Role of stem cell-derived microvesicles in the paracrine action of stem cells
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The paracrine theory has recently changed the view of stem cell biological action and of the potential application of stem cells in regenerative medicine. Indeed, most of the beneficial effects of stem cell based therapy have been related to soluble factors released from stem cells. In this context, microvesicles (MVs) released as exosomes from the endosomal compartment, or as shedding vesicles from the cell surface may play a relevant role in the inter-cellular communication between stem and injured cells. By transferring proteins, bioactive lipids, mRNA and microRNA, MVs act as vehicle of information that may change the phenotype of recipient cells. The exchange of information between stem cells and tissue injured cells is reciprocal. The MV mediated transfer of tissue specific information from the injured cells to stem cells may reprogram the latter to gain phenotypic and functional characteristics of the cell of origin. On the other hand, MVs released from stem cells may confer to injured cells a stem cell-like phenotype with the activation of self-regenerative programs. In fact, MVs released from stem cells retain several biological activities that reproduce, in a variety of experimental models, the beneficial effects of stem cells.