Department of Biomedical Engineering
The Chinese University of Hong Kong

Nanoengineering for the Detection and Treatment of Cancer

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Time : 10:30 am
Venue : Room 1122, William M W Mong Engineering Building, CUHK

Abstract

My laboratory develops technologies to accelerate the research, diagnosis, and treatment of cancer and allied diseases via drug delivery and sensor nanotechnologies. Using nanotherapeutic strategies, we investigate methods to enable drugs to translocate tissue barriers. We found glycoproteins, expressed in the disease microenvironment, can be nanotherapeutic targets to improve the efficacy of precision medicines, to abrogate dose-limiting toxicities, and to facilitate delivery across the blood-brain barrier for the treatment of intracranial tumors and metastases. We also develop AI/machine learning processes to facilitate nanoparticle assembly based on drug molecular structures, to enable the rapid synthesis of diverse nanotherapeutics.

In the nanosensors field, my laboratory develops optical detection technologies using “quantum well nanosensors” to facilitate disease diagnosis, monitoring, and research. We developed a “machine perception liquid biopsy” platform to enable the detection of diseases via a blood test, and to discover novel protein biomarkers, facilitated by machine learning algorithms.

Biography

Dr. Daniel A. Heller, PhD is Head of the Cancer Nanomedicine Laboratory and Member of the Molecular Pharmacology Program in the Sloan Kettering Institute and Co-Director of The Pat and Ian Cook Doctoral Program in Cancer Engineering at Memorial Sloan-Kettering Cancer Center. He is also Professor in the Department of Pharmacology at Weill Cornell Medicine. His work focuses on the development of nanoscale technologies for the research, diagnosis, and treatment of cancer. Dr. Heller obtained his bachelor’s degree in history and PhD in chemistry from the University of Illinois at Urbana-Champaign in 2010, working in the laboratory of Michael Strano. He completed a Damon Runyon Cancer Research Foundation Postdoctoral Fellowship in the laboratory of Robert Langer at the David H. Koch Institute for Integrative Cancer Research at MIT in 2012. He is a 2012 recipient of the National Institutes of Health Director’s New Innovator Award, a 2015 Kavli Fellow, a 2017 recipient of the Pershing Square Sohn Prize for Young Investigators in Cancer Research, a 2018 American Cancer Society Research Scholar, a 2018 recipient of the CRS Nanomedicine and Nanoscale Drug Delivery Focus Group Junior Faculty Award, a 2018 NSF CAREER Awardee, a 2020 awardee of the Weill Cornell Graduate School Pharmacology Teaching and Mentoring Award, a 2021 American Institute for Medical and Biological Engineering (AIMBE) Fellow, a 2022 awardee of the UM Ventures Life Science Invention of the Year, and a 2024 College of Liberal Arts and Sciences Young Alumni Awardee, University of Illinois.

***** ALL ARE WELCOME *****

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