Stanford

Taia T. Wang, MD, PhD, MSCI

Assistant Professor of Medicine (Infectious Diseases) and of Microbiology and Immunology

Medicine - Infectious Diseases

CONTACT INFORMATION

- **Lab Manager**

  Courtney Scallan

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Bio

BIO

Taia Wang, MD, PhD is an Assistant Professor of Medicine and of Microbiology and Immunology with research aimed at defining mechanisms in human immunity and disease. The Wang laboratory uses in vivo and in vitro systems to study how antibodies can modulate viral infections or anti-viral vaccine responses through signaling interactions with Fc gamma receptors (Fc#Rs). The overarching goal of projects in the Wang lab is to elucidate Fc#R pathways that can be harnessed towards the development of enhanced vaccines and therapeutics.

Dr. Wang obtained M.D. and Ph.D. training at Mount Sinai School of Medicine. Her Ph.D. training focused on mechanisms in immunity against influenza viruses (P. Palese). Following this training, she completed postdoctoral research at the Rockefeller University where she studied human IgG and Fc#R biology in the Laboratory of Molecular Genetics and Immunology (J. Ravetch). Most recently, Dr. Wang received the Searle Scholar's Award and was selected to be a Chan Zuckerberg Investigator for her work in the pathogenesis of infectious diseases.

SARS-CoV-2, dengue viruses, influenza viruses, disease pathogenesis, influenza virus vaccines

ACADEMIC APPOINTMENTS

- Assistant Professor, Medicine - Infectious Diseases
- Assistant Professor, Microbiology & Immunology
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Associate Director, Stanford Medical Scientist Training Program, (2020- present)

HONORS AND AWARDS

- Searle Scholars Award, The Searle Scholars Program (2018)
- Investigator, Chan Zuckerberg Biohub (2017)
- Young Physician-Scientist Award, The American Society for Clinical Investigation (2017)
- Leona M. and Harry B. Helmsley Scholar, Helmsley Charitable Trust (2015)

- Niarchos Scholar, Stavros Niarchos Foundation (2014)
- Iris and Junming Le Scholar, The Iris and Junming Le Foundation (2013)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Infectious Diseases Society of America (2019 - present)
- Member, Henry Kunkel Society (2018 - present)
- Member, American Society for Microbiology (2016 - present)
- Associate Scientific Advisor, Science Translational Medicine (2015 - 2016)

PROFESSIONAL EDUCATION

- Postdoctoral training, Rockefeller University , Fc receptor biology and human immunology (2016)
- MSCI, Rockefeller University , Masters of Science in Clinical Investigation (2015)
- MD, Mount Sinai School of Medicine , Medicine (2012)
- PhD, Mount Sinai School of Medicine , Virology (2010)

LINKS

- NY Times: After Recovery From the Coronavirus, Most People Carry Antibodies: https://www.nytimes.com/2020/05/07/health/coronavirus-antibody-prevalence.html?searchResultPosition=1
- The Scientist: What Do Antibody Tests For SARS-CoV-2 Tell Us About Immunity?: https://www.the-scientist.com/news-opinion/what-do-antibody-tests-for-sars-cov-2-tell-us-about-immunity--67425
- The Smithsonian: What Scientists Know About Immunity to the Novel Coronavirus: https://www.smithsonianmag.com/science-nature/can-you-become-immune-sars-cov-2-180974532/
- The Atlantic: Immunology Is Where Intuition Goes to Die: https://www.theatlantic.com/health/archive/2020/08/covid-19-immunity-is-the-pandemics-central-mystery/614956/
- NY Times: In Early February, the Coronavirus Was Moving Through New York: https://www.nytimes.com/2020/06/30/health/coronavirus-ny.html?searchResultPosition=2
- NY Times: The Coronavirus Could Dodge Some Treatments, Study Suggests: https://www.nytimes.com/2020/07/28/health/coronavirus-mutation-spike-treatment.html?searchResultPosition=3
- Stanford faculty named in first cohort of Chan Zuckerberg Biohub investigators: http://news.stanford.edu/2017/02/08/stanford-faculty-named-first-cohort-chan-zuckerberg-biohub-investigators/
- Wang, assistant professor of medicine, of microbiology and of immunology, received two seven-year awards to study influenza immunity: a $1.5 million grant from St. Jude Children’s Research Hospital for improving knowledge of how influenza immunity develops during infancy and childhood, and a $2.2 million grant from the Icahn School of Medicine at Mount Sinai for developing longer-lasting influenza vaccines.: http://med.stanford.edu/news/all-news/brands/notable.html
- An Open Label Study of IgG Fc Glycan Composition in Human Immunity: https://clinicaltrials.gov/ct2/show/NCT01967238?term=taia+wang&rank=1
- 5 Questions: Taia Wang on why some develop severe dengue disease: https://med.stanford.edu/news/all-news/2017/02/5-questions-taia-wang-on-clues-to-severe-dengue-disease.html
- A puzzling path from infection to Guillain-Barré syndrome: http://stm.sciencemag.org/content/8/326/326ec28
- Two-pronged approach to prevent pneumonia: http://stm.sciencemag.org/content/7/296/296ec121
- Influenza antibody archaeology: http://stm.sciencemag.org/content/8/320/320ec4
- Original antigenic sin strikes again?: http://stm.sciencemag.org/content/7/290/290ec94.e-letters
- Polypharmacy repercussions: http://stm.sciencemag.org/content/7/314/314ec200

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Laboratory of Mechanisms in Human Immunity and Disease Pathogenesis

Studies in our lab are aimed at defining mechanisms in human immunity and disease. We are particularly interested the hypothesis that diversity in antibody-based signaling that arises from diversity in IgG antibodies and their receptors, is a central driver of heterogeneity in human immune functioning and susceptibility to infectious diseases. We are studying how the Fc domain repertoire of an individual impacts the quality of effector cell responses that can be recruited during immune activation and how selectivity of effector responses contributes to immunity and disease.

SARS-CoV-2, dengue viruses, influenza viruses, disease pathogenesis, influenza vaccines

Current clinical studies:

Recruiting:

An Open Label Study of IgG Fc Glycan Composition in Human Immunity

Principal Investigator: Taia T. Wang, MD, PhD

ClinicalTrials.gov Identifier:

NCT01967238

PROJECTS

- Regulation of the IgG Fc domain repertoire - NIH NIAID R01 - Stanford University
- Immune determinants of dengue disease severity - Searle Scholars Award - Stanford University
- Defining the role of IgG Fc domains and their receptors in antiviral immunity - Chan Zuckerberg Initiative
- Enhancing IgG transfer to prevent perinatal infections - Bill & Melinda Gates Foundation - Rockefeller University
- Impact of Initial Influenza Exposure on Immunity in Infants - NIH NIAID U19 - St. Jude Children’s Research Hospital
- Center for Influenza Vaccine Immunology and Development - NIH NIAID U19 - Icahn School of Medicine at Mount Sinai
- Rockefeller University Cooperative Centers of Human Immunology - NIH NIAID U19
- Stanford Cooperative Centers of Human Immunology - NIH NIAID U19 - Stanford University
- Mechanisms and Duration of Immunity to SARS-CoV-2 - NIH NIAID U19 - Stanford University
- Antibody responses in symptomatic and asymptomatic SARS-CoV-2 infections - NIH NIAID - Rockefeller University
- Immunity against COVID-19 - Fast Grants - Stanford University
- SARS-CoV-2 vaccine designed to enhance immunogenicity of the receptor binding domain - Bill and Melinda Gates Foundation - Stanford University

Teaching

COURSES

2021-22

- Advanced Immunology II: IMMUNOL 202 (Spr)
- Physician Scientist Hour: INDE 217 (Aut, Win, Spr)

2020-21

- Advanced Immunology II: IMMUNOL 202 (Spr)
- Physician Scientist Hour: INDE 217 (Aut, Win, Spr)

2019-20

- Advanced Immunology II: IMMUNOL 202 (Spr)

2018-19

- Advanced Immunology II: IMMUNOL 202 (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Usama Ashraf, Saborni Chakraborty, Bowie Cheng, Nimish Kathale

Doctoral Dissertation Advisor (AC)

Joseph González

Postdoctoral Research Mentor

Usama Ashraf, Saborni Chakraborty, Bowie Cheng, Nimish Kathale

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Immunology (Phd Program)
- Microbiology and Immunology (Phd Program)

Publications

PUBLICATIONS

- **Early non-neutralizing, afucosylated antibody responses are associated with COVID-19 severity.** *Science translational medicine*
  Chakraborty, S., Gonzalez, J. C., Sievers, B. L., Mallajosyula, V., Chakraborty, S., Dubey, M., Ashraf, U., Cheng, B. Y., Kathale, N., Tran, K. Q., Scallan, C., Sinnott, A., Cassidy, et al
  1800: eabm7853

- **Antibodies elicited by SARS-CoV-2 infection or mRNA vaccines have reduced neutralizing activity against Beta and Omicron pseudoviruses.** *Science translational medicine*
  Sievers, B. L., Chakraborty, S., Xue, Y., Gelbart, T., Gonzalez, J. C., Cassidy, A. G., Golan, Y., Prahl, M., Gaw, S. L., Arunachalam, P. S., Blish, C. A., Boyd, S. D., Davis, et al
  1800: eabn7842

- **Current and novel biomarkers of thrombotic risk in COVID-19: a Consensus Statement from the International COVID-19 Thrombosis Biomarkers Colloquium.** *Nature reviews. Cardiology*
  Gorog, D. A., Storey, R. F., Gurbel, P. A., Tantry, U. S., Berger, J. S., Chan, M. Y., Duerschmied, D., Smyth, S. S., Parker, W. A., Ajjan, R. A., Vilahur, G., Badimon, L., Berg, et al
  1800

- **New-onset IgG autoantibodies in hospitalized patients with COVID-19.** *Nature communications*
  Chang, S. E., Feng, A., Meng, W., Apostolidis, S. A., Mack, E., Artandi, M., Barman, L., Bennett, K., Chakraborty, S., Chang, I., Cheung, P., Chinthrajah, S., Dhingra, et al
  2021; 12 (1): 5417

- **An aberrant inflammatory response in severe COVID-19.** *Cell host & microbe*
  Merad, M., Subramanian, A., Wang, T. T.
  2021; 29 (7): 1043-1047

- **Immunity after SARS-CoV-2 infections.** *Nature immunology*
  Jagannathan, P., Wang, T. T.
  2021

- **Engineering luminescent biosensors for point-of-care SARS-CoV-2 antibody detection.** *Nature biotechnology*
  Elledge, S. K., Zhou, X. X., Byrnes, J. R., Martinko, A. J., Lui, I., Pance, K., Lim, S. A., Glasgow, J. E., Glasgow, A. A., Turcios, K., Iyer, N. S., Torres, L., Peluso, et al
  2021

- **SARS-CoV-2 vaccines in advanced clinical trials: where do we stand.** *Advanced drug delivery reviews*
  Chakraborty, S. n., Mallajosyula, V. n., Tato, C. M., Tan, G. S., Wang, T. T.

2021

- **Illuminating the Fc dependence of SARS-CoV-2 neutralization.** *Immunity*
  González, J. C., Wang, T. T.
  2021

- **Peginterferon Lambda-1a for treatment of outpatients with uncomplicated COVID-19: a randomized placebo-controlled trial.** *Nature communications*
  Jagannathan, P. n., Andrews, J. R., Bonilla, H. n., Hedlin, H. n., Jacobson, K. B., Balasubramanian, V. n., Purington, N. n., Kamble, S. n., de Vries, C. R., Quintero, O. n., Feng, K. n., Ley, C. n., Winslow, et al
  2021; 12 (1): 1967

- **Proinflammatory IgG Fc structures in patients with severe COVID-19** *Nature Immunology*
  Chakraborty, S., Gonzalez, J., Edwards, K., ..., Wang, T. T.
  2021

- **Immunoglobulin E sialylation regulates allergic responses.** *Immunology and cell biology*
  Xie, M. M., Bertozzi, C. R., Wang, T. T.
  2020

- **Maternal Anti-Dengue IgG Fucosylation Predicts Susceptibility to Dengue Disease in Infants.** *Cell reports*
  Thulin, N. K., Brewer, R. C., Sherwood, R., Bournazos, S., Edwards, K. G., Ramadoss, N. S., Taubenberger, J. K., Memoli, M., Gentles, A. J., Jagannathan, P., Zhang, S., Libraty, D. H., Wang, et al
  2020; 31 (6): 107642

- **Defining the features and duration of antibody responses to SARS-CoV-2 infection associated with disease severity and outcome.** *Science immunology*
  Röltgen, K. n., Powell, A. E., Wirz, O. F., Stevens, B. A., Hogan, C. A., Najeeb, J. n., Hunter, M. n., Wang, H. n., Sahoo, M. K., Huang, C. n., Yamamoto, F. n., Manohar, M. n., Manalac, et al
  2020; 5 (54)

- **Engineering luminescent biosensors for point-of-care SARS-CoV-2 antibody detection.** *medRxiv : the preprint server for health sciences*
  Elledge, S. K., Zhou, X. X., Byrnes, J. R., Martinko, A. J., Lui, I. n., Pance, K. n., Lim, S. A., Glasgow, J. E., Glasgow, A. A., Turcios, K. n., Iyer, N. n., Torres, L. n., Peluso, et al
  2020

- **FcRn, but not Fc#Rs, drives maternal-fetal transplacental transport of human IgG antibodies.** *Proceedings of the National Academy of Sciences of the United States of America*
  Borghi, S. n., Bournazos, S. n., Thulin, N. K., Li, C. n., Gajewski, A. n., Sherwood, R. W., Zhang, S. n., Harris, E. n., Jagannathan, P. n., Wang, L. X., Ravetch, J. V., Wang, T. T.
  2020

- **Competitive SARS-CoV-2 Serology Reveals Most Antibodies Targeting the Spike Receptor-Binding Domain Compete for ACE2 Binding.** *mSphere*
  Byrnes, J. R., Zhou, X. X., Lui, I. n., Elledge, S. K., Glasgow, J. E., Lim, S. A., Loudermilk, R. P., Chiu, C. Y., Wang, T. T., Wilson, M. R., Leung, K. K., Wells, J. A.
  2020; 5 (5)

- **Human B Cell Clonal Expansion and Convergent Antibody Responses to SARS-CoV-2.** *Cell host & microbe*
  Nielsen, S. C., Yang, F. n., Jackson, K. J., Hoh, R. A., Röltgen, K. n., Jean, G. H., Stevens, B. A., Lee, J. Y., Rustagi, A. n., Rogers, A. J., Powell, A. E., Hunter, M. n., Najeeb, et al
  2020

- **Imbalanced Host Response to SARS-CoV-2 Drives Development of COVID-19.** *Cell*
  Blanco-Melo, D. n., Nilsson-Payant, B. E., Liu, W. C., Uhl, S. n., Hoagland, D. n., Møller, R. n., Jordan, T. X., Oishi, K. n., Panis, M. n., Sachs, D. n., Wang, T. T., Schwartz, R. E., Lim, et al
  2020; 181 (5): 1036–45.e9

- **Proinflammatory IgG Fc structures in patients with severe COVID-19** *Nature Immunology*
  Chakraborty, S., Gonzales, J., Edwards, K., Mallajosyulla, V., Buzzanco, A. S., Sherwood, R., Buffone, C., Kathale, N., Providenza, S., Xie, M. M., Andrews, J. R., Blish, C. A., Singh, et al
  2020

- **Functional diversification of IgGs through Fc glycosylation** *JOURNAL OF CLINICAL INVESTIGATION*
  Wang, T. T., Ravetch, J.

2019; 129 (9): 3492–98

- **IgG Fc Glycosylation in Human Immunity.** *Current topics in microbiology and immunology*
  Wang, T. T.
  2019

- **Immunity by Design.** *Cell host & microbe*
  Wang, T. T.
  2018; 23 (4): 430–31

- **The Role of Fc Gamma Receptors in Broad Protection against Influenza Viruses.** *Vaccines*
  Thulin, N. K., Wang, T. T.
  2018; 6 (3)

- **Immunological responses to influenza vaccination: lessons for improving vaccine efficacy.** *Current opinion in immunology*
  Wang, T. T., Bournazos, S. n., Ravetch, J. V.
  2018; 53: 124–29

- **IgG antibodies to dengue enhanced for Fc#RIIIA binding determine disease severity.** *Science (New York, N.Y.)*
  Wang, T. T., Sewatanon, J. n., Memoli, M. J., Wrammert, J. n., Bournazos, S. n., Bhaumik, S. K., Pinsky, B. A., Chokephaibulkit, K. n., Onlamoon, N. n., Pattanapanyasat, K. n., Taubenberger, J. K., Ahmed, R. n., Ravetch, et al
  2017; 355 (6323): 395–98

- **Signaling by Antibodies: Recent Progress** *ANNUAL REVIEW OF IMMUNOLOGY, VOL 35*
  Bournazos, S., Wang, T. T., Dahan, R., Maamary, J., Ravetch, J. V., Littman, D. R., Yokoyama, W. M.
  2017; 35: 285–311

- **Sex Differences in Autoimmune Diseases** *HORMONES, BRAIN AND BEHAVIOR, VOL 4: CLINICALLY IMPORTANT HORMONE EFFECTS ON BRAIN AND BEHAVIOR, 3RD EDITION*
  Voskuhl, R., Wang, T. T., Lightman, S., Pfaff, D. W., Joels, M.
  2017: 445–72

- **Increasing the breadth and potency of response to the seasonal influenza virus vaccine by immune complex immunization.** *Proceedings of the National Academy of Sciences of the United States of America*
  Maamary, J. n., Wang, T. T., Tan, G. S., Palese, P. n., Ravetch, J. V.
  2017

- **Signaling by Antibodies: Recent Progress** *Annual Review of Immunology*
  Bournazos, S., Wang, T. T., Dahan, R., Maamary, J., Ravetch, J. V.
  2017; 35 (April 26): 285-311

- **The Role and Function of Fc# Receptors on Myeloid Cells.** *Microbiology spectrum*
  Bournazos, S. n., Wang, T. T., Ravetch, J. V.
  2016; 4 (6)

- **Sex Differences in Autoimmune Disease** *Hormones, Brain and Behavior*
  Voskuhl, R., Wang, T. T.
  Academic Press.2016; 3: 445–465

- **Anti-HA Glycoforms Drive B Cell Affinity Selection and Determine Influenza Vaccine Efficacy** *CELL*
  Wang, T. T., Maamary, J., Tan, G. S., Bournazos, S., Davis, C. W., Krammer, F., Schlesinger, S. J., Palese, P., Ahmed, R., Ravetch, J. V.
  2015; 162 (1): 160-169

- **IgG anti-HA Fc glycoform modulation is predictive of influenza vaccine efficacy**
  Wang, T., Maamary, J., Schlesinger, S., Ravetch, J.
  AMER ASSOC IMMUNOLOGISTS.2015

- **Immune Complexes: Not Just an Innocent Bystander in Chronic Viral Infection** *IMMUNITY*
  Wang, T. T., Ravetch, J. V.
  2015; 42 (2): 213-215

- **Type I and type II Fc receptors regulate innate and adaptive immunity** *NATURE IMMUNOLOGY*
  Pincetic, A., Bournazos, S., DiLillo, D. J., Maamary, J., Wang, T. T., Dahan, R., Fiebiger, B., Ravetch, J. V.
  2014; 15 (8): 707-716
- **Emergence and evolution of the 1918, 1957, 1968, and 2009 pandemic virus strains** *Textbook of Influenza*
  Wang, T. T., Palese, P.
  John Wiley & Sons.2013; 2
- **Emergence and evolution of the 1918, 1957, 1968, and 2009 pandemic virus strains** *TEXTBOOK OF INFLUENZA, 2ND EDITION*
  Wang, T. T., Palese, P., Webster, R. G., Monto, A. S., Braciale, T. J., Lamb, R. A.
  2013: 218–28
- **Seroevidence for H5N1 Influenza Infections in Humans: Meta-Analysis** *SCIENCE*
  Wang, T. T., Parides, M. K., Palese, P.
  2012; 335 (6075): 1463-1463
- **H5N1 influenza viruses: Facts, not fear** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Palese, P., Wang, T. T.
  2012; 109 (7): 2211-2213
- **Hemagglutinin stalk antibodies elicited by the 2009 pandemic influenza virus as a mechanism for the extinction of seasonal H1N1 viruses** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Pica, N., Hai, R., Krammer, F., Wang, T. T., Maamary, J., Eggink, D., Tan, G. S., Krause, J. C., Moran, T., Stein, C. R., Banach, D., Wrammert, J., Belshe, et al
  2012; 109 (7): 2573-2578
- **Why Do Influenza Virus Subtypes Die Out? A Hypothesis** *MBIO*
  Palese, P., Wang, T. T.
  2011; 2 (5)
- **Biochemistry. Catching a moving target.** *Science*
  Wang, T. T., Palese, P.
  2011; 333 (6044): 834-835
- **Vaccination with a synthetic peptide from the influenza virus hemagglutinin provides protection against distinct viral subtypes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Wang, T. T., Tan, G. S., Hai, R., Pica, N., Ngai, L., Ekiert, D. C., Wilson, I. A., Garcia-Sastre, A., Moran, T. M., Palese, P.
  2010; 107 (44): 18979-18984
- **A Nine-Segment Influenza A Virus Carrying Subtype H1 and H3 Hemagglutinins** *JOURNAL OF VIROLOGY*
  Gao, Q., Lowen, A. C., Wang, T. T., Palese, P.
  2010; 84 (16): 8062-8071
- **PB1-F2 Expression by the 2009 Pandemic H1N1 Influenza Virus Has Minimal Impact on Virulence in Animal Models** *JOURNAL OF VIROLOGY*
  Hai, R., Schmolke, M., Varga, Z. T., Manicassamy, B., Wang, T. T., Belser, J. A., Pearce, M. B., Garcia-Sastre, A., Tumpey, T. M., Palese, P.
  2010; 84 (9): 4442-4450
- **Influenza Virus Vaccine Based on the Conserved Hemagglutinin Stalk Domain** *MBIO*
  Steel, J., Lowen, A. C., Wang, T. T., Yondola, M., Gao, Q., Haye, K., Garcia-Sastre, A., Palese, P.
  2010; 1 (1)
- **Broadly Protective Monoclonal Antibodies against H3 Influenza Viruses following Sequential Immunization with Different Hemagglutinins** *PLOS PATHOGENS*
  Wang, T. T., Tan, G. S., Hai, R., Pica, N., Petersen, E., Moran, T. M., Palese, P.
  2010; 6 (2)
- **Unraveling the Mystery of Swine Influenza Virus** *CELL*
  Wang, T. T., Palese, P.
  2009; 137 (6): 983-985
- **Universal epitopes of influenza virus hemagglutinins?** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*

Wang, T. T., Palese, P.
2009; 16 (3): 233-234

- **The capsule of Bacillus anthracis behaves as a thymus-independent type 2 antigen** *INFECTION AND IMMUNITY*
  Wang, T. T., Lucas, A. H.
  2004; 72 (9): 5460-5463

- **Induction of opsonic antibodies to the gamma-D-glutamic acid capsule of Bacillus anthracis by immunization with a synthetic peptide-carrier protein conjugate** *FEMS IMMUNOLOGY AND MEDICAL MICROBIOLOGY*
  Wang, T. T., Fellows, P. F., Leighton, T. J., Lucas, A. H.
  2004; 40 (3): 231-237