Principal Investigator: Shang-Cheng Hung

Grant Title: Development of microarrays for probing specific GAG-protein interactions

Abstract:

Cell-surface glycosaminoglycans (GAGs) are linear, polyanionic polysaccharides composed of repeating disaccharide units, including heparan sulfate (HS), chondroitin sulfate (CS), dermatan sulfate (DS), and keratan sulfate (KS). These molecules are known to modulate the activity of various biologically and medically important proteins. However, due to challenges in obtaining sufficient quantities of structurally well-defined GAGs, the molecular details of most GAG–protein interactions remain poorly understood. Dr. Hung's team, a leader in HS synthesis, will expand their platform to generate a comprehensive library of GAG oligosaccharides (HS, CS, DS, KS) with variations in chain length and sulfation patterns. In this report, a library of KS oligosaccharides was synthesized, and was tested with human galectins through a GAG microarray. The microarray analysis revealed that KS binding to human galectin-1, -3, and -8 increases with chain length and is strongly enhanced by specific sulfation. This approach will enable detailed structure–activity relationship (SAR) studies, offering new opportunities for understanding GAG–protein interactions and advancing strategies for disease diagnosis, prevention, and therapeutic development.