Katherine Amberg-Johnson

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https://kambergjohnson.com/

Microbiologist with extensive experience in drug development and target identification.

Team-player that can communicate to foster productive collaborations to progress multidisciplinary projects.

Strategic worker with excellent time management skills.

Passionate about science.

**RESEARCH EXPERIENCE**

**Graduate Student, Antimalarial Drug Discovery July 2014-present**

Supervisor: Professor Ellen Yeh, Stanford University

Project: My ongoing project is focused on the biogenesis of the apicoplast, a non-photosynthetic plastid organelle, in the malaria and related parasites. Biogenesis of the apicoplast depends on novel, but largely obscure, mechanisms for protein/lipid import and inheritance during parasite replication, presenting opportunities to discover new antiparasitic drug targets. Taking advantage of a powerful chemical rescue screen, I identified a “first-in-class” antimalarial compound inhibiting apicoplast biogenesis. Using unbiased strategy, I identified the likely target in *Plasmodium falciparum* and *Toxoplasma gondii* is FtsH1, a homolog of a bacterial membrane AAA+ metalloprotease. FtsH1 is a novel and, importantly, druggable antimalarial target. Development of FtsH1 inhibitors may have significant advantages over existing apicoplast drugs with improved drug kinetics and multistage efficacy against multiple human parasites. Since FtsH1 is the first regulator of apicoplast biogenesis identified in a phenotypic screen and the first member of this protease family required for organelle biogenesis, molecular elucidation of its function will reveal novel cell biology evolved from secondary endosymbiosis and deeper insight into eukaryogenesis.

Publications:

Amberg-Johnson, K., Ganesan, S.M., Lorenzi, H.A., Niles, J.C., Yeh, E. A first-in-class inhibitor of parasite FtsH disrupts plastid biogenesis in human pathogens. *Nature Chem Bio.* (In review).

Presentations:

Bay Area Microbial Pathogenesis (Oral Presentation, UCSF) 2017

Molecular Parasitology Meeting (Poster Presentation, Woods Hole) 2015, 2016

Bay Area Meeting on Organelle Biology (Oral Presentation, UCSF) 2015

**Undergraduate Research Assistant, Structural Determination of σ54  July 2010-May 2013**

Supervisor: Professor Dave Wemmer, UC Berkeley

Project: I worked on structural characterization of a bacterial transcription factor, σ54. We hypothesized σ54 is activated by a pulling force, and so I performed molecular tweezer experiments to determine how a pulling force effected the unfolding of the molecule. To that end, I mutated residues of σ54 to include cysteines on each end, validated the correct structure in the NMR, expressed and purified the protein in *E.coli,* coupled long DNA handles to each cysteine using disulfide bonds, and bound the DNA-protein chimeras to beads so that they could be manipulated in the optical trap. I found that σ54 contained an unfolding intermediate. Surprisingly, only part of a subdomain unfolded before the rest of the protein. This work was of particular importance because it suggested a novel mechanism of bacterial transcription initiation. Since I was the first to perform these experiments in the lab, I optimized many aspects of this experiment and was solely responsible for all aspects of this project. This work lead to two presentations, a paid summer internship, an honors thesis, and the Barry Goldwater scholarship.

Presentations:

UC Berkeley Undergraduate Honors Thesis Research Symposium. (Oral and Poster Presentation) 2013

UC Berkeley Amgen Symposium (Oral and Poster Presentation) 2012

**EDUCATION**

Stanford University **Anticipated May 2018**

Ph.D. in Microbiology and Immunology

University of California, Berkeley **May 2013**

Bachelors of Science in Microbial Biology

GPA: 3.98/4.00

**FELLOWSHIPS, AWARDS, AND HONORS**Bio-X Stanford Interdisciplinary Graduate Fellowship (Stanford University) 2016-2019

Two-Photon and Super-Resolution Microscopy Pilot Grant (Stanford University) 2016

Biosciences Office of Graduate Education Travel Grant (Stanford University) 2015, 2016

Cellular and Molecular Biology Training Grant (Stanford University) 2013-2016

Amgen Scholars Program (UC Berkeley) 2012

Barry Goldwater Scholarship (UC Berkeley) 2012-2013

Science Undergraduate Laboratory Internship (LBNL) 2011

Leadership Award (UC Berkeley) 2009-2010

**LEADERSHIP AND TEACHING**

Oral Communication Tutor (Stanford University) 2017-present

Mentored > 4 junior graduate students 2015-present

Innate Immunology Teaching Assistant 2016

Techniques in Biotechnology Teaching Assistant 2015

**MEMBERSHIP IN PROFESSIONAL SOCIETIES**

American Society for Cell Biology