

BIOGRAPHICAL SKETCH

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NAME: PENGHUA WANG

eRA COMMONS USER NAME (credential, e.g., agency login): PENGHUAWANG

POSITION TITLE: Assistant Professor

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Sun Yat-sen University, Guangzhou, China	B.S	07/1992	Biochemistry
The National University of Singapore, Singapore	PHD	04/2006	Biochemistry & Molecular Biology
Yale University School of Medicine, CT, USA	Postdoc	06/2009	Immunology & Virology

A. Personal Statement

Dr. Wang has extensive experience in viral pathogenesis and viral immunology in mouse and cell culture models. Specifically, he attempts to understand pathogenic mechanisms of viral infection at the cellular and animal levels and study the molecular function of host genes that influence viral pathogenesis and the disease outcomes. On the host end, he is keen on the mechanisms of immunopathogenesis of viral infection, detection of viruses and initiation of innate antiviral immune responses. On the viral end, he hopes to understand the mechanisms of immune evasion and modulation of cellular functions by viral proteins. Dr. Wang also has expertise on virus-mosquito interaction and transmission.

Dr. Wang has over 15 years' experience in pattern recognition receptor signaling (PRR), including RIG-I, cGAS-STING and inflammasomes. He studies their physiological functions in the context of viral infection and novel cellular regulators of these signaling pathways. Of note, Dr. Wang pioneers the research on the UBXN family (ubiquitin regulatory X domain-containing proteins) and their roles in PRR signaling and has been continuously working on it for over 8 years.

Besides scientific research, Dr. Wang is actively participating in training next generation of scientists and community outreach. Since 2015, he has served as a mentor for summer research internships (4 high school and undergraduate students), graduate research projects (Four Ph.D. and Master Students), postdoctoral training (8 Ph.D. and M.D. scholars).

Current and recently completed projects that I would like to highlight include:

R21AI177623

Wang (PI)

07/01/2023-06/30/2025

The mechanism of flaviviral suppression of vitamin A metabolism

R21AI170981

Wang (PI)

02/21/2023-01/31/2025

UBXN1 Regulates Inflammasome Signaling

R01AI132526

Wang (PI)

01/03/2018-12/31/2022

The role of UBXNs in antiviral immunity

R21AI155820

Wang (PI)

11/01/2020-10/31/2022

A critical role for UB3N3B in IgG homeostasis and maternal transfer

Citations:

1. Ketkar H, Harrison AG, Graziano VR, Geng T, Yang L, Vella AT, **Wang P**. UB3 Domain Protein 6 Positively Regulates JAK-STAT1/2 Signaling. *J Immunol*. 2021 Jun 1;206(11):2682-2691. doi: 10.4049/jimmunol.1901337. Epub 2021 May 21. PubMed PMID: 34021047; PubMed Central PMCID: PMC8164993.
2. Yang L, Wang L, Ketkar H, Ma J, Yang G, Cui S, Geng T, Mordue DG, Fujimoto T, Cheng G, You F, Lin R, Fikrig E, **Wang P**. UB3N3B positively regulates STING-mediated antiviral immune responses. *Nat Commun*. 2018 Jun 13;9(1):2329. doi: 10.1038/s41467-018-04759-8. PubMed PMID: 29899553; PubMed Central PMCID: PMC5998066.
3. Ma J, Ketkar H, Geng T, Lo E, Wang L, Xi J, Sun Q, Zhu Z, Cui Y, Yang L, **Wang P**. Zika Virus Non-structural Protein 4A Blocks the RLR-MAVS Signaling. *Front Microbiol*. 2018; 9:1350. doi: 10.3389/fmicb.2018.01350. eCollection 2018. PubMed PMID: 29988497; PubMed Central PMCID: PMC6026624.
4. **Wang P**, Zhu S, Yang L, Cui S, Pan W, Jackson R, Zheng Y, Rongvaux A, Sun Q, Yang G, Gao S, Lin R, You F, Flavell R, Fikrig E. Nlrp6 regulates intestinal antiviral innate immunity. *Science*. 2015 Nov 13;350(6262):826-30. doi: 10.1126/science. aab3145. Epub 2015 Oct 22. PubMed PMID: 26494172; PubMed Central PMCID: PMC4927078.

B. Positions, Scientific Appointments, and Honors

Positions

- 2023-present: Associate Professor w/tenure, Department of Immunology, the University of Connecticut Health Center, Farmington, CT.
- 2018-2022: Assistant Professor, Department of Immunology, the University of Connecticut Health Center, Farmington, CT.
- 2015-2018: Assistant Professor, Department of Microbiology & Immunology, New York Medical College, Valhalla, NY.
- 2015-present: Adjunct Assistant Professor, Internal Medicine, Yale University School of Medicine, New Haven, CT
- 2009-2015: Associate Research Scientist, Internal Medicine, Yale University School of Medicine, New Haven, CT.
- 2006-2009: Postdoctoral Associate, Internal Medicine, Yale University School of Medicine, New Haven, CT
- 2001-2006: Research Associate, Department of Biochemistry, the National University of Singapore, Singapore.
- 1998-2000: Production Engineer, Klenco (s) Pte Ltd, Singapore.
- 1992-1998: Research and Development Engineer and Manager, Haifeng Pharmaceuticals Co. Lt, Shandong, China.

Scientific Appointments

- 2018-present: Member of the Editorial Board of *Antimicrobial Agents and Chemotherapy*, American Society of Microbiology; *Frontiers in Microbiology*; *The Innovation*, Cell Press.
- 2015-present: *Ad hoc* grant reviewer, National Institutes of Health VPI Study Section and several special emphasis panels.
- 2022-present: *Ad hoc* grant reviewer, Department of Defense Viral Diseases panel.
- 2014-present: *Ad hoc* grant reviewer for Hongkong Health and Medical Research Fund (HMRF), Israel Science Foundation, New Frontiers in Research Fund of Canada, French National Research Agency, Swiss National Science Foundation and FRQNT of Canada.
- 2015-present: Member, American Society for Virology, American Association of Immunologists

Honors

- 2010: Travel award, NIAID Dengue Virus Workshop, Portland, Oregon
2009: Best Poster Award at Northeast Biodefense 2009 Annual Meeting
2009: Northeast Biodefense Center, Career Development Award (2009-2011)
2001: National University of Singapore Research Graduate Scholarship (2001-2005)
1990: Sun Yat-sen University Scholarship for Outstanding Students (10%)
1989: Sun Yat-sen University Scholarship for Outstanding Students (5%)

C. Contributions to Science

- 1. Pathogen pattern recognition receptor signaling.** Toll like receptors (TLRs)/RIG-I like receptors (RLRLs)/NOD-like receptors (NLRs) and the cyclic GMP-AMP synthase (cGAS)-stimulator of interferon genes (STING) are important pathogen sensing pathways that are critical for induction of innate immune response and activation of adaptive immunity. Dr. Wang attempts to understand their functions during viral infection and how they are regulated by cellular and viral factors.
 - Ketkar H, Harrison AG, Graziano VR, Geng T, Yang L, Vella AT, **Wang P**. UBX Domain Protein 6 Positively Regulates JAK-STAT1/2 Signaling. *J Immunol*. 2021 Jun 1;206(11):2682-2691. doi: 10.4049/jimmunol.1901337. Epub 2021 May 21. PubMed PMID: 34021047; PubMed Central PMCID: PMC8164993.
 - Yang L, Wang L, Ketkar H, Ma J, Yang G, Cui S, Geng T, Mordue DG, Fujimoto T, Cheng G, You F, Lin R, Fikrig E, **Wang P**. UBXN3B positively regulates STING-mediated antiviral immune responses. *Nat Commun*. 2018 Jun 13;9(1):2329. doi: 10.1038/s41467-018-04759-8. PubMed PMID: 29899553; PubMed Central PMCID: PMC5998066.
 - Zhu S, Ding S, **Wang P**, Wei Z, Pan W, Palm NW, Yang Y, Yu H, Li HB, Wang G, Lei X, de Zoete MR, Zhao J, Zheng Y, Chen H, Zhao Y, Jurado KA, Feng N, Shan L, Kluger Y, Lu J, Abraham C, Fikrig E, Greenberg HB, Flavell RA. Nlrp9b inflammasome restricts rotavirus infection in intestinal epithelial cells. *Nature*. 2017 Jun 29;546(7660):667-670. doi: 10.1038/nature22967. Epub 2017 Jun 21. PubMed PMID: 28636595; PubMed Central PMCID: PMC5787375.
 - **Wang P**, Zhu S, Yang L, Cui S, Pan W, Jackson R, Zheng Y, Rongvaux A, Sun Q, Yang G, Gao S, Lin R, You F, Flavell R, Fikrig E. Nlrp6 regulates intestinal antiviral innate immunity. *Science*. 2015 Nov 13;350(6262):826-30. doi: 10.1126/science.aab3145. Epub 2015 Oct 22. PubMed PMID: 26494172; PubMed Central PMCID: PMC4927078.
- 2. Pathogenesis of mosquito-borne diseases.** Mosquito-transmitted flaviviruses and alphaviruses such as Zika and Chikungunya viruses have re-emerged as a significant public health threat. Dr. Wang attempts to identify novel host factors that restrict or facilitate viral pathogenesis *in vivo* and *in vitro*. Understanding the molecular mechanisms underlying the pathogenesis of these disease conditions and virus-specific host immune response can advance the development of specific antiviral therapeutics and vaccines.
 - Geng T, Yang D, Lin T, Cahoon JG, Wang P. UBXN3B Controls Immunopathogenesis of Arthritogenic Alphaviruses by Maintaining Hematopoietic Homeostasis. *mBio*. 2022 Dec 20;13(6):e0268722. doi: 10.1128/mbio.02687-22. Epub 2022 Nov 15. PubMed PMID: 36377866; PubMed Central PMCID: PMC9765034.
 - Geng T, Lin T, Yang D, Harrison AG, Vella AT, Fikrig E, **Wang P**. A Critical Role for STING Signaling in Limiting Pathogenesis of Chikungunya Virus. *J Infect Dis*. 2021 Jun 15;223(12):2186-2196. doi: 10.1093/infdis/jiaa694. PubMed PMID: 33161431; PubMed Central PMCID: PMC8205639.
 - Lin T, Geng T, Harrison AG, Yang D, Vella AT, Fikrig E, **Wang P**. CXCL10 Signaling Contributes to the Pathogenesis of Arthritogenic Alphaviruses. *Viruses*. 2020 Nov 2;12(11). doi: 10.3390/v12111252. PubMed PMID: 33147869; PubMed Central PMCID: PMC7692144.
 - Yang L, Geng T, Yang G, Ma J, Wang L, Ketkar H, Yang D, Lin T, Hwang J, Zhu S, Wang Y, Dai J, You F, Cheng G, Vella AT, Flavell RA, Fikrig E, **Wang P**. Macrophage scavenger receptor 1 controls Chikungunya virus infection through autophagy in mice. *Commun Biol*. 2020 Oct 8;3(1):556. doi: 10.1038/s42003-020-01285-6. PubMed PMID: 33033362; PubMed Central PMCID: PMC7545163.

3. Mechanisms of flavivirus transmission. In nature, most flaviviruses such as dengue and Zika viruses are transmitted by mosquitoes. Dr. Wang is interested in identifying both the mosquito and mammalian factors that facilitate or restrict viral transmission by mosquitoes, especially understanding how flaviviruses manipulate the skin immune system, microbiota and skin odors to attract mosquitoes.

- Zhang H, Zhu Y, Liu Z, Peng Y, Peng W, Tong L, Wang J, Liu Q, **Wang P**, Cheng G. A volatile from the skin microbiota of flavivirus-infected hosts promotes mosquito attractiveness. *Cell*. 2022 Jun 28. doi: 10.1016/j.cell.2022.05.016. PubMed PMID: 35777355.
- Yu X, Tong L, Zhang L, Yang Y, Xiao X, Zhu Y, **Wang P**, Cheng G. Lipases secreted by a gut bacterium inhibit arbovirus transmission in mosquitoes. *PLoS Pathog*. 2022 Jun;18(6):e1010552. doi: 10.1371/journal.ppat.1010552. eCollection 2022 Jun. PubMed PMID: 35679229; PubMed Central PMCID: PMC9182268.
- Chen L, Zhang X, Guo X, Peng W, Zhu Y, Wang Z, Yu X, Shi H, Li Y, Zhang L, Wang L, **Wang P**, Cheng G. Neighboring mutation-mediated enhancement of dengue virus infectivity and spread. *EMBO Rep*. 2022 Nov 7;23(11):e55671. doi: 10.15252/embr.202255671. Epub 2022 Oct 5. PubMed PMID: 36197120; PubMed Central PMCID: PMC9638853.
- Zhu Y, Zhang C, Zhang L, Yang Y, Yu X, Wang J, Liu Q, **Wang P**, Cheng G. A human-blood-derived microRNA facilitates flavivirus infection in fed mosquitoes. *Cell Rep*. 2021 Dec 14;37(11):110091. doi: 10.1016/j.celrep.2021.110091. PubMed PMID: 34910910.

4. Pathogenesis of COVID-19. COVID-19 constitutes the greatest global public health crisis in the 21st century. I am interested in the mechanisms of immune control and pathogenesis of SARS-CoV-2. Specifically, I am studying the role of RLRs in sensing SARS-CoV-2 and activating innate immune responses, and characterizing proviral host factors that could be antiviral drug targets.

- Yu X, Tong L, Zhang L, Yang Y, Xiao X, Zhu Y, **Wang P**, Cheng G. Lipases secreted by a gut bacterium inhibit arbovirus transmission in mosquitoes. *PLoS Pathog*. 2022 Jun;18(6):e1010552. doi: 10.1371/journal.ppat.1010552. eCollection 2022 Jun. PubMed PMID: 35679229; PubMed Central PMCID: PMC9182268.
- Tong L, Xiao X, Li M, Fang S, Ma E, Yu X, Zhu Y, Wu C, Tian D, Yang F, Sun J, Qu J, Zheng N, Liao S, Tai W, Feng S, Zhang L, Li Y, Wang L, Han X, Sun S, Yang L, Zhong H, Zhao J, Liu W, Liu X, **Wang P**, Li L, Zhao G, Zhang R, Cheng G. A glucose-like metabolite deficient in diabetes inhibits cellular entry of SARS-CoV-2. *Nat Metab*. 2022 May;4(5):547-558. doi: 10.1038/s42255-022-00567-z. Epub 2022 May 9. PubMed PMID: 35534727.
- Yang DM, Geng TT, Harrison AG, **Wang PH**. Differential roles of RIG-I like receptors in SARS-CoV-2 infection. *Mil Med Res*. 2021 Sep 7;8(1):49. doi: 10.1186/s40779-021-00340-5. PubMed PMID: 34488908; PubMed Central PMCID: PMC8421188.
- Harrison AG, Lin T, **Wang P**. Mechanisms of SARS-CoV-2 Transmission and Pathogenesis. *Trends Immunol*. 2020 Dec;41(12):1100-1115. doi: 10.1016/j.it.2020.10.004. Epub 2020 Oct 14. Review. PubMed PMID: 33132005; PubMed Central PMCID: PMC7556779.

Complete List of Published Work in MyBibliography (90 publications, 25 since Jan 2020):

<https://www.ncbi.nlm.nih.gov/myncbi/collections/mybibliography/?action=openalert>