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Extracellular vesicles internalization mechanisms into cells

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Extracellular vesicles (EV) are a potent intercellular communication system, delivering proteins and genetic material throughout the body, strongly influencing the fate of recipient cells. Due to their specific biological functions and to their peculiar molecular content they have been proposed as biomarkers for various diseases and as optimal candidates for therapeutic applications. Despite of their extreme biological relevance, their mechanisms of internalization into recipient cells are still hotly debated. We performed a multiscale investigation based on atomic force microscopy, small angle X-ray and neutron scattering, neutron reflectometry, infrared spectroscopy and scanning calorimetry to reveal the structural features of EV of different origin an to investigate their interaction with model membrane systems of variably complex composition, to spot the role of different membrane phases on the vesicles internalization routes. Our analysis reveals dependence of interaction mechanisms on EV nature. Our approach has clear implications on the modulation of EV internalization routes by targeting specific domains at the plasma cell membrane and, as a consequence, on EV-based therapies.

[F. Perissinotto & V. Rondelli et al., Nanoscale, 2021]
[M. Grava et al., Biomolecular Concepts, 2022]
[V. Rondelli et al., ACS Omega, 2022]
[M. Grava et al., Il Nuovo Cimento C, 2022]

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