

# Selasi Dankwa, Ph.D.

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Research Scientist III  
Seattle Children's Research Institute  
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## EDUCATION

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2015 Ph.D. in Biological Sciences in Public Health, Harvard University, Cambridge, MA  
2007 B.A. in Biological Chemistry, Wellesley College, Wellesley, MA

## RESEARCH EXPERIENCE

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- 2016-Present **Research Scientist III**, Advisor: Joseph D. Smith, Ph.D. (2021-Present)  
**Postdoctoral Scientist**, Advisor: Joseph D. Smith, Ph.D. (2016-2021)  
Seattle Children's Research Institute, Seattle, WA (2018-Present)  
Center for Infectious Disease Research, Seattle, WA (2016-2018)  
Study of the pathogenesis of cerebral malaria
- Currently investigating kinase-mediated brain endothelial barrier dysfunction and repair using systems biology-based cell and molecular biology approaches
  - Studied Malawian and Indian cerebral malaria cohorts for parasite factors that influence disease outcome by characterizing PfEMP1 variants in cerebral malaria clinical isolates using next-generation sequencing and *in vitro* models of primary human brain endothelium
- 2015 **Postdoctoral Fellow**, Harvard T.H. Chan School of Public Health, Boston, MA  
Advisor: Manoj T. Duraisingh, Ph.D.  
Study of the adaptation of *Plasmodium* species to primate hosts
- Investigated the host tropism of ape and human *Plasmodium* species by studying the binding of invasion ligands to genetically engineered red blood cells of variant surface sialic acid
- 2009-2015 **Graduate Student**, Harvard T.H. Chan School of Public Health, Boston, MA  
Advisor: Manoj T. Duraisingh, Ph.D.  
Sialic acid as a determinant of *Plasmodium* invasion of erythrocytes in malaria infection
- Studied the impact of sialic acid variation on invasion of red blood cells by the zoonotic *Plasmodium knowlesi* and human *Plasmodium falciparum* parasites using reverse genetics of cultured red blood cells and various cell and molecular biology approaches
- 2007-2009 **Research Technician**, Boston Children's Hospital, Boston, MA  
Advisor: Robert N. Husson, M.D.  
Study of serine/threonine protein kinases in *Mycobacterium tuberculosis*
- Produced and characterized recombinant *Mycobacterium tuberculosis* (Mtb) serine/threonine protein kinases (STPKs) and Mtb kinase-deletion mutants to identify substrates and substrate motifs of the STPKs and to understand the role of STPK phosphorylation in Mtb

## HONORS AND AWARDS

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2023 Selected to present in the Stanford-Berkeley-UCSF Next Generation Faculty Symposium  
2020 Named to *Cell Press* list of 1000 Inspiring Black Scientists in America  
2019-2020 American Heart Association Postdoctoral Fellowship  
2013 Outstanding Talk Award, Molecular Parasitology Meeting XXIV, Woods Hole, MA  
2011-2013 Harvard Global Health Institute International Travel Fellowship

## GRANT SUBMISSION

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NIH/NIAID; R01 submitted June 5, 2023

Role: Principal Investigator

**Elucidating endothelial barrier dysfunction induced by *Plasmodium falciparum* malaria parasites.** This grant aims to provide a detailed understanding of how *Plasmodium falciparum* parasites drive endothelial barrier disruption. The proposed experiments will temporally dissect phosphosignaling pathways in parasite-stimulated brain endothelial cells using systems biology and targeted approaches to define the mechanisms by which specific pathways contribute to loss of barrier integrity.

## PUBLICATIONS

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Wei L, **Dankwa S**, Vijayan K, Smith JD, Kaushansky A. Interrogating endothelial barrier regulation by temporally resolved kinase network generation. *BioRxiv* 508598 [Preprint]. September 19, 2022 [cited 2023 Oct 5]. Available from: doi: <https://doi.org/10.1101/2022.09.19.508598>

Vandorpe DH, Rivera A, Ganter M, **Dankwa S**, Wohlgemuth JG, Dlott JS, Snyder LM, Brugnara C, Duraisingh M, Alper SL. Purinergic signaling is essential for full Psickle activation by hypoxia and by normoxic acid pH in mature human sickle red cells and in vitro-differentiated cultured human sickle reticulocytes. *Pflugers Arch*. 2022 May;474(5):553-565. PMID: 35169901.

Sahu PK, Duffy FJ\*, **Dankwa S\***, Vishnyakova M\*, Majhi M, Pirpamer L, Vigdorovich V, Bage J, Maharana S, Mandala W, Rogerson SJ, Seydel KB, Taylor TE, Kim K, Sather DN, Mohanty A, Mohanty RR, Mohanty A, Pattnaik R, Aitchison JD, Hoffman A, Mohanty S, Smith JD, Bernabeu M, Wassmer SC. Determinants of brain swelling in pediatric and adult cerebral malaria. *JCI Insight*. 2021 Sep 22;6(18):e145823. PMID: 34549725. \*Equal contribution

**Dankwa S**, Dols MM, Wei L, Glennon EKK, Kain HS, Kaushansky A, Smith JD. Exploiting polypharmacology to dissect host kinases and kinase inhibitors that modulate endothelial barrier integrity. *Cell Chem Biol*. 2021 Jun 29:S2451-9456(21)00303-2. PMID: 34216546

Proto W, Siegel S, **Dankwa S**, Liu W, Kemp A, Marsden S, Zenonos Z, Unwin S, Sharp P, Wright G, Hahn B, Duraisingh M, Rayner JC. Adaptation of *Plasmodium falciparum* to humans involved the loss of an ape-specific erythrocyte invasion ligand. *Nat Commun*. 2019 Oct 4;10(1):4512. PMID: 31586047

Glennon EKK\*, **Dankwa S\***, Smith JD, Kaushansky A. Opportunities for Host-targeted Therapies for Malaria. *Trends Parasitol*. 2018 Oct;34(10):843-860. PMID: 30122551. Review. \*Equal contribution (Selected by *Cell Press* Editor as "Best of Trends" review article in 2018 from *Trends in Parasitology*, <http://crosstalk.cell.com/blog/best-reviews-we-published-in-2018-part-2>)

Kessler A, **Dankwa S**, Bernabeu M, Harawa V, Danziger SA, Duffy F, Kampondeni SD, Potchen MJ, Dambrauskas N, Vigdorovich V, Oliver BG, Hochman SE, Mowrey WB, MacCormick IJC, Mandala WL, Rogerson SJ, Sather DN, Aitchison JD, Taylor TE, Seydel KB, Smith JD, Kim K. Linking EPCR-Binding

PfEMP1 to Brain Swelling in Pediatric Cerebral Malaria. *Cell Host Microbe*. 2017 Nov 8;22(5):601-614. PMID: 29107642

(Commentary in Dvorin JD. Getting Your Head around Cerebral Malaria. *Cell Host Microbe*. 2017 Nov 8;22(5):586-588)

Lim C\*, **Dankwa S\***, Paul AS, Duraisingh MT. Host Cell Tropism and Adaptation of Blood-Stage Malaria Parasites: Challenges for Malaria Elimination. *Cold Spring Harb Perspect Med*. 2017 Nov 1;7(11):a025494. PMID: 28213436 (*Book chapter*) \*Equal contribution

**Dankwa S**, Chaand M, Kanjee U, Jiang RHY, Nobre LV, Goldberg JM, Bei AK, Moechtar MA, Grüning C, Ahouidi AD, Ndiaye D, Dieye TN, Mboup S, Weekes MP, Duraisingh MT. Genetic Evidence for Erythrocyte Receptor Glycophorin B Expression Levels Defining a Dominant *Plasmodium falciparum* Invasion Pathway into Human Erythrocytes. *Infect Immun*. 2017 Sep 20;85(10):e00074-17. PMID: 28760933

**Dankwa S**, Lim C, Bei AK, Jiang RH, Abshire JR, Patel SD, Goldberg JM, Moreno Y, Kono M, Niles JC, Duraisingh MT. Ancient human sialic acid variant restricts an emerging zoonotic malaria parasite. *Nat Commun*. 2016 Apr 4;7:11187. PMID: 27041489

(Highlighted on National Public Radio:

<http://www.npr.org/sections/goatsandsoda/2016/04/08/473385975/monkey-malaria-creeps-closer-to-being-a-major-human-threat>)

Niang M, Bei AK, Madnani KG, Pelly S, **Dankwa S**, Kanjee U, Gunalan K, Amaladoss A, Yeo KP, Bob NS, Malleret B, Duraisingh MT, Preiser PR. STEVOR is a *Plasmodium falciparum* erythrocyte binding protein that mediates merozoite invasion and rosetting. *Cell Host Microbe*. 2014 Jul 9;16(1):81-93. PMID: 25011110

Joice R, Nilsson SK, Montgomery J, **Dankwa S**, Egan E, Morahan B, Seydel KB, Bertuccini L, Alano P, Williamson KC, Duraisingh MT, Taylor TE, Milner DA, Marti M. *Plasmodium falciparum* transmission stages accumulate in the human bone marrow. *Sci Transl Med*. 2014 Jul 9;6(244):244re5. PMID: 25009232

Prisic S, **Dankwa S**, Schwartz D, Chou MF, Locasale JW, Kang CM, Bemis G, Church GM, Steen H, Husson RN. Extensive phosphorylation with overlapping specificity by *Mycobacterium tuberculosis* serine/threonine protein kinases. *Proc Natl Acad Sci USA*. 2010 Apr 20;107(16):7521-6. PMID: 20368441

## TEACHING EXPERIENCE

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- 2021      **Speaker, Biomed Summer Camp**  
Northwest Association for Biomedical Research, Seattle, WA  
- Taught a virtual introductory lesson on malaria to high school students
- 2018, 2019      **Guest Lecturer, Undergraduate Global Health Course**  
University of Washington, Seattle, WA  
- Delivered an interactive, perspective lecture to undergraduate students on *Road Accidents in Ghana*

- 2017 **Instructor, Undergraduate Biology Senior Seminar**  
University of Washington, Seattle, WA
- Developed and co-taught a seminar on *Medical Treatments: From Bench to Bedside* in mentored teaching fellowship. Implemented active learning techniques to maintain student-centered class
- 2012 **Teaching Assistant, Continuing Education Workshop**  
University of Ghana/American Society for Cell Biology, Accra, Ghana  
*West African Workshop on Cell Biology of Infectious Pathogens*
- Assisted in preparation of laboratory sessions, design and presentation of individual research proposals and small group discussions of primary scientific literature
- 2011 **Teaching Assistant, Graduate Course in Global Health**  
Harvard T.H. Chan School of Public Health, Boston, MA  
*Epidemiology and Control of Important Parasitic Infections in Developing Countries*
- Assisted in the design of assignments to evaluate student performance; graded group projects, presentations and exams

## MENTORING EXPERIENCE

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- 2021-Present **Corey Layzer, B.A.**, Research Technician, Laboratory of Joseph D. Smith, Ph.D.  
Seattle Children's Research Institute, Seattle, WA  
Primary supervisor on research project to investigate the impact of *P. falciparum* parasites on the brain endothelial barrier.
- 2021 **Olivia Smith, B.Sc.**, Ph.D. rotation student, Laboratory of Joseph D. Smith, Ph.D.  
Seattle Children's Research Institute, Seattle, WA  
Primary mentor on a literature-based project to select suitable targets for transcriptional profiling of *P. falciparum* parasites to investigate how they respond to the host during severe disease.
- 2018-2021 **Mary-Margaret Dols, B.Sc.**, Research Technician, Laboratory of Joseph D. Smith, Ph.D., Seattle Children's Research Institute, Seattle, WA  
Primary supervisor on research project to genetically and chemically validate the importance of kinases in modulation of endothelial barrier integrity.
- 2018 **Sabrina San Diego**, B.Sc. candidate, Lab Assistant, Undergraduate Intern, Laboratory of Joseph D. Smith, Ph.D., Center for Infectious Disease Research, Seattle, WA  
Co-mentor on a project to clone domains of the *P. falciparum* virulence protein PfEMP1 for recombinant protein expression in mammalian cells.
- 2016-2017 **Cristian Ovadiuc**, B.Sc. candidate, Undergraduate Intern, Laboratory of Joseph D. Smith, Ph.D., Center for Infectious Disease Research, Seattle, WA  
Primary mentor on a project to clone a PfEMP1 gain-of-function mutant and assess its binding to endothelial protein c receptor.

## CONTRIBUTIONS TO DIVERSITY, EQUITY AND INCLUSION

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### Mentoring

2016-Present **Formal**, Smith Lab, Seattle Children's Research Institute: Mentorship of undergraduates, a graduate student and research technicians from underrepresented groups in science, including in race, ethnicity and gender.

2009-Present **Informal**: Supporting undergraduates, prospective and junior scientists by assisting with graduate school, medical school and job applications, providing guidance on navigating the school and work environment as a minority, advising on immigration matters, career development and fellowship applications.

### Leadership/Outreach

2021 **Group leader, Employee discussions on racism and workplace discrimination**  
Facilitated virtual small group discussions in response to workplace scenarios of racism and other forms of discrimination at Seattle Children's depicted in video format.  
Center for Global Infectious Disease Research, Seattle Children's Research Institute, Seattle, WA

2021 **Speaker, Biology of Parasitism virtual course, Africa Chapter**  
Presented career perspective talk to African scientists in a virtual course organized by professors at the University of Glasgow and institutions in East and Southern Africa.

2018, 2021 **Interviewer**, Recruitment for trainee positions in the Smith Lab  
Participated in reviewing applications, interviewing shortlisted candidates and recommending applicants for intern and research technician positions in the Smith Lab.

2018 **Speaker, BioQuest Academy**  
Center for Infectious Disease Research, Seattle WA  
Delivered an interactive lecture on *The Biology and Control of Malaria* to high school students underrepresented in science during a summer-long science immersion course.

2016 **Career Panelist**, Washington State Opportunity (WSO) Scholarship Program  
Center for Infectious Disease Research, Seattle, WA  
Shared about my career path with University of Washington WSO undergraduate scholars of diverse backgrounds interested in careers in science.

2016 **Tour Guide and Instructor**, Middle School Girls in Engineering, Math and Science (GEMS) Program  
Center for Infectious Disease Research, Seattle, WA

2015 **English Tutor**, Harvard Bridge Program, Cambridge, MA  
Provided English grammar lessons to adult immigrant.

### SERVICE

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2023 **Speaker, Science Discovery Lab**, Seattle Children's Research Institute, Seattle, WA  
Presented research overview and career perspective talk to high school students

2021 **Member, Newsletter Editorial Team**, American Committee of Molecular, Cellular and Immunoparasitology of the American Society of Tropical Medicine and Hygiene  
Contributor and co-editor of quarterly ACMCIP newsletter

- 2016 **Guest Speaker, Middle School Biology Class**  
Salmon Bay School, Seattle, WA  
Taught an introductory lesson on malaria to 200 middle-schoolers
- 2015, 2016 **Ad hoc Reviewer**, Seeding Labs, Boston, MA  
Determined the scientific merit of applications for scientific equipment submitted by academic institutions in low- and middle-income countries

## PROFESSIONAL ACTIVITIES

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- 2019 Participant, International Centers of Excellence for Malaria Research Annual Workshop, Nairobi, Kenya
- 2018-Present Member, American Heart Association
- 2016-Present Member, American Society of Tropical Medicine and Hygiene
- 2018, 2021 *Ad hoc Reviewer, Frontiers in Cellular and Infection Microbiology, Journal of Pharmacy and Pharmacology*

## PRESENTATIONS

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### Invited Seminar Presentations

“Mechanisms of endothelial barrier dysfunction and repair in cerebral malaria”. (September 2023). Johns Hopkins Malaria Research Institute, Baltimore, MD.

“Deciphering mechanisms of endothelial barrier dysfunction and repair in cerebral malaria”. (February 2023). Georgetown University Department of Biology, Washington, DC.

“Understanding the dynamics of blood-brain barrier breakdown and repair in cerebral malaria”. (January 2023). Seattle University Biology, Seattle, WA.

“Deciphering mechanisms of endothelial barrier dysfunction and repair in cerebral malaria”. (February 2022). New York University Department of Biology, New York City, NY.

“Deciphering mechanisms of endothelial barrier dysfunction and repair in cerebral malaria”. (December 2021). Virtual presentation. Case Western Reserve University, Center for Global Health and Diseases.

“Deciphering mechanisms of vascular dysfunction and repair in cerebral malaria.” (October 2021). Virtual presentation. Advanced Topics in Infectious Diseases, Memorial Sloan Kettering Cancer Center – Weill Cornell Medicine Seminar Series.

“Kinase inhibitor modulation of endothelial barrier permeability: Tackling endothelial dysfunction in cerebral malaria.” (October 2020) Virtual presentation. Agilent Infectious Disease Webinar.

### Conferences

**Dankwa S**, Wei L, Layzer C, Kaushansky A, Smith JD. (September 2023). Elucidating mechanisms of endothelial barrier dysfunction induced by *Plasmodium falciparum*. **Poster presentation**. Molecular Parasitology Meeting XXXIV, Marine Biological Labs, Woods Hole, MA

**Dankwa S**, Dols MM, Wei L, Glennon EKK, Kain HS, Kaushansky A, Smith JD. (October 2021) “Targeting host kinases to repair endothelial dysfunction in cerebral malaria.” **Oral presentation**. Molecular Parasitology Meeting XXXII, Marine Biological Labs, Woods Hole, MA

**Dankwa S**, Dols M, Wei L, Glennon EKK, Kain H, Kaushansky A, Smith JD. (November 2019) “Targeting host kinases to protect the endothelial barrier from hyper-inflammatory damage”. **Poster presentation**. 68<sup>th</sup> Annual meeting of the American Society of Tropical Medicine and Hygiene, National Harbor, MD

**Dankwa S**, Dols M, Glennon EKK, Kain H, Kaushansky A, Smith, JD. (June-July 2019) “Targeting host kinases to promote endothelial barrier function”. **Flash talk and Poster presentation**. Gordon Research Conference (Malaria), Les Diablerets, Switzerland

**Dankwa S**, Glennon EKK, Kain H, Kaushansky A, Smith JD. (February 2018) “Identifying host kinases and inhibitors that regulate barrier properties in human brain endothelial cells”. **Oral and Poster presentations**. Keystone Symposium on Vascular Biology and Human Diseases: From Molecular Pathways to Novel Therapeutics, Santa Fe, New Mexico

**Dankwa S**, Dambrauskas N, Sather DN, Smith JD. (November 2016) “Functional characterization of a brain-specific CIDR $\alpha$ 1.7-PfEMP1 variant suggests a role in the pathogenesis of pediatric cerebral malaria”. **Poster presentation**. 65<sup>th</sup> Annual meeting of the American Society of Tropical Medicine and Hygiene, Atlanta, GA

**Dankwa S**, Lim C, Bei AK, Jiang RH, Abshire JR, Patel SD, Goldberg JM, Moreno Y, Niles JC, Duraisingh MT. (June 2016) “Ancient human loss of sialic acid variant restricts an emerging zoonotic malaria parasite”. **Oral presentation**. 28<sup>th</sup> Annual Seattle Parasitology Conference, Seattle, WA

**Dankwa S**, Kanjee U, Jiang RHY, Bei AK, Ganter M, Moechtar M, Grüning C, Ahouidi AD, Ndiaye D, Dieye TN, Mboup S, Duraisingh MT. (November 2014) “The EBL-1/Glycophorin B ligand-receptor interaction defines a dominant *Plasmodium falciparum* invasion pathway”. **Poster presentation**. 63<sup>rd</sup> Annual meeting of the American Society of Tropical Medicine and Hygiene, New Orleans, LA

**Dankwa S**, Bei AK, Jiang RHY, Patel SD, Abshire JR, Niles JC, Duraisingh MT. (September 2013) “Loss of the *N*-glycolylneuraminic form of sialic acid restricts invasion of human erythrocytes by the macaque parasite *Plasmodium knowlesi*”. **Oral presentation**. Molecular Parasitology Meeting XXIV, Marine Biological Labs, Woods Hole, MA