Joint Event on

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## Endothelial regeneration by membrane particles derived from mesenchymal stem cells

Mesenchymal stromal cells (MSC) are studied as an immunomodulatory and regenerative therapy in organ repair. Recent work demonstrated that dead MSC which are unable to secret factors, are effective in a sepsis model, suggesting that MSC activity is dependent on the cell membrane interactions with immune cells. We propose a new therapy based on the generation of plasma Membrane Particles (MP) from MSC. We previously showed that MP were effective in reducing the inflammatory phenotype of monocytes. In this study, we investigated the therapeutic potential of MP as regenerative treatment for EC in a TNF-α inflammatory condition. MP were generated from MSC by hypotonic shock and extrusion. MP showed vesicle shape (cryoelectron-microscopy) and a size below 200 nm. Uptake of MP by EC was analyzed by confocal microscopy, and within 24 hours >90% of EC have taken up MP. Three different concentrations of MP were tested on EC. None of the MP concentrations induced apoptosis or activation of EC measured by the expression of the adhesion markers such as ICAM-1, and VCAM. With respect to the regenerative capacity of EC after MP treatment, we have observed an enhancement of angiogenesis by increasing the number of tubes, and branches formation in vitro compared to the negative control (non-treated EC). In the scratch wound healing assays, MP had a stimulating effect on EC to fill the scratch in a dose-dependent manner. In conclusion, MP potentially serve as a novel cell derived therapy that restores vascular integrity and induces endothelial regeneration.

## Biography

Ana Merino has completed her PhD at the University of Córdoba (Spain) and Post-doctoral studies at the Biomedical Institute of Bellvitge (IDIBELL) in Barcelona (Spain). She has published more than 30 papers in indexed journals. As a senior Researcher, she is currently developing the project: Pre-clinical evaluation of membranes particles from mesenchymal stem cells for immune and degenerative disorders. This project is being developed in the Internal Medicine department from Erasmus Medical Center (Rotterdam, The Netherlands) in collaboration with the company Takeda-Tigenix..

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