"Investigating Biomedical Challenges Through State-of-the-Art DNA-based Technology"

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3:30 pm
Wu & Chen Auditorium

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Abstract

DNA can serve purposes beyond conveying hereditary information – its highly specific Watson-Crick base pairing can also be used to direct the assembly of cells, nanoparticles, and proteins. Recently developed in the Sohn lab [1], high-throughput DNA-directed patterning takes advantage of the versatile and iterative aspects of photolithography to define clearly regions on an aldehyde-functionalized slide to which amine-terminated 20 nucleotide oligonucleotides are conjugated. By tagging antibodies, liposomes, or cells with the complementary oligonucleotide, I can create patterns with high spatial resolution. In this talk, I will demonstrate the versatility of high-throughput DNA-directed patterning through disparate applications, including the immobilization of antibodies [2], the validation of a liposome model of SARS-CoV-2 [3], and an *in vitro* model of the tumor microenvironment. The advantages afforded by this technique enable me to validate ACE2-binding and antibody neutralization of different variant model liposomes and to study interactions of the multiple types of cells found in the bone marrow. By controlling the organization of cells with single-cell resolution and the ability to configure heterogeneous cellular environments, DNA-directed patterning presents opportunities in the study of high complexity biomedical challenges.

Bio

Dr. Molly Kozminsky received her undergraduate degree in Chemical-Biological Engineering from MIT. She then pursued her PhD in Chemical Engineering in the lab of Professor Sunitha Nagrath at the University of Michigan, where she used nanomaterial-based microfluidic devices to isolate circulating tumor cells from genitourinary cancer patients for subsequent analysis. Dr. Kozminsky is currently a postdoctoral fellow in Professor Lydia Sohn's lab at the University of California, Berkeley, where she uses high-throughput DNA-directed patterning to study the tumor microenvironment. She has been awarded the NSF Graduate Research Fellowship (2014-2017), the NIH F32 Postdoctoral Fellowship (2019), and the American Association for Cancer Research Women in Cancer Research Scholar Award (2021).

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