

# ImmunoTools special Award 2014



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## **Establishment of protocols for Isolation and Characterization of Cells from Human Amnion and Wharton's jelly: New sources of cells for regenerative medicine**

The clinical success of regenerative cell-mediated therapeutic approaches is dependent upon the source of cells and their immunogenicity. Placental tissues including the cord blood combine two appealing features for cell-mediated therapy, namely potentiality of cell differentiation, due to the early embryological origin and their immunological characteristics. In both cases, mesenchymal stem cells are available. These are adult multipotent cells isolated from almost every type of connective tissue, which can self-renew and under appropriate in vitro conditions have the capacity to differentiate into mesodermal, endodermal and even ectodermal lineages.

Therefore, the study of both placenta- and cord blood derived mesenchymal stem cells constitutes a novel field of research which is attracting an ever-increasing interest for its potential to provide cells which are not only available in large supply, but which also display high plasticity for differentiation and have interesting anti-inflammatory and immunomodulatory effects in vivo.

The amnion is a thin, avascular membrane derived from the embryo's epiblast. It is composed of an epithelial layer and an outer layer of connective tissue. Cord blood's connective tissue, Wharton's jelly, possess mesenchymal stem cells with multipotent properties between embryonic stem cells and adult stem cells, having the potential to act as cellular therapy in transplantation and regenerative medicine.

Mesenchymal stem cells from these tissues are a good choice for regenerative medicine because of both their phenotypic plasticity and immunomodulatory capability. Is it readily available and easily procured without invasive procedures, and its use does not elicit ethical debate.

However, due to the complexity of these tissues, the region of origin and which isolation method is best, has to be defined as well as the properties of cells isolated from them.

The aim of this work is to develop new protocols for isolating cells from human amnion and Wharton's jelly cord blood and phenotypically characterize them.

In order to phenotypically characterize cells isolated from human amnion and Wharton's Jelly, we must use several anti-human antibodies for flow cytometry. We would study the expression of a number of markers that are associated with an embryonic phenotype (Oct-4, SSEA-4 c-Kit) or with an adult phenotype (CD54, CD90, CD105, CD146) by FACS analysis. Taken together, all the above-mentioned will allow us to define both human amnion and Wharton Jelly isolated cells as mesenchymal stem cells (MSCs). These cells should be named as human amnion mesenchymal stem cells (hAMSC) and it should be differentiated from human amnion epithelial stem cells that can also be isolated from human amnion.

**ImmunoTools** *special* AWARD for

**Sebastián San Martín** includes 25 reagents

**FITC** - conjugated anti-human CD24, CD29, CD45, CD56, HLA-DR, Control-IgG1, Annexin V,

**PE** - conjugated anti-human CD9, CD14, CD34, CD44, CD45, CD59, CD105, Control-IgG1,

recombinant human cytokines rh BMP-2, rh BMP-7, rh EGF, rh IGF-I, rh IGF-II, rh TGF-beta3, rh TRAIL, rh VEGF-A/VEGF-165,

human IL-6 ELISA-set, human TNF alpha ELISA-set

[DETAILS](#)