-292.
10. Ismail, A.S., Severson, K.M., **Vaishnava, S.**, Behrendt, C.L., Yu, X., Benjamin, J.L., Ruhn, K.A., Hou, B., DeFranco, A.L., Yarovinsky, F., Hooper, L.V. (2011). Gammadelta intraepithelial lymphocytes are essential mediators of host-microbial homeostasis at the intestinal mucosal surface. *Proc. Natl. Acad. Sci.* 108, 8743-8748.
9. Duerkop, B.A., **Vaishnava, S.**, and Hooper, L.V. (2009). Immune responses to the microbiota at the intestinal mucosal surface. *Immunity* 31, 368-376.
8. **Vaishnava, S.**, Behrendt, C.L., Ismail, A.S., Eckmann, L., and Hooper, L.V. (2008). Paneth cells directly sense gut commensals and maintain homeostasis at the intestinal host-microbial interface. *Proc. Natl. Acad. Sci.* 105, 20858-20863.
7. **Vaishnava, S.**, and Hooper, L.V. (2007). Alkaline phosphatase: keeping the peace at the gut epithelial surface. *Cell Host & Microbe* 2, 365-367.

Graduate School and Earlier Publications

6. Reiff, S.B., **Vaishnava, S.**, and Striepen, B. (2012). The HU protein is important for apicoplast genome maintenance and inheritance in *Toxoplasma gondii*. *Eukaryotic Cell* 11, 905-915.
5. **Vaishnava, S.**, and Striepen, B. (2006). The cell biology of secondary endosymbiosis: how parasites build, divide and segregate the apicoplast. *Molecular Microbiology* 61, 1380-1387.
4. Gubbels, M.J., **Vaishnava, S.**, Boot, N., Dubremetz, J.F., and Striepen, B. (2006). A MORN-repeat protein is a dynamic component of the *Toxoplasma gondii* cell division apparatus. *Journal of Cell Science* 119, 2236-2245.
3. Gaji, R.Y., Zhang, D., Breathnach, C.C., **Vaishnava, S.**, Striepen, B., and Howe, D.K. (2006). Molecular genetic transfection of the coccidian parasite *Sarcocystis neurona*. *Molecular and Biochemical Parasitology* 150, 1-9.
2. **Vaishnava, S.**, Morrison, D.P., Gaji, R.Y., Murray, J.M., Entzeroth, R., Howe, D.K., and Striepen, B. (2005). Plastid segregation and cell division in the apicomplexan parasite *Sarcocystis neurona*. *Journal of Cell Science* 118, 3397-3407.
1. White, M.W., Jerome, M.E., **Vaishnava, S.**, Guerini, M., Behnke, M., and Striepen, B. (2005). Genetic rescue of a *Toxoplasma gondii* conditional cell cycle mutant. *Molecular Microbiology* 55, 1060-1071.

Invited Talks

Keynotes

08/19 NERIC Conference, Bretton Woods, NH

09/17 Student invited seminar, Cell and Molecular Biology program, URI, RI

08/13 Department of Cellular Biology Annual Retreat, University of Georgia, GA

National & International

- 05/21 University of Pennsylvania, Prok Seminar Series (Virtual Seminar)
03/21 The University of Toledo College of Medicine and Life Sciences, (Virtual Seminar)
01/21 Rutgers Center for Lipid Research Seminar Series (Virtual seminar)
01/20 UCSD Program in Immunology Seminar Series, La Jolla, CA
11/19 Microbiology seminar Series, Dartmouth College, Hanover, NH
11/19 Microbiome Innovation Summit, The Jackson Laboratory in Farmington, CT
10/19 Mucosal Immunology Seminar Series at Mass General Hospital (MGH), Boston, MA
10/19 Immunology Interest Group (IIG) Seminar Series at the National Institutes of Health
06/18 FASEB Nutritional Immunology Conference, Leesburg, VA
11/16 EMBO Innate Lymphocyte Cell Symposium, Berlin
08/16 Mucosal Immunology Course and Symposium (MICS), Toronto
03/16 Department of Biology Seminar Series, Boston College, MA
04/14 School of Life Science, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland
03/14 Food Science Department, University of Nebraska, NE
03/14 Microbiology & Immunology Department, University of British Columbia, Canada
02/14 Molecular Microbiology and Immunology department, Brown University, RI
01/14 Department of Molecular Microbiology, UC Davis, CA
12/13 Department of Biology, Carnegie Mellon University, PA
04/13 Department of Microbiology and Immunology, University of Tennessee
03/13 Department of Molecular Biology, Princeton, NJ
02/13 Microbiology and Immunology Department, UCSF
01/13 Molecular and Cell Biology Department, Berkeley, CA
01/13 Department of Immunology, Duke University, NC
01/13 Department of Pathology, Microbiology & Immunology, Vanderbilt University, TN
05/11 Gut Microbiota in Health and Disease Symposium, EPFL, Switzerland

Regional & Institutional

- 11/21 [New England Immunology Conference \(NEIC\), Woods Hole, MA](#)
04/19 COBRE Center for Computational Biology of Human Disease, Brown University
05/16 Pediatric Research Colloquium, Rhode Island Hospital, RI, 5/16
08/15 Molecular & Cellular Biology, Brown University

Teaching

Classes directed

- 16-pres Co-director Biol1600, Development of Vaccines to Infectious Diseases, Enrollment capped at 90 students
17-pres Co-director Biol1250, Host-Microbiome Interactions in Health and Disease, Enrollment capped at 20 students

Guest lecturer

- 15-pres Biol1520, Innate Immunity

18-pres Biol0100, Living Biology
20 Biol0520, Immunology

Mentoring

Postdocs

18-pres Geon Goo Han
15-19 Namrata Iyer | Currently: Marie Curie Fellow, Trinity College, Dublin

Graduate Students

21-pres Rebecca Yunker (Patho)
19-pres Maryam Bonakdar (Patho)
17-22 Sarah Gordon (MCB)
15-20 Mayara Grizotte-Lake (Patho) | Currently: Scientist, Epivax, Providence
15-20 Kellyanne Duncan (Patho) | Currently: Scientist, Seres Therapeutics, Boston

Undergraduate students

21-pres Meera Singh Independent study
19-pres Theodoros Karanikolas Independent study
19-pres Masha Glik Independent study
17-21 Gracie Whelan Honors thesis| Currently: Research Assistant, Harvard
17-19 Douglas Wu Research assistant| Currently: MD program at
OSU
16-19 Kelly Carey-Ewend Honors thesis| Currently: MD/Ph.D. program at
UNC
15-16 Joshua Hackney Research assistant| Currently: Grad student, JHU
15 Monica Thapaliya Leadership Alliance| Currently: Grad student, U Penn

Advising

Ph.D. Thesis Committee Membership

Name	Period	Advisor
Ryan Xu	15-18	Amanda Jamieson
Jenna Perry	15-19	Chris de Graffenried
Aislinn Rowan	16-19	Peter Belenky
Gregory Thomson	17-20	Richard Bennett
Angela Tata	17-21	Laurent Brossay
Gregory Serpa	17-21	Amanda Jamieson
Jenna Wurster	18-22	Peter Belenky
Swathi Penumutch	19-pres	Peter Belenky
Miles Mundy	20-pres	Laurent Brossay

Honors Thesis Committee

Name	Period	Advisor
Michelle Zabat	17	Peter Belenky
Zemplen Pataki	17	Chris de Graffenried
Emma Diamond	20-21	Peter Belenky
Katharine Hewlett	20-21	Peter Belenky

Undergraduate Advising

16-pres Concentration advisor in Human Health & Biology (total 20 students)
16-pres Freshman and Sophomore advisor (total 20 students)

Service

Intramural

16-pres Trainer in MCB Graduate Program
15-pres Trainer in Pathobiology Graduate Program
16, 18 Pathobiology Graduate Student Admissions Committee
20-pres Pathobiology Graduate Program Steering Committee
17-20 Brown University Community Council (BUCC), 2017-2020
18-pres Trainer in CCMB Graduate Program
19-pres MMI Seminar Series speaker selection committee
19 MMI Tenure Track Faculty Recruitment Committee

Extramural

05/18 Co-Chair, Mucosal Immunology Block-Symposium, AAI Meeting, Austin
Texas.
03/19-03/21 Review panel for Research Fellowship Award, Crohn's and Colitis
Foundation of America (CCFA)
04/19 *Ad hoc* NIDDK (ZDK1 GRB-7 O1)
04/19 *Ad hoc* NIH NIAID R13
10/19 *Ad hoc* NIDDK (ZDK1 GRB-7 O1)
06/20 *Ad hoc* NIDDK ZRG1 DKUS-P (02)
12/20 *Ad hoc* NIDDK ZRG1 DKUS-P (02)
03/21 *Ad hoc* NIDDK, DNPD study section
06/21-03/25 Standing member NIDDK, DNPD study section
06/21-05/24 Committee member, AAI Education Committee
15-pres *Ad hoc* reviewer for Cell Host & Microbe, Immunity, J Ex. Medicine,
Nature Communications, Elife, PLOS Pathogen. Gut Microbes, NPJ
Biofilms & Microbiome.