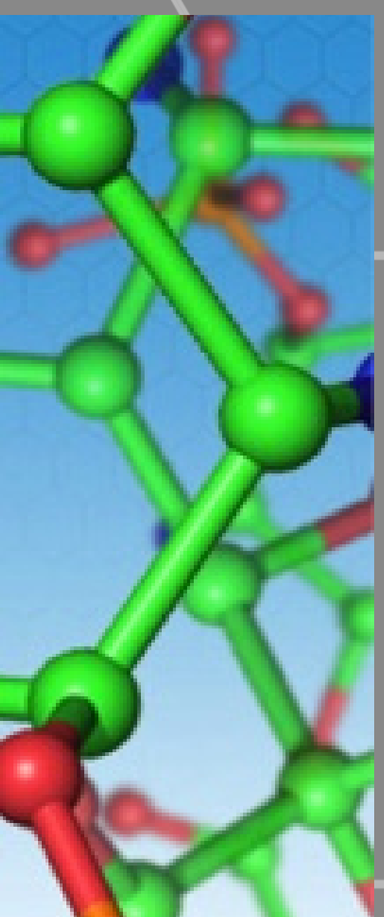
13th Annual

Riley O. Schaeffer

Endowed Lectureship

2022



DEPARTMENT OF CHEMISTRY & CHEMICAL BIOLOGY

Presented by:

Prof. Dennis A Dougherty

California Institute of Technology

Chemistry on the Brain: Understanding the Nicotine Receptor

Friday, November 11, 2022 4:00 PM

Clark Hall, Lecture Hall 101

Reception Clark Hall 105 Open Space 3:15 PM

The remarkable complexity of the human brain is evident at all levels, from anatomical to cellular to molecular. The central molecules of synaptic signaling comprise a diverse array of integral membrane proteins that are resistant to most approaches to high resolution structural characterization. As such, chemistry provides the most powerful tool for unraveling the structures and functions of the molecules of memory, thought, and sensory perception; of Alzheimer's, Parkinson's, and schizophrenia. Using the mindset and methodologies of physical organic chemistry, and combining them with molecular biology, electrophysiology, and computer modelling we have probed these complex membrane proteins with a precision and subtlety normally associated with small molecule studies. We have uncovered key interactions that allow agonists to bind, and that distinguish binding of natural ligands vs. substances of abuse, including a key cation-π interaction that enables tight binding of nicotine to specific regions of the brain.

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