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 σ^{54} **July 2010-May 2013**

Supervisor: Professor Dave Wemmer, UC Berkeley

Project: I worked on structural characterization of a bacterial transcription factor, σ^{54}. We hypothesized σ^{54} 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 σ^{54} 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 σ^{54} 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