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Stemness of Mesenchymal Stem Cells

Mesenchymal stem cells (MSCs) are multipotent adult stem cells that can self-renew and differentiate into a variety of cell types including chondrocytes, osteocytes and adipocytes. MSCs reside in bone marrow, adipose tissues, cord blood, peripheral blood, placenta, Wharton's jelly, fetal liver and lung among others. MSCs represent one of the most promising stem cells for regenerative medicine due to their multipotency, immunoprivileged properties and easy expansion in vitro. So far, MSCs are already in various phases of clinical application [1-4].

Research Article **Published Date:-2017-12-07 00:00:00**

Intraepidermal Injections of Autologous Epidermal Cell Suspension: A new promising approach to Dermatological Disorders. Preliminary Study

Regenerative medicine is a modern approach of dermatological treatment, using Epidermal Cells of the interfollicular epidermis (ESCs) for their effect in skin regeneration in chronic ulcers and burns, melanoma, vitiligo, junctional epidermolysis bullosa. Intraepidermal injections of autologous epidermal cell suspension can be a new and very promising treatment for many other cutaneous disorders as non-scarring alopecia (Alopecia Areata, Androgenic Alopecia) or scarring alopecia (Lichern Plano Pilaris alopecia, Discoid Lupus Erithematosus alopecia), anti-aging therapies. The intraepidermal injection of an autologous epidermal cell suspension is a simple, fast and safe surgical procedure: a small, thin portion of the epidermis of the patient undergoes a treatment where a suspension with all the cells collected from the epidermis and cultured for 7 days is injected into the skin. Our preliminary study shows that a suspension contains a significant number of viable cells that survive at day 7 in culture.

Our research is ongoing and is focusing on the typing of the different cells in the suspension and evaluation of the presence and the nature of stem cells.

Case Report **Published Date:-2017-09-21 00:00:00**

Nicotinamide as a treatment option of Age-Related Macular Degeneration

Age related macular degeneration is a severe disease of mainly elderly people and leads to central vision loss because of the degeneration of the retinal pigment epithelium [1]. Genetic and environmental factors are responsible for the accumulation of extracellular material and deposit formation near the retinal pigment epithelial (RPE) layer, which leads to loss of photoreceptors and induction of chronic inflammation. The deposits are composed of lipids and proteins including many complement proteins, indicating the involvement of the complement system in the degenerative process and chronic inflammation [2]. So far there is no treatment for the dry form of AMD, except nutritional supplementation with antioxidants and vitamins [3]. Combined with a prolonged lifetime expectation in developed countries, AMD is developing to a social and economic burden. Therefore, there is an urgent need for a treatment of AMD that can delay disease manifestation and progression for several years.

Research Article **Published Date:-2017-09-07 00:00:00**

Arid3a regulates mesoderm differentiation in mouse embryonic stem cells

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Research into regulation of the differentiation of stem cells is critical to understanding early developmental decisions and later development growth. The transcription factor ARID3A previously was shown to be critical for trophectoderm and hematopoetic development. Expression of ARID3A increases during embryonic differentiation, but the underlying reason remained unclear. Here we show that Arid3a null embryonic stem (ES) cells maintain an undifferentiated gene expression pattern and form teratomas in immune-compromised mice. However, Arid3a null ES cells differentiated in vitro into embryoid bodies (EBs) significantly faster than control ES cells, and the majority forming large cystic embryoid EBs. Analysis of gene expression during this transition indicated that Arid3a nulls differentiated spontaneously into mesoderm and neuroectoderm lineages. While young ARID3A-deficient mice showed no gross tissue morphology, proliferative and structural abnormalities were observed in the kidneys of older null mice. Together these data suggest that ARID3A is not only required hematopoiesis, but is critical for early mesoderm differentiation.

Research Article **Published Date:-2017-07-31 00:00:00**

Enhancing adipose stem cell chondrogenesis: A study on the roles of dexamethasone, transforming growth factor ?3 and ascorbate supplements and their combination

Varied exogenous chondrogenic factors (CFs) are implicated in promoting differentiation of stem cells along a chondrocyte lineage in the field of regenerative tissue engineering for articular cartilage repair. The effects of dexamethasone, transforming growth factor ?3 (TGF-?3), ascorbate, and their combinations, on mRNA expression in micromass-cultured human adipose derived stem cells (hADSCs) were investigated as a function of time. Indices include chondrogenic, hypertrophic, angiogenic, fibrogenic and osteogenic markers along with mechanical properties, assessed by atomic force microscopy. Early in the culture, i.e., at day three, no significant differences in mRNA expression of SOX9, aggrecan, lubricin, Col XI, Col X, vascular endothelial growth factor, Col I, and alkaline phosphatase were observed among samples treated with different CFs. However, significant differences in mRNA expression levels of pre-mentioned markers among samples treated with each CF exist when samples were supplied with the CFs for more than three days. A new indexing scheme summing expression of chondrogenic and subtracting non-chondrogenic angiogenic, fibrogenic and osteogenic marker levels shows dexamethasone is the overall leading CF among the factors and their combinations. Based on this scheme, we have projected not only the possible signaling pathways which might be affected by addition of CFs but also hypothetical indexes that may occur upon temporal variation of growth factor regimens.

Research Article **Published Date:-2017-07-25 00:00:00**

Surgical Implantation of Stem Cells in Heart Failure Patients due to Idiophatic Cardiomyopathy

Introduction: Congestive heart failure is one of the main causes of morbidity and mortality in the XXI century given the promising to date of ABMDSCs and HFDSCs we investigate the safety and efficacy for the implantation of those stem cells for the treatment of idiopathic cardiomyopathy. This is the first pilot clinical study to assess the safety and feasibility of HFDSC in humans. We totally implanted 13 patients: 3 patients were implanted with ABMDSC by Mini-invasive surgical technique in March 2004 in Montevideo, Uruguay, and 10 patients were implanted with HFDSCs by using 2 different surgical techniques: minimally invasive technique (1 patient) and full sternotomy technique (9 patients) between January and February of 2005 in Guayaquil Ecuador.

The HFDSCs were obtained from fetuses of 5 to 12 weeks´ gestation from legally consent, no compensated donors who have undergone terminated ectopic pregnancies, elective abortions, or spontaneous miscarriages. At that gestation´s period, totipotent stem cells´ fetus haven´t develop yet the HLA histocompatibility complex, so there´s no possible antigenicity between donor and recipient.

Results: Patients with HFDSCs improved in association with increased contractility in these regions. Compared with baseline assessments, we noted other improvements: The mean (±SD) NYHA class decreased from 3.4±0.5 to 1.33±0.5 (P=.001); the mean EF increased 31%, from 26.6% ± 4.0% to 34.8%±7.2% (P=.005); performance in the ETT increased 291.3%, from 4.25 minutes to 16.63 minutes (128.9% in metabolic equivalents, 2.45 to 5.63) (P<.0001); the mean LVEDD decreased 15%, from 6.85±0.6cm to 5.80±0.58cm (P<.001); mean performance in the 6-minute walk test increased 43.2%, from 251±113.1 seconds to 360±0 seconds (P=.01); the mean distance increased 64.4%, from 284.4±144.9m to 468.2±89.8m (P=.004); and the mean result in the Minnesota congestive HF test decreased from 71±27.3 to 6±5.9 (P<.001) The Kaplan-Maier probability of survival at 48 months was 66%.

It is not observed rejection, these patients have not developed malignance nodules or cancer at all in the follow-up. In the AMBCSs. The preoperative average NYHA functional class was 3.4; at. 6 months of follow up the average functional class value was 1.3 (p<0,005);. After 6 months all of them remained in functional class I/II. Baseline values of LVEF were 25,28 and 30%.; at 6 months increased to 38, 40 and 46%. (p<0,05). LVESV went from 50mm to 42mm (p<0.05). After 24 months, 2 of the patients still maintained this improvement, while the 3er patient returned to the earlier values after suffering from pneumonia. At 12 years and 5 months 2 patients are alive both received a Resynchronization Therapy; at 8 years and 3 months and 9 years and 1,6 month the actual average EF are 28 and 30 %. The 3er patient died of sudden death at 10 years after the implantation. We can´t demonstrate the cause of this sudden death.

Conclusion: Irrespective of the improvement seen in this study, it is still premature to determine accurately the mechanism of action, indications, doses and type of stem cells. Therefore, is imperative and extremely important that more research is needed.

Review Article **Published Date:-2017-03-09 00:00:00**

Rhabdomyoblasts in Pediatric Tumors: A Review with Emphasis on their Diagnostic Utility

Rhabdomyosarcoma is a soft tissue pediatric sarcoma composed of cells which show morphological, immunohistochemical and ultrastructural evidence of skeletal muscle differentiation. To date four major subtypes have been recognized: embryonal, alveolar, spindle cell/sclerosing and pleomorphic. All these subtypes are defined, at least in part, by the presence of rhabdomyoblasts, i.e. cells with variable shape, densely eosinophilic cytoplasm with occasional cytoplasmic cross-striations and eccentric round nuclei. It must be remembered, however, that several benign and malignant pediatric tumours other than rhabdomyosarcoma may exhibit rhabdomyoblaststic and skeletal muscle differentiation. This review focuses on the most common malignant pediatric neoplasm that may exhibit rhabdomyoblastic differentiation, with an emphasis on the most important clinicopathological and differential diagnostic considerations.

Research Article **Published Date:-2017-01-03 00:00:00**

The Femoral Head of Patients with Hip Dysplasia is not as Osteogenic as Iliac Crest Bone Location

When Total Hip Arthroplasty (THA) is required in a patient with developmental dysplasia of the hip (DDH), bone deficiency in the acetabular roof often remains a problem. The iliac crest (IC) has long been the preferred source of autograft material, but graft harvest is associated with frequent complications and pain. Autologous bone graft can also be obtained from the femoral head (FH) for reconstruction of the acetabulum in hip arthroplasty. However, in certain challenging clinical scenarios, incorporation of the femoral head autograft appears less successful than the iliac crest autograft. The difference in potential for proliferation and osteoblastic differentiation between the two sites has still not been evaluated; therefore, it is not known how to compensate for this difference when it is present. We designed this study to evaluate the number of mesenchymal stem cells (MSCs) in both the iliac crest and femoral head of the same patient. We also determined the best operating room procedure for loading the femoral head with MSCs to achieve equivalent numbers of MSCs as in the IC. Twenty patients (8 men and 16 women) undergoing THA for DDH were enrolled in the study. The mean age was 55.5 years (range 41–65 years). Bone marrow aspirates were obtained from three depths within the femoral head and the aspirates were quantified relative to matched iliac crest aspirates that were obtained from the same patient at the same time. The cell count, progenitor cell concentration (cells/mL marrow), and progenitor cell prevalence (progenitor cells/million nucleated cells) were calculated.

Aspirates of FH marrow demonstrated less concentrations of mononuclear cells compared with matched controls from the iliac crest. Progenitor cell concentrations were consistently lower in FH aspirates compared to matched controls from the iliac crest ($p = 0.05$). The concentration of osteogenic progenitor cells was, on average, 40% lower in the FH aspirates than in the paired iliac crest samples ($p = 0.05$). However, with bone marrow aspirated from the iliac crest, we were able to load the femoral head autograft with sufficient MSCs to obtain the same number as present in an iliac crest. With concentrated bone marrow from the IC, supercharging the femoral autograft with MSCs to numbers above that present in the IC was possible in the operating room, and the number of MSCs supercharged in the femoral head was predictable.

Based on these findings we suggest that FH graft supercharged with BM-MSCs from the IC is comparable to IC graft for osseous graft supplementation especially in THA for patients with DDH.