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Human adipose derived mesenchymal stem cells: A potent anti-fibrosis therapy for systemic sclerosis

Noel D[1, 2, 3], **Maria A T1**, [2], **Toupet K**[1, 2], **Fonteneau G**[1, 2], **Maumus M**[1, 2], **Bony C**[1, 2], **Jorgensen C**[1, 2, 3] and **Guilpain P**[1, 2]
[1]Saint Eloi Hospital, France
[2]Montpellier University, France
[3]Lapeyronie Hospital, France

Because of immune-modulatory and trophic properties, mesenchymal stem/stromal cells (MSC) appear as a promising treatment for systemic sclerosis (SSc), a rare intractable disease with fibrosis-related mortality. While autologous approaches could be inappropriate because of alterations in SSc-MSCs, we evaluated allo- and xenogeneic approaches in the relevant hypochlorite (HOCl)-induced murine model of diffuse SSc, recapitulating the main features of the disease. Therefore, we investigated the effect of murine and human (h) MSC in the HOCl-induced SSc model. Subcutaneous fat being an accessible source of MSC, we also compared human bone marrow- (BM-MSC) with adipose-derived MSC (ASC). We therefore assessed the effect of BM-MSC from syngeneic BALB/c, allogeneic C57BL/6 mice and xenogeneic hBM-MSC or hASC (3 donors each) in HOCl-challenged mice. We demonstrated that allo- and xenogeneic BM-MSC were as effective as syngeneic BM-MSC in decreasing skin thickness, expression of *Col1*, *Col3, a-SMA* and collagen content in skin and lungs. Compared with hBM-MSC, hASC induced a similar reduction in *Col1* and a-*SMA* expression, but a stronger reduction of *TNFa, IL1b*, and enhanced ratio of *Mmp1/Timp*1 in target tissues. This therapeutic efficacy was mainly associated with paracrine activity since MSC did not migrate to the skin. Our results indicated similar therapeutic effects using allo-/xenogeneic BM-MSC while hASC displayed potent anti-inflammatory and remodeling properties. Considering heterogeneity between MSC sources and samples, potency assays are needed to optimize MSC-based therapy outcomes in SSc.

Biography

Noel D is currently a Research Director in the Inserm Institute for Regenerative Medicine and Biotherapies in Montpellier. She has received her PhD from Bordeaux University in 1992. She then completed Post-doctoral studies at the Institute of Molecular Genetics in Montpellier in the field of Recombinant Retrovirology and Gene Therapy. Since 1999, she works on mesenchymal stem cells and their applications in the treatment of osteo-articular diseases. She has published more than 138 papers in reputed journals and has been serving as Editorial Board Member.

daniele.noel@inserm.fr

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