

Methodological Advances to Study the Extracellular vesicle Biomolecular Corona for Diagnostics and Therapeutics

The term "biomolecular corona" (BC) refers to the intricate interaction of macromolecules at the interface between a nanoparticle's surface and its surrounding environment. Originally identified on synthetic nanoparticles, BC is now also recognized to form on biogenic nanoparticles such as extracellular vesicles (EVs). The BC is composed of biomolecules gathered from the extracellular space, which may alter the surface of these nanoparticles and influence their biological functions, including cellular uptake, distribution within the body, and involvement in disease processes. Recent research has begun exploring the nature of the biomolecular corona with the aim of uncovering new properties of EVs. Despite its potential, we still lack a clear understanding of the mechanisms and specificity that govern the recruitment of biomolecules to the EV surface. Over the past few years, our lab has been actively engaged in developing new methods to study the EV-BC, with the goal of leveraging this knowledge for diagnostic and therapeutic applications. In this lecture I will present our latest findings on EV-BC highlighting the potential of studying EV-BC for disease diagnostics and the impact of BC on EV-based therapies, introducing new non-destructive, "in-situ" methods for studying EV-BC interactions under physiological conditions.