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CHEMISTRY SEMINAR 291

Nonlinear Optical Studies of Drug-Lipid Interactions

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ABSTRACT

Small organic molecules may adsorb to and perturb the physical structure of lipids in the mammalian plasma membrane, causing changes to the conformation and function of transmembrane proteins. These non-specific interactions can also impact bioaccumulation and toxicity. We used the label-free nonlinear optical method second harmonic generation (SHG) to monitor adsorption of therapeutically-relevant concentrations of water-soluble N-substituted glycine oligomers (peptoids) to artificial lipid membranes. Peptoids have exhibited enhanced biostability compared to proteins and peptides, and have shown promise as therapeutics and as nanomaterials. To advance peptoid-based technologies, molecular-level information is needed to predict their behavior in the human body. Our studies quantified the binding affinities of peptoids (with varied 3D structures and individual substituent features) to phospholipid membranes of varying phase, cholesterol content, and head group charge at a range of physiological pH conditions.

BIO:

Grace grew up in Dallas, Texas and received her B.S. from Stanford University. She completed her Ph.D. with Prof. Franz Geiger at Northwestern University. She then conducted postdoctoral research at Johns Hopkins University and at the University of Utah prior to starting her independent career as a Clare Boothe Luce Assistant Professor at Santa Clara University in 2014. She is also the recipient of a 2018 Cottrell Scholar Award.