A Proteomimetic Polymer Chemistry Approach to Expanding the Druggable Proteome

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Abstract

In this presentation, we describe Protein-Like Polymers (PLPs) as an approach to mimicking proteins. These proteomimetics are based on peptide-brush polymers composed from monomers each containing a peptide side-chain. Herein, we describe the development of this class of biomolecule polymer conjugate, discuss their physicochemical and structural properties and will expand on their utility in a range of settings, including as a new type of therapeutic modality. We will highlight some examples including their ability to engage critical intracellular protein-protein interactions especially among intrinsically disordered transcription factors responsible for driving neurodegenerative disease and cancer. These will include a novel approach to targeted protein degradation utilizing the polymer-based technology to rapidly converge on functional molecules.

Short Biography

Nathan C. Gianneschi received his B.Sc(Hons) at the University of Adelaide, Australia in 1999 and his Ph.D at Northwestern University in 2005. Following a postdoctoral fellowship at The Scripps Research Institute, in 2008 he began his career at the University of California, San Diego. In July of 2017, Gianneschi moved his multidisciplinary research group to Northwestern University where he is currently Jacob & Rosaline Cohn Professor of Chemistry, Materials Science & Engineering, Biomedical Engineering and Pharmacology. For his work he has been awarded the NIH Director's New Innovator Award, the NIH Director's Transformative Research Award and the White House's highest honor for young scientists and engineers with a Presidential Early Career Award for Scientists and Engineers. Prof. Gianneschi was awarded a Dreyfus Foundation Fellowship, is a Kavli Fellow of the National Academy of Sciences, a Fellow of the Royal Society of Chemistry, and is an Alfred P. Sloan Foundation Fellow.