

Extracellular vesicle-mediated modulation of angiogenesis

Chiara Gai ¹, Andrea Carpanetto ¹, Maria Chiara Deregibus ¹, Giovanni Camussi ²

Affiliations + expand

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Abstract

Angiogenesis is a tightly regulated process where a number of different players are involved. Recently, a role for membrane vesicles actively released from cells has been proposed. Virtually all cell types may release non-apoptotic membrane vesicles in the nano-size range containing critical components of the cell of origin. The two main categories of these vesicles include exosomes and microvesicles that differ for biogenesis but, sharing several features and mechanisms of action, have been collectively named extracellular vesicles (EV). EV are able to transfer from one cell to another bioactive lipids, proteins and nucleic acids that may induce changes in the phenotype and functions of the recipient cells. This new mechanism of cell to cell communication has been involved in modulation of the angiogenic process. Tumor cells, inflammatory cells and stem/progenitor cells were shown to release EV with angiogenic properties suggesting that they may act on vascular remodeling in different physiological and pathological conditions. In this review we discuss the evidence for the role and the mechanisms of action of EV in vascular homeostasis and in the angiogenic processes occurring in tumors, inflammation and tissue regeneration.