

Cellular Nanosponges for the Treatment of Viral Infection, Liangfang Zhang, PhD

Abstract: The global incidence of infections caused by bacteria and viruses has been increasing, which imposes a major threat to public health given the high morbidity and mortality rates associated with these diseases. Nanoparticle technology has enabled a wide array of improvements in the treatment of infectious diseases, ranging from improved efficacy in drug delivery to enhanced immunogenicity of vaccines. Among the different bio-inspired nanotechnology strategies, utilization of cellular membrane material for nanoparticle preparation presents a unique top-down approach that offers the advantage of being able to completely replicate the surface antigens and functions of source cells. Herein, I discuss the biological functionalization of polymeric nanoparticles with a layer of membrane coating derived from natural cells. Specifically, I will focus on the use of these cell-mimicking nanoparticles for the treatment of viral infections including SARS-CoV-2 infection.

Bio: Dr. Liangfang Zhang is Professor of Nanoengineering and Bioengineering and Director of Chemical Engineering Program at the University of California San Diego. Dr. Zhang received his B.E. and M.S. degrees in Chemical Engineering from Tsinghua University, and his Ph.D. in Chemical & Biomolecular Engineering from the University of Illinois at Urbana-Champaign in 2006 under the supervision of Prof. Steve Granick. He was a postdoctoral associate in the laboratory of Prof. Robert Langer at MIT during 2006-2008. He joined the Department of Nanoengineering at UC San Diego as an Assistant Professor in 2008 and was promoted to Professor in 2014. Dr. Zhang has made seminal contributions to the field of bioengineering and nanomedicine. He has published 219 peer-reviewed articles in highly regarded journals. In 2017, 2018 and 2019, he was among the Thompson Reuters list of “Highly Cited Researcher”. He is an inventor of 108 patents and patent applications worldwide. He has received numerous mainstream recognitions, including the Victor K. LaMer Award (2009) and Unilever Award (2012) from the American Chemical Society, MIT Technology Review’s TR35 Innovator Award (2013), Allan P. Colburn Award (2014) from the American Institute of Chemical Engineers, Popular Science’s Brilliant 10 Award (2016), U.S. Department of State ASPIRE Award (2017), and Kabiller Young Investigator Award (2017). Professionally, Dr. Zhang was recently elected to the College of Fellows of the American Institute for Medical and Biological Engineering (AIMBE) in 2015 and to the Fellows of the American Association for the Advancement of Science (AAAS) in 2018.