MSCs are a proposed therapeutic tool in tissue rehabilitation and tissue engineering and one of the therapeutic strategies for patients with osteoporosis. The aim of this study was to assess the *in vivo* effects of LLLT on viability and calcium ion release of healthy bone marrow derived mesenchymal stem cells (BMMSCs) and osteoporotic-BMMSCs.
Materials and Methods: 18 female rats were divided into six groups. These groups included: 1. control healthy, 2. LLLT healthy, 3. control OVX, 4. LLLT-OVX, 5. Alendronate (Alen)-OVX, and 6. Alen+LLLT-OVX. Ovariectomy was done on rats of groups 3, 4, 5 and 6. After that all rats were euthanized and their MSC harvested and cultured in complete medium. In all groups, BMMSC viability, and calcium colorimetric assay were evaluated.
Results: We observed a significant increase in optical density(OD) of BMMSCs viability in LLLT healthy group compared to control-OVX, Alen-OVX, LLLT-OVX, LLLT+Alen- OVX, groups. LLLT+Alen-OVX group showed a significant increase in OD of BMMSCs viability compared to LLLT-OVX, Alen -OVX, and control-OVX groups. We observed a significant increase in calcium ion release of LLLT healthy group compared to control healthy, control OVX, Alen-OVX, LLLT- OVX, and LLLT+Alen- OVX groups. There were significant increases in calcium ion release of control healthy group compared to control OVX, Alen-OVX, LLLT- OVX, and LLLT+Alen-OVX groups. LLLT+Alen-OVX group showed a significant increase in calcium ion release compared to LLLT-OVX, Alen-OVX, and control OVX groups.
Conclusion: OVX-rats showed significant decrease in BMMSCs viability and calcium ion release compared to healthy group. This study showed biostimulatory effect of PWLLLT on viability and calcium ion release of healthy BMMSCs compared to Groups 3-6.
Keywords: Osteoporosis, Ovariectomy, Low-Level Laser Therapy

Ps-41: Cis pT231-Tau Is An Early Driver of Neurodegeneration in Bipolar I Disorder Examined Through Cellular Models

Naserkhaki R[1, 2*], Shahpasand K[2]

1. Department of Developmental Biology, University of Science and Culture, ACECR, Tehran, Iran
2. Department of Stem Cells and Developmental Biology, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, Tehran, Iran
Email: shahpasand09@gmail.com

Background: Bipolar disorder is an episodic recurrent pathological mood disturbance that ranges from extreme elation or mania to severe depression. Recent studies indicate that tauopathy may have contribution in pathogenesis of bipolar disorder. Lithium as a first-line treatment for bipolar disorder has been identified as an inhibitor of GSK-3β which is one of the main kinases of tau protein. Also argyrophilic grains composed of phosphorylated tau have been observed in postmortem brains of bipolar patients. Furthermore, recent studies have demonstrated that phosphorylated tau at Thr231 exists in two distinct CIS and trans conformation in which CIS pT231-tau is highly neurotoxic and acts as an early driver of tauopathy in several neurodegenerative diseases. Although tau aggregation is detected in bipolar brain samples, its contribution to the disease etiology is not clear yet.
Materials and Methods: In this study we established cellular models of mania episode of bipolar disorder by overexpressing GSK-3β in SH-SY5Y cells through transfection and examined cell viability, CIS p-tau and GSK-3β expression in these models by immunofluorescence and Flow cytometry.
Results: We have found that CIS p-tau increased in mania model of bipolar disorder as viability decreased. Furthermore, we showed that lithium treatment inhibits CIS p-tau expression in these mania models.
Conclusion: This study shows that CIS p-tau may contribute to pathophysiology of bipolar disorders and could be the cause of neural cell death upon the disease which in turn would suggest novel therapeutic strategies against the disease.
Keywords: Bipolar Disorder, Cistauosis, GSK-3β, Tauopathy

Ps-42: Design of A Novel 3-Layered NanoFibrous Mat for Wound Healing

Nejaddehbashi F[1*], Orazizadeh M[2], Hashemitabar M[2], Bayati V[2], Abbaspour M[3], Moghimipour E[4]

1. Department of Anatomical Sciences, University of Jundishapur, Ahvaz, Iran
2. Targeted Drug Delivery Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
3. Nanotechnology Research Center, University of Jundishapur, Ahvaz, Iran
4. Cellular and Molecular Research Center, University of Jundishapur, Ahvaz, Iran
Email: fereshte_negad@yahoo.com

Background: The purpose of this study was to prepare and evaluate a 3- layered biomimetic applicable nanofibrous mat for wound dressing. The mat was composed of polycaprolactone (PCL) in the bottom layer, chitosan/poly ethylene oxide (Cs/PEO) in the middle layer and PCL/Collagen in the top layer.
Materials and Methods: Field emission scaning electron microscopy (FE-SEM) evaluation, mechanical properties and thermogravity analysis (TGA) were applied for characterization of nanofibrous mat. Then human dermal fibroblasts (HDFs) were seeded on the 3- layered nanofibrous mat and *in vitro* assessment was applied by using MTT and cell attachment with FE-SEM.
Results: HDFs could attach properly to surface of mat and showed normal growth and spreading. All three layers showed normal physical and mechanical characteristics that indicated integrity and strength of the three- layered nanofibrous mat.
Conclusion: This three- layered nanofibrous mat could be introduced as a dynamic and effective candidate for wound dressing.
Keywords: Wound Healing, Electrospining, Scaffold, Three Dimensional Mat

Ps-43: Probable Molecular Mechanism for Restricted Adipogenic Differentiation Potential of Equine MSCs

Shojaee A[1, 3], Parham A[1, 2*], Ejeian F[3], Nasr-Esfahani MH[3]

1. Department of Basic Sciences, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran
2. Embryonic and Stem Cell Biology and Biotechnology Research Group, Institute of Biotechnology, Ferdowsi University of Mashhad, Mashhad, Iran
3. Department of Cellular Biotechnology, Cell Science Research

Center, Royan Institute for Biotechnology, ACECR, Isfahan, Iran
Email: parham@um.ac.ir

Background: It has been proposed that adipogenic potential of mesenchymal stem cells (MSCs) depends on transcription factors, age, hormones, growth factors, and donor. Adipogenesis is negatively regulated by multiple signaling pathway such as transforming growth factor β (TGF-β) and Wnt/β-catenin signaling pathway. Adipogenic differentiation potential of equine adipose-derived MSCs (e-ADSCs) strongly depends on the components of the differentiation media, but he related mechanisms still are unclear. This study aimed to invetiagte the role of TGF-β1 and CTNNB, as two key members of TGF-β and Wnt/β-catenin signaling pathways on adipogenic differentiation of e-ADSCs.
Materials and Methods: e-ADSCs were isolated from the fat tissue of gluteal region and expanded *in vitro*. The cells at passages 5 were seeded and maintained in usual adipogenic culture medium. 75 % confluency of cells was considered as day 0 and cells were harvested at days 1, 3, 5 and 7. Then, total RNA was extracted and transcribed into cDNA using commercially available kits. Quantitative RT-PCR (qPCR) was performed using a SYBR green master mix and specific primers for GAPDH (as internal control), TGF-β1 and CTNNB. Cells at day 0 were used as calibrator, data were normalized by GAPDH and analyzed using one way ANOVA. Adipogenic differentiation was assessed by Oil Red O specific staining.
Results: At the mRNA level, the expression of TGF-β1 was significantly up regulated at days 3, 5 compared with day 1. Although mRNA level of TGF-β1 was significantly reduced at day7, but no significant difference was observed comparison to day 1. The expression of CTNNB were upregulated at all- time points compared with day1.
Conclusion: The upregulated expression of both TGF-β1 and CTNNB supports the view that TGF-β and Wnt signaling pathways may are one of the probable mechanisms involved in adipogenic inhibition of e-ADSCs.
Keywords: Adipogenesis, Mesenchymal Stem Cells, Equine, TGF-β , Wnt/β-catenin

Ps-44: Investigating The Hepatic Differentiation of Induced Pluripotent Stem Cells by MiR-122 Upregulation and MiR-let-7f Downregulation

Parvanak M[1*], Mostafavi-Pour Z[1], Soleimani M[2]

1. Department of Clinical Biochemistry, Faculty of Medical Science, Shiraz University of Medical Science, Shiraz, Iran
2. Department of Hematology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran
Email: parvanak.maliheh@yahoo.com

Background: Induced pluripotent stem cells (iPSCs) can be a potentially matchless cellular resource for regenerative medicine because of their potential of differentiate into all kinds of cells and patient specific utilization. Since liver transplantation is the only accepted option for end-stage liver diseases, cell therapy by iPSCs can be a promising alternative way for orthotropic liver transplantation and improve the issue of the donor shortage and rejection risk. Although microRNAs (miRs) can act as powerful differentiation tool, few studies have been done in the field of iPSCs and hepatic differentiation by miRs. miR-122 is the most specific and abundant miR in the liver that play an important role in liver development. Another miR that is important for hepatocyte differentiation is miR-let-7f, but in the reverse way; Therefore, let7-f downregulation (off-let-7f) hustle hepatic differentiation.
Materials and Methods: iPSCs were transduced with lentiviruses containing miR-122, or off-let7-f, or negative control (scramble:scr). After making sure of miRs expression by qRT-PCR, hepatic differentiation was evaluated. Albumin (Alb), alpha fetoprotein (AFP), cytokeratin 18 (CK18), hepatic nuclear factor 4α (HNF4α) expression were analyzed by qRT-PCR. Alb and Urea secretion media were measured by photometric method. Glycogen storage was evaluated by Periodic acid–Schiff (PAS), and Alb, AFP, HNF4α proteins were checked by Immunocytochemistry (ICC).
Results: It was shown that miR-122 upregulation and miR-let-7f downregulation could promote hepatic differentiation effectively. In the transduced groups, significant overexpression was detectec for Alb, AFP, CK18, and HNF4α and it had ascending trend with the most levels on days 14 and 21; Alb and Urea production enhanced significantly; Positive staining was detected for Alb, AFP, and HNF4α on day 21, as well as for glycogen depositions.
Conclusion: Summing all these contents together indicate that using miRs for hepatic differentiation of iPSCs can be considered as a good candidate for improvement cell therapy for end-stage liver diseases.
Keywords: iPSCs, MiR-122, Let-7f, Hepatocyte

Ps-45: Anti-Cancer Effect of Hydro-Alcoholic Extract of Trifolium Pratens L. on U87MG Cell Line

Pazhouhi M*, Khazaei M, Ansarian A

Fertility and Infertility Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran
Email: mona.pazhouhi@gmail.com

Background: Glioblastoma multiforme (GBM) is the most common type of the malignant astrocytic brain tumors. Natural products have played an important role in cancer therapy. The potential of using natural products as anti-cancer drugs was confirmed by international organization and nowadays there is a growing interest in discovery of naturally occurring anti-cancer drugs. Trifolium pratense L., a member of Leguminosae or Fabaceae family, is a short-lived biennial plant, which has been suggested for cancer treatment in traditional medicine. The aim of the present study was to investigate effects of T. pratense hydroalcoholic extract on a glioblastoma cell line (U87MG).
Materials and Methods: U87MG cells were cultured in DMEM/F12 supplemented with 10% FBS. The effect of T. pratense extract (6.25, 12.5, 25, 50, 100, 200 and 400 µg/mL) on cell viability was investigated using trypan blue staining, MTT assay, and lactate dehydrogenase activity measurement. Nitric oxide (NO) production was measured using Griess reaction. Data were analyzed by one-way ANOVA and $P<0.05$ was considered significant.
Results: Significant difference was seen among the groups treated with T. pratense extract compared to the control group ($P<0.05$) after 24, 48, and 72 hours. Increasing the dose significantly decreased cell viability ($P<0.05$). The IC50 values for 24-, 48- and 72-hours treatments were 398.37, 109.19 and 21.06 µg/ml, respectively. Also, T. pratense extract significantly decreased NO production ($P<0.05$) by U87MG cells.
Conclusion: T. pratense extract reduced U87MG cell viability in dose- and time-dependent manner and showed anti-cancer