BIOGRAPHICAL SKETCH

NAME: Edem, Gavor

ORCID: 0000-0001-7100-7849

POSITION TITLE: Staff scientist

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
University of Cape Coast, Ghana	BSc	08/2009	05/2013	Molecular Biology
National University of Singapore, Singapore	PHD	01/2016	10/2021	Structural Biology
California Institute of Technology, United States of America	Staff scientist	12/2023	Present	Structural Biology/ Immunology

A. Personal Statement

I am a dynamic individual who can quickly adapt to new environments and work collaboratively or independently. I have acquired research experience and core skills in molecular biology and biochemistry, including recombinant protein expression and purification, protein structure, and interaction studies using X-ray crystallography. During my tenure as a graduate student and postdoctoral research fellow at the National University of Singapore, my previous research centered on the structure-function studies of a group of mosquito-borne viruses. Moving forward, I am interested in applying integrative structural biology including cryoEM to studying immune responses to viral infections towards effective immunogen design and bnAbs/vaccine development. Recently, I have become acquainted with cryo-electron microscopy. Currently, I am a staff scientist in the Bjorkman lab at the California Institute of Technology, focusing on the structure-function studies of HIV-1/SARS-CoV-2 envelope proteins' interactions with broadly neutralizing antibodies (bnAbs) using cryoEM. It is my goal to become an independent and expert user of cryoEM.

B. Publications/contributions to science

As a graduate student at the National University of Singapore, my research focused on understanding mosquito proteins and their role in virus transmission. During the COVID-19 pandemic, I contributed to the scientific community by writing a review article analyzing how antibodies bind to and neutralize the SARS-CoV-2 virus—an interest I continue to pursue in my current research.

1. Loh, Su Ning, Ian Russell Anthony, **Edem Gavor**, Xin Shan Lim, R. Manjunatha Kini, Yu Keung Mok, and J. Sivaraman. 2024. "Recognition of Aedes aegypti Mosquito Saliva Protein LTRIN by the Human Receptor LTβR for Controlling the Immune Response". *Biology* 13, no. 1: 42. https://doi.org/10.3390/biology13010042

2. **Edem Gavor**, Yeu Khai Choong, Yonghao Liu, Julien Pompon, Eng Eong Ooi, Yu Keung Mok, Haiyan Liu, R Manjunatha Kini, J. Sivaraman (2022). Identification of Aedes aegypti salivary gland proteins interacting with human immune receptor proteins. P*los Neglected Tropical Diseases*. DOI: 10.1371/journal.pntd.0010743

3. **Edem Gavor**, Yeu Khai Choong, Chacko Jobichen, Yu Keung Mok, R Manjunatha Kini, J. Sivaraman. (2021). Structure of Aedes aegypti carboxypeptidase B1-inhibitor complex uncover the disparity between mosquito and non-mosquito insect carboxypeptidase inhibition mechanism. *Protein Sci*. 30(12):2445-2456. doi: 10.1002/pro.4212. Epub 2021 Nov 5.

4. **Edem Gavor**, Yeu Khai Choong, Nikhil Kumar Tulsian, Digant Nayak, Fakhriedzwan Idris, Hariharan Sivaraman , Donald Heng Rong Ting , Alonso Sylvie , Yu Keung Mok , R. Manjunatha Kini, J. Sivaraman. (2021). Structure of Aedes aegypti procarboxypeptidase B1 and its binding with Dengue virus for controlling infection. *Life Sci. Alliance*. 5(1):e202101211. doi: 10.26508/lsa.202101211. Print 2022 Jan.

4. **Gavor, E**., Choong, Y. K., Er, S. Y., Sivaraman, H., & Sivaraman, J. (2020). Structural Basis of SARS-CoV-2 and SARS-CoV Antibody Interactions. *Trends in immunology*, 41(11), 1006–1022. https://doi.org/10.1016/j.it.2020.09.004

5. **Gavor E,** Sivaraman H, Er SY, Choong YK, Sivaraman J. (2020). Structural Basis of SARS-CoV-2- and SARS-CoV-Receptor Binding and Small-Molecule Blockers as Potential Therapeutics. *Annu Rev Pharmacol Toxicol*. doi: 10.1146/annurev- pharmtox-061220-093932. Epub ahead of print. PMID: 32574109.

C. Positions and Honors

Positions and Scientific Appointments

2023 – Present	Staff scientist, California Institute of Technology
2021 – 2023	Post-doctorla fellowship, National University of Singapore
2016 – 2020	Graduate Research Assistant, National University of Singapore
2013 – 2014	Teaching Assistant, University of Cape Coast

Honors

2013	B.Sc. awarded with high honors, University of Cape Coast
2013	Best graduating student of the department of Molecular Biology, University of Cape Coast
2016-2021	Singapore International Graduate Awards Scholarship

BIOGRAPHICAL SKETCH

NAME: Pamela, Bjokrman, PhD

ORCID: https://orcid.org/0000-0002-2277-3990

POSITION TITLE: Professor

B.A., University of Oregon, 1978;

Ph.D., Harvard University, 1984.

Assistant Professor, Caltech, 1989-95;

Associate Professor, 1995-98;

Professor, 1998-2004;

Delbruck Professor, 2004-15;

Centennial Professor, 2015-18;

Baltimore Professor, 2018-;

Merkin Institute Professor, 2021-;

HHMI Investigator, 1989-2015;

Executive Officer, 2000-06, 2020-22.

Our laboratory is interested in immune recognition of viral pathogens. We are investigating the immune responses against HIV-1 and other viruses, most recently SARS-CoV-2, in order to develop improved therapeutics and/or vaccines. We use X-ray crystallography, electron microscopy, and biochemistry to study pathogen glycoproteins and host immune proteins. Using structural information and alternate antibody architectures, we are engineering antibody-based reagents with increased potency and breadth. We are also investigating the structural correlates of potent antibody-mediated neutralization of HIV-1, SARS-CoV-2, and hepatitis C virus to better understand what leads to naturally-occurring potent neutralizing antibodies. Edem's role as a structural biology scientist in our lab is crucial for the characterisation of how several of our broadly neutralising antibodies recognise these pathogens. His training at the Stanford cryoEM center is key to our research here in Caltech.

Selected Publications

Barnes, CO, West Jr., AP, Huey-Tubman, KE, Hoffmann, MAG, Sharaf, NG, Hoffman, PR, Koranda, N, Gristick, HB, Gaebler, C, Muecksch, F, Cetrulo Lorenzi, JC, Finkin, S, Hägglöf, T, Hurley, A, Millard, KG, Weisblum, Y, Schmidt, F, Hatziioannou, T, Bieniasz, PD, Caskey, M, Robbiani, DF, Nussenzweig, MC, Bjorkman, PJ (2020) Structures of human antibodies bound to

SARS-CoV-2 spike reveal common epitopes and recurrent features of antibodies. Cell 182: 828-842.e16. doi:10.1016/j.cell.2020.06.025

Barnes, CO, Jette, CA, Abernathy, MA, Dam, K-M A, Esswein, SR, Gristick, HB, Malyutin, AG, Sharaf, NG, Huey-Tubman, KE, Lee, YE, Robbiani, DF, Nussenzweig, MC, West, AP, Bjorkman, PJ (2020) Structural classification of neutralizing antibodies against the SARS-CoV-2 spike receptor-binding domain suggests vaccine and therapeutic strategies. Nature 588: 682-7. doi:10.1038/s41586-020-2852-1

Cohen, AA, Gnanapragasam, PNP, Lee, YE, Hoffman, PR, Ou, S, Kakutani, LM, Keeffe, JR, Wu, H-J, Howarth, M, West, AP, Barnes, CO, Nussenzweig, MC, Bjorkman, PJ (2021) Mosaic nanoparticles elicit cross-reactive immune responses to zoonotic coronaviruses in mice. Science eabf6840 doi:10.1126/science.abf6840.

Cohen, AA*, van Doremalen, N*, Greaney, AJ, Andersen, H, Sharma, A, Starr, TN, Keeffe, JR, Fan, C, Schulz, JE, Gnanapragasam, PNP, Kakutani, LM, West Jr., AP, Saturday, G, Lee YE, Gao, H, Jette, CA, Lewis, MG, Tan, TK, Townsend, AR, Bloom, JD, Munster, VJ, Bjorkman, PJ (2022) Mosaic RBD nanoparticles protect against diverse sarbecovirus challenges in animal models. Science *Co-first authors. doi:10.1126/science.abq0839

Diskin R, Scheid JF, Marcovecchio PM, West AP, Klein F, Gao H, Gnanapragasam PNP, Abadir A, Seaman MS, Nussenzweig MC, Bjorkman PJ (2011) Increasing the potency and breadth of an HIV antibody by using structure-based rational design. Science 334: 1289-1293. doi:101126/science1213782

*Escolano, A, *Gristick, HB, Abernathy, ME, Merkenschlager, J, Gautam, R, Oliveira, TY, Pai, J, West, AP, Barnes, CO, Cohen, AA, Wang, H, Golijanin, J, Yost, D, Keeffe, JR, Wang, Z, Zhao, P, Yao, K-H, Bauer, J, Nogueira, L, Gao, H, Voll, AV, Montefior, DC, Seaman, MS, Gazumyan, A, Silva, M, McGuire, AT, Stamatatos, L, Irvine, DJ, Wells, L, Martin, MA, *Bjorkman, PJ, *Nussenzweig, MC (2019) Immunization expands HIV-1 glycan patch-specific B-cells in mice and macaques. Nature 570: 468-73. *co-first authors/co-corresponding authors. doi:10.1038/s41586-019-1250-z

Escolano, A*, Gristick, HB*, Gautam, R*, DeLaitsch, AT*, Abernathy, ME, Yang, Z, Wang, H, Hoffmann, MAG, Nishimura, Y, Wang, Z, Koranda, N, Kakutani, LM, Gao, H, Gnanapragasam, PNP, Raina, H, Gazumyan, A, Cipolla, M, Oliveria, TY, Ramos, V, Irvine, DJ, Silva, M, West, AP, Keeffe, JR, Barnes, CO, Seaman, MS, Nussenzweig, MC, Martin, MA, Bjorkman, PJ (2021) Sequential immunization of macaques elicits heterologous neutralizing antibodies targeting the V3-glycan patch of HIV-1 Env. Science Transl Med. doi: 10.1126/scitranslmed.abk1533. *Co-first authors.

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