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Restoring the regenerative capacity of human bone marrow-derived mesenchymal stem cells (BM-MSCs) from the elderly to establish a high quality autologous MSC bank

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MSC-based therapies have great potential for treating many age-related diseases. Due to biosafety concerns and FDA regulations, autologous stem cells are preferable for cell-based therapies. Unfortunately, the quantity and quality of MSCs decrease with aging, inhibiting progress in developing autologous MSC-based applications. In the present study, we propose an innovative approach for rescuing aged MSCs by separating a sub-population of more "youthful" cells, using biomarkers (size and SSEA-4 expression), from a population of cells obtained from the BM of elderly donors (human subjects); and protecting and amplifying this "youthful" sub-population by culture on a "young microenvironment" using our established patented technology (BM-ECM produced by young cells). The results demonstrate that by applying this approach we were able to identify and isolate a subpopulation of BM-MSCs from elderly donors, displaying a less "aged" phenotype, and culture them on a young microenvironment (BM-ECM) to significantly improve their proliferation and differentiation capacity.

Biography

Xiao-Dong Chen is a Professor in the Department of Comprehensive Dentistry and Chief of the Regenerative Medicine Program in the School of Dentistry at the University of Texas, Health Science Center at San Antonio. His group was the first to establish Cell-Free Native ECM made by Bone Marrow Stromal Cells. To closely replicate the tissue specific microenvironment (niche) *ex vivo*, he and his team have extended their technology by developing a variety of 3D tissue-specific scaffolds for facilitating stem cell-based applications.

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