Real-Time Monitoring of Nanoscale Exosomes by In Vivo Flow Cytometry

Peking University, China

Xunbin Wei
Email: xwei@bjmu.edu.cn

Exosomes, a subtype of extracellular vesicles, maintain physiological homeostasis and facilitate intercellular communication by delivering biologically active molecules. Exosomes could serve as potential diagnostic and prognostic biomarkers for a variety of clinical conditions, including tumor malignancies, and are also promising as therapeutic delivery vehicles. However, the greatest difficulty in the clinical translation of exosomes is that they are currently poorly understood, especially concerning their in vivo behavior. In this study, we provide a novel method for monitoring exosomes in the blood circulation based on in vivo flow cytometry (IVFC). We demonstrate that IVFC allows for the monitoring of exosome concentration, aggregation, and cellular uptake. In vivo experiments indicate that polyethylene glycol (PEG)-modified exosomes have a longer residence time and less aggregation in circulation compared to unmodified exosomes. These studies demonstrate that IVFC enables real-time in vivo monitoring of circulating exosomes, which can provide valuable insights into the pharmacokinetics and cellular targeting capabilities of exosomes.

Short Bio:

Xunbin Wei completed his post-doc at Harvard Medical School. He was a professor in Fudan University, China. From 2011-2019, he was a professor and chair in Department of Biomedical Instrumentation, School of Biomedical Engineering, Shanghai Jiao Tong University. Currently, he is a professor at Department of Biomedical Engineering, Institute of Clinical Advanced Medicine, Peking University. Dr. Wei is an SPIE Fellow, and recipient of Chinese Outstanding Young Scholar Award. He has published more than 100 peer-reviewed papers, including in Nature and PNAS. His interests include cancer detection by optical means, optical manipulation of cells,

and light treatment of Alzheimer disease.