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Fetal-derived stem cells: Characteristics and applications

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Together with stem cells derived from adult tissues or from embryos, there is an emerging scientific interest in cells derived from human term placenta, including cells from the fetal amnion and chorion membranes, Wharton's Jelly, and cells derived from the amniotic fluid. The interest rises mostly from their immunomodulatory capacities, but also from their ease in procurement, their differentiation capabilities, and their low immunogenicity. It is now clear that a number of different mechanisms contribute to the therapeutic effects exerted by the amniotic membrane-derived cells, including cell differentiation potential. However, the ability of these cells to interact with and modulate the functions of a wide variety of immune cells via paracrine signaling mediated by secreted bioactive metabolites has resulted to be the responsible mechanism of the therapeutic potential of these cells. This has been confirmed by the comparative studies using placenta-derived cells and conditioned medium derived from the culture of these cells in several preclinical models, such as lung and liver fibrosis, arthritis, encephalomyelitis. Multiple aspects of placenta-derived cells will be presented, such as isolation protocols, phenotypic characterization, the basics of their immunomodulatory mechanisms, the preclinical results, and the envisaged clinical applications. In conclusion, placenta-derived cells possess a variety of properties which render them an attractive source for a range of applications, especially in regards to inflammatory diseases.

Biography

Ornella Parolini is the Director of E. Menni Research Center, Fondazione Poliambulanza, Brescia, Italy and the President of IPLASS - International Placenta Stem Cell Society. She has pioneered research on human placenta-derived stem cells. Her research is focused on the immunomodulatory, anti-inflammatory and antifibrotic properties of amniotic and chorionic membrane-derived cells. She has been invited as a speaker to over 80 international congresses and has been the organizer and scientific leader of several international events. She is author of over 100 publications in peer-reviewed journals as well as several book chapters. She has one issued and two pending patents.

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