



JOHNS HOPKINS
BIOMEDICAL ENGINEERING

BME Virtual Seminar Series

Eric Sundberg, PhD

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Emory University School of Medicine

Monday, April 4th, 2022

1:30 p.m.

Held via Zoom

Faculty host: Jamie Spangler



Engineering antibody-mediated immune responses

Abstract: Immunoglobulin G (IgG) antibodies are major components of the humoral and adaptive immune systems and, as such, are critical to protecting the host from pathogens both upon their initial encounter, primarily via antibody-mediated effector functions, as well as their reencounter, after somatic hypermutation and production from memory B cells. Antibodies also constitute an important and growing class of drugs for the treatment of a wide range of diseases, including autoimmunity, infection and cancer. The abilities of antibodies to recruit and stimulate immune system cells in order to exert their effector functions are harbored in their constant regions, or Fc domains, which engage Fc γ receptors (Fc γ Rs) and complement. This property is critically important for their clinical efficacy, especially in the immunotherapeutic treatment of cancer. Methods to engineer IgG Fc domains to manipulate their *in vivo* killing capacities lag substantially behind those for customizing Fabs due to the presence of a conserved N-linked glycan in the Fc domain at residue Asn297 that is overwhelmingly the most important molecular determinant of Fc γ R binding. Advances in IgG antibody engineering, including enzyme-directed glyco-engineering, will be presented in this seminar.

Bio: Eric Sundberg managed to graduate from the University of Rochester with bachelor's degrees in both Biochemistry and Economics while mostly playing soccer. He then obtained his PhD at Northwestern University where he worked with Dr. Ted Jardetzky (now at Stanford), beginning his journey in structural immunology and microbiology. He was a postdoctoral fellow with Dr. Roy Mariuzza at the Center for Advanced Research in Biotechnology (now the Institute for Bioscience and Biotechnology Research), part of the University of Maryland. Eric established his independent laboratory first at the Boston Biomedical Research Institute, then at the Institute of Human Virology at the University Of Maryland School Of Medicine in Baltimore, before moving to Atlanta to become Chair of the Department of Biochemistry at the Emory University School of Medicine. He conducts research at the intersection of structural biology, glycobiology, immunology and microbiology, focusing on the dissection of molecular mechanisms in infectious diseases and engineering of novel protein therapeutics.