

ENGINEERING VIRUSES FOR EFFICIENT, TARGETED, AND MINIMALLY INVASIVE GENE DELIVERY

Pathobiology Lecture Series

WHEN: 12 p.m., January 29, 2025

WHERE: Vet Med Basic Sciences Building, Room 1261

Gene delivery has become an essential method for biological research and offers promises for therapeutic applications. Adeno-associated viruses (AAVs) are among the most preferred gene delivery vectors due to their low toxicity and high engineering potential. However, their poor efficacy and target specificity remain critical limitations, often raising serious safety concerns in clinical trials. My research has focused on engineering these viral vectors, enabling efficient and targeted gene delivery to the central and peripheral nervous systems through minimally invasive routes. To achieve this goal, we have developed several high-throughput platforms for engineering and screening the genetic variant libraries of AAV capsids and genomes by adapting cutting-edge directed evolution and spatial omics technologies. Through these technical innovations, we have developed a series of engineered AAVs that are, for instance, capable of penetrating the protective blood-brain barrier, preferentially transducing specific brain cell types, or avoiding the liver when intravenously administered. Our platform technologies have successfully been expanded across species, including rodents and non-human primates, proving the exciting potential for advancing therapeutic gene delivery tools. In my new lab at UIUC Bioengineering, we aim to advance the precision of gene delivery by better understanding the genetic and epigenetic programs of brain functions and disorders and by using the obtained knowledge to develop programmable gene delivery vectors to target brain cell types and states. We tackle this challenge at the intersection of synthetic biology, single-cell/spatial omics, and machine learning, hoping to deliver precision, programmable, and personalized genetic medicine for complex neurological and mental disorders.



Dr. Min Jee Jang

Assistant Professor
Bioengineering
University of Illinois Urbana-Champaign



College of
Veterinary Medicine