

Chemical and Biomolecular Engineering

Fall 2021 Seminar Series

Professor Eric Shusta

University of Wisconsin-Madison

Date: Thursday, October 28, 2021

Time: 10:30 a.m.

Join Zoom Meeting

Meeting ID: 999 7571 3314

Passcode: 442921



Antibody Engineering Strategies to Overcome the Blood-Brain Barrier

Abstract: Millions of people worldwide are afflicted with neurological diseases such as Parkinson's disease, Alzheimer's disease, brain cancer, and cerebral AIDS. Although many new drugs are being developed to combat these and other brain diseases, few new treatments have made it to the clinic. The impermeable nature of the brain vasculature, also known as the blood-brain barrier (BBB), is at least partially responsible for the paucity of new brain therapeutics. As examples, approximately 98% of small molecule pharmaceuticals do not enter the brain after intravenous administration, and the BBB prevents nearly all protein and gene medicines from entering the brain. Our research group is therefore focused on developing tools for the analysis of the brain drug delivery process and on identifying novel strategies for circumventing this transport barrier. This presentation will detail our recent efforts to overcome BBB restrictions on brain drug delivery. To this end, we have mined large antibody libraries to identify antibodies that can target the intact and disrupted BBB. After conjugation to drug payloads that can include small molecules, proteins, or DNA therapeutics, these antibodies could have the potential to deliver medicines across the BBB and into the central nervous system for the treatment of brain disease.

Bio: Eric V. Shusta, Howard Curler Distinguished Professor, R. Byron Bird Department Chair, Department of Chemical and Biological Engineering, Department of Neurological Surgery, University of Wisconsin-Madison, eshusta@wisc.edu.

Dr. Shusta received his Ph.D. in 1999 from the University of Illinois where he studied the production and engineering of antibodies and T-cell receptors using yeast. He followed this with postdoctoral training at the University of California-Los Angeles where he helped pioneer molecular level analyses of the blood-brain barrier. Currently, Dr. Shusta is the Howard Curler Distinguished Professor and R. Byron Bird Department Chair in Chemical and Biological Engineering at the University of Wisconsin. He is also appointed in the Department of Neurological Surgery. His research focuses on the development of molecular and cellular engineering tools that can help gain a better understanding of blood-brain barrier transport and function. He has been recognized by an NSF Career award, the American Chemical Society BIOT division young investigator award, and is an elected fellow in the American Institute for Medical and Biological Engineering, among other awards.