Therapeutic potential of plasma membrane-derived microparticles

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Résumé en anglais	In the past, plasma membrane-derived microparticles were considered "cellular dust." According to the literature, circulating levels of microparticles are increased in several cardiovascular diseases associated with inflammation, suggesting that microparticles are linked to deleterious effects such as endothelial dysfunction or thrombosis. However, very recent studies have shown that under several conditions microparticles can transfer biological messages between cells. Indeed, microparticles act as vectors of key information to maintain cell homeostasis or to favor cell repair and induce angiogenesis. For instance, microparticles of platelet origin are able to repair myocardial injury after myocardial infarction. Also, we have shown that engineered microparticles generated from human activated/apoptotic T cells promote angiogenesis through the up-regulation of adhesion proteins and pro-angiogenic factors in human endothelial cells. Interestingly, the effects induced by these microparticles on the formation of capillary-like structures, expression of adhesion molecules, and pro-angiogenic factors are reversed after silencing of the Sonic Hedgehog (Shh) morphogen pathway. In addition, the same type of microparticles is able to induce neo-vascularization in an ischemic hindlimb model. These effects are, at least in part, mediated by Shh and nitric oxide production. Taking into consideration these results and the most recent data concerning the ability of microparticles to transmit genetic information between cells through mRNA transfer, it is plausible that plasma membrane-derived microparticles could serve as tools with veritable therapeutic potential.
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