Understanding Molecular Behavior at the Biointerface

Paul Cremer
J. Lloyd Huck Chair, Natural Sciences, Chemistry, Biochemistry, and Molecular Biology

CURRENT RESEARCH

Uncovering what underlies neurodegenerative disease

Senile plaques are built up deposits of amino acid-based peptides, called amyloid beta, in the grey matter of the brain. These deposits are associated with aging; however, a large buildup is associated with more serious neurodegenerative conditions, like Alzheimer's. While scientists have begun to uncover the interactions between amyloid beta peptides and disease, a great deal remains unknown. Dr. Paul Cremer, Professor of Chemistry, Biochemistry, and Molecular Biology at Pennsylvania State University, studies the basic chemistry of ion-cell membrane interactions in order to elucidate why senile plaques form on these surfaces, and furthermore, how plaques are linked to neurodegenerative diseases. His studies are helping to understand the molecular behavior at the biointerface. In other words, how do ions, peptides, small molecules, and proteins all interact at the barrier to entrance into the cell? By answering these challenging questions, Dr. Cremer is developing a fundamental understanding of the basic chemistry that occurs at the biomembrane while providing insights into diseases that serves as the first step in finding cures.

Perhaps most unique about Dr. Cremer's approach is the multidisciplinary nature of his research and team. By combining chemistry, engineering, medicine, spectroscopy, microfluidics, and nanotechnology, he and his team approach questions that have puzzled the medical community with a new perspective. Biophysical and analytical studies are tied together through the employment of novel lab-on-a-chip platforms which enable high throughput and low sample volume analysis to be performed with unprecedented signal-to-noise. Highly regarded for his innovation, Dr. Cremer is the recipient of...

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AFFILIATION

Pennsylvania State University

EDUCATION

- Ph.D., in Chemistry, 1996 , University of California, Berkeley

AWARDS

- J. Lloyd Huck Chair in Natural Sciences, Penn State University (2013-Present)
- Fellow, American Association for the Advancement of Science (2010)
- Edith and Peter O'Donnell Award in Science, The Academy of Medicine, Engineering, and Science of Texas (2010)
- Fellow, American Chemical Society (2009)
- Pittsburgh Conference Achievement Award (2006)

RESEARCH AREAS

Technology, Chemistry, Fluidics, Materials Science / Physics

FUNDING REQUEST

Your contributions will support the continued research of Dr. Paul Cremer, of Pennsylvania State University, as he uses a molecular level approach to understanding biointerfaces and diseases related to them. Donations will fund the necessary $750K/year required for personnel, equipment, and supplies. Dr. Cremer's research is likely to make an impact in the understanding and treatment of many diseases, especially neurodegenerative diseases; join in understanding the underpinnings of disease and increasing healthspan for patients. Support the research of Dr. Cremer.