

# Transplantation of autologous extracellular vesicles for cancer-specific targeting

Paolo Ciana

Department of Health Sciences, University of Milan, Italy *e-mail:* [paolo.ciana@unimi.it](mailto:paolo.ciana@unimi.it)

Notwithstanding the huge research effort made by the scientific community, tumor selective targeting for the delivery of diagnostics and therapeutics is still considered one of the main challenges in cancer diagnosis and therapy. Among different nanoparticle-driven strategies, one of the most promising approach is based on extracellular vesicles (EVs). EVs are naturally occurring nano-sized lipid vesicles secreted by virtually all cell types; they constitute a key unit of communication not only among intracellular structures, but also as a relevant component of the paracrine and endocrine apparatus for the intercellular exchange of biological messages within the body. This layer of communication has been proven to play a significant role in several hallmarks of cancer, including inhibition of cell death, invasion, metastasis and immunosuppression. Our work aims at interfering with this layer of communication, transforming EVs in an anti-cancer tool. The original observation that cancer cells are producing EVs which display a remarkable targeting activity selectively for neoplastic tissue, provided us with the rationale basis of their use as a drug-delivery system. The molecular mechanism underlying this tumor-tropism is only poorly understood, we may postulate that it stems from a conserved biological function that is disrupted in tumorigenesis; the characterization of this mechanism will certainly improve our knowledge on neoplastic transformation and provide a tumor targeting tool for cancer therapy. Collectively our studies demonstrated that we may already use these EVs as personalized tool for the delivery of anti-cancer and diagnostic agents by autologous transplantation, thus setting the ground for an EV-interfering strategy for cancer management.

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