ANGEL KRITTINAN KONGSOMBOONVECH, PhD

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SUMMARY

Collaborative, organized, and detail-oriented Scientist with passion and dedication to the fields of molecular biology, immunology, host-pathogen interactions, and infectious diseases for the past 9 years. Extensive mentorship experience with strong communication skills. I am eager to apply the skillset I developed during my training in a Scientist role for novel therapeutic strategies for life-altering diseases.

TECHNICAL SKILLS SUMMARY

- **Cell Culture:** fibroblasts (human, mouse), immortalized cell lines, stem cells, immune cells (e.g. T cells, macrophages), and parasites; cell and parasite viability assays
- **Cell differentiation:** erythropoiesis, bone marrow cells differentiation into macrophages and dendritic cells
- **Gene Editing:** CRISPR/Cas9 (e.g. human hematopoietic stem cells, parasites)
- **Molecular Biology:** PCR, molecular cloning, Western Blot and phospho-Western Blot
- **Immunology:** Flow cytometry (Miltenyi MACSQuant, BD LSR II), cyTOF, ELISA, immunofluorescence assays, T cell activation and cytokine response assays
- ***in vivo* work**: mice handling, colony maintenance, breeding, dissection, organs harvest, tail bleeds
- **Software:** GraphPad Prism, FlowJo, Sequencher, SnapGene
- **Soft skills:** Mentored 8 undergraduate researchers in total; led and co-led 4+ projects, trained in management (Yale University Professional Development course)

RESEARCH EXPERIENCE

Research Scientist; Stanford University School of Medicine; 09/2024 – Present

Investigating the role of CD44 cross-linking in erythrocytes during malaria parasite invasion

- Exploring CD44-dependent signaling in malaria parasite invasion through generation of truncated CD44 cultured RBCs from human hematopoietic stem cells.

Postdoctoral Scholar; Stanford University School of Medicine; 01/2021 – 08/2024

Investigating the function of erythrocyte CD44 during malaria parasite invasion

- Optimized protocol to enrich the CD44-null population following CRISPR/Cas9 by two-fold, and validated by flow cytometry.
- Discovered ground-breaking interaction that promotes malaria parasite invasion.
- Optimized and executed phospho-Western blot of ghost erythrocytes to determine novel CD44-dependent phosphorylation of erythrocyte cytoskeletal proteins.
- Mentor undergraduate summer students from Stanford's Diversity, Respect, and Inclusion are Vital for Excellence (DRIVE) program.

Investigating host cell responses of erythroid progenitor cells to parasite infection

- Developed and optimized assays to identify changes in erythroid progenitor in response to *Plasmodium falciparum* infection.
- Led efforts to design and improve cyTOF panels of 40 markers.
- Generated a GFP-expressing *P. falciparum* strain.
- Improved parasite detection by 20% with flow cytometry protocol for infected erythrocytes.
- Supervised and led the project to successfully assess perturbations of erythroid development through synchronization of parasite cultures and infection of various stages of primary erythroid progenitor cells.

Developing innovative therapy for heart failure: Mitochondria-rich extracellular vesicles from erythroid progenitor cells

- Led and established collaboration with an academic partner through experimental planning and execution as well as materials preparation to advance our labs' collaboration profile.
- Optimized assay to extract erythroid-derived mitochondria-rich extracellular vesicles.
- Updated SOPs, instituted new processes, and trained the collaborator on streamlined mitochondria-containing extracellular vesicles generation.
- Provided essential preliminary data to achieve funded grant ($50,000).

Doctoral Student Researcher; University of California, Merced; 06/2015 – 12/2020

Investigating host and parasite requirements for CD8 T cell IFNγ responses to *Toxoplasma gondii*

- Generated parasite mutant strains using CRISPR/Cas9 genome editing and performed forward genetic screening of synchronized 50+ parasite strains.
- Differentiated murine bone marrow stem cells into macrophages, isolated CD8 T cells from the harvested spleen and lymph nodes to generate needed cell population for the T cell activation assays.
- Responsible for the design, optimization, and execution of T cell activation assays to assess immune responses to *Toxoplasma gondii* infections by ELISA and multi-color flow cytometry.
- Discovered a unique immunological pathway—the innate immune sensor NLRP3, but not its canonical inflammasome complex, is required for the adaptive CD8 T cell response to *Toxoplasma gondii* infection.
- Regularly maintained and synchronized 100+ parasite strains in cell culture.
- Identified novel parasitic protein(s) that modulates host adaptive immune response by utilizing genetic crosses of parasite strains and quantitative trait loci mapping using R.
- Management and leadership: The only graduate student to serve as a lab manager; trained and supervised all incoming postdoctoral scholars, graduate students, and undergraduates as well as managed, maintained, and purchased equipment and inventory.

EDUCATION

- **PhD**, **Quantitative and Systems Biology**; University of California, Merced; 12/2020
- **MHS** (Masters of Health Science), **Biomedical Sciences**; Quinnipiac University; 01/2014
- **Postgraduate certificate, Infectious Diseases**; London School of Hygiene and Tropical Medicine; 06/2012
- **BS, Biochemistry**; University of California, Los Angeles (UCLA); 09/2009

PUBLICATIONS

- **Kongsomboonvech A.K.**, Valissery, P., Egan E.S. Cross-linking of erythrocyte CD44 promotes *Plasmodium falciparum* invasion. *In Prep.*
- **Kongsomboonvech, A.,** Takizawa, C. (2024). Let me in: Interpreting graphs of parasite infection in red blood cells. BioGraphI FMN Fall 2023, QUBES Educational Resources. DOI:10.25334/D8TG-E410.
- Baro B., Kim C.Y., Lin C., **Kongsomboonvech A.K.**, Tetard M., *et al.* (2023) *Plasmodium falciparum* exploits CD44 as a co-receptor for erythrocyte invasion. *Blood*. DOI: 10.1182/blood.2023020831. **Commentary:** *Blood* (2023) 142 (23): 1942–1944; DOI: 10.1182/blood.2023022781.
- **Kongsomboonvech A.K.***, Garcia-López L.*, *et al.* (2023) Variation in CD8 T cell IFNγ differentiation to strains of *Toxoplasma gondii* is characterized by small effect QTLs with contribution from ROP16. *Front. Cell. Infect. Microbiol.* DOI: 10.3389/fcimb.2023.1130965. *Co-first authors.
- **Kongsomboonvech A.K.**, Rodriguez F., *et al.* (2020) Naïve CD8 T cell IFNγ responses to a vacuolar antigen are regulated by an inflammasome-independent NLRP3 pathway and *Toxoplasma gondii* ROP5. *PLOS Pathogens* 16(8): e1008327. DOI: 10.1371/journal.ppat.1008327.

FELLOWSHIPS AND AWARDS

- Best Poster, 15th Annual Pediatrics Research Retreat; Stanford University School of Medicine; 2024
- Postdoctoral Support, Stanford Maternal & Child Health Research Institute; 2022 – Present
- NIH NIDDK T32 Postdoctoral Research Training Grant in Pediatric Nonmalignant Hematology and Stem Cell Biology (T32 DK098132-06); 2021 – 2023
- Poster Finalist, 13th Annual Pediatrics Research Retreat; Stanford University School of Medicine; 2022
- University of California President's Dissertation Year Fellowship; UC Merced; 2020 – 2021
- School of Natural Sciences Distinguished Scholars Fellowship; UC Merced; 2018
- The AAI Young Investigator Award; 22nd Annual Woods Hole Immunoparasitology Meeting; 2018
- Best Poster, Quantitative and Systems Biology Spring Retreat; UC Merced; 2016