

Poster Presentations

Ps-1: The Apoptotic Effect of Microvesicles Derived from Mesenchymal Stem Cells on The NB4 Cells

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Background: Stem cell based therapy as a novel approach is propounded for treatment of autoimmune and other hematological diseases and also used in regenerative medicine. There has been a significant growing interest in stem cells and induced pluripotent stem (iPS) cells' utilization, especially mesenchymal stromal cells (MSCs) in combination with tissue engineering in recent years. The use of MSCs as a therapeutic option shows a promising future due to their immunoprivileged status and immunomodulatory properties. MSCs are plastic adherent nonhematopoietic multipotent cells that have the ability of renewal and differentiation into cells. there is a need for effective treatments to address chemo resistance in the APL. Recent studies considered microvesicles as a potential therapeutic agent. Microvesicles are small membranebound particles released by different cells including healthy and tumor types. Microvesicles can transfer their contents, proteins and RNAs, to target cells and thereby transform them. This may induce apoptosis or survival depending on cell origin and the target cell. As point of view, microenvironment of bone marrow, normal and leukemic cells have interchangeable interaction through microvesicles, so microvesicles derived from human bone marrow mesenchymal stem cells might affect leukemic cells. In this study, we investigated the apoptotic effect of microvesicles derived from mesenchymal stem cells on NB4 cell line.

Materials and Methods: MSCs were cultured in culture medium. Microvesicles were isolated from Mesenchymal stem cells by ultra centrifugation and were added to NB4 cell line. Also, NB4 cells without microvesicles were cultured as control group. After 7 days, cell count, cell viability By MTT assay and RT real time-PCR for BAX gene expression were performed.

Results: We demonstrate the effect of microvesicles derived from human bone marrow mesenchymal stem cells apoptosis of NB-4 cell line. This study shows, cell growth dramatically hindered and induction of apoptosis increased in NB4 cells, and BAX gene show significant rising.

Conclusion: Obtained results demonstrated that bone marrow microvesicles derived from human bone marrow mesenchymal stem cells have potential capability to play as effective therapeutic regimen in curing APL.

Keywords: Mesenchymal Stem Cells, Microvesicles, Apoptosis,

Ps-2: Conditions of The Legitimate Contracts of Stem Cell in Terms of Jurisprudence, Law and The Legal Views of Imam Khomeini

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Background: Although production and use of stem cells has opened new horizons in medicine and treatment of incurable diseases, it has been accompanied with wide ethical and legal issues in the world. Researches play a vital role in the continued expansion of medical sciences and without fresh researches, new treatments still remain unclear. The therapeutic use of stem cells, although is applied after a long and accurate range of tests, dates back to a short time and its outcome is still unknown. In many cases, indeed therapeutic activities have research aspects, so the research contracts of therapy stem cells between a therapy center and a researcher must have eligible conditions stated in article 190 of Civil Code by the legislator and without any of these conditions the validity of the contract would be canceled. In therapeutic stem cells researches, first it must be checked whether the patient is able to make such a contract legally and juristically. Regarding the interdisciplinary studies of jurisprudence and law, the present paper is aimed to study and recover the relations between a human and his/her physical organs, that is disputed by many of jurists and lawmen. Some jurists and lawyers believe that a person dominates his/her body organs and it is in fact a rational issue, as if he/she possesses his/her property. Among them it must be mentioned of the late Ayatollah Khomeini and Ayatollah Makarem Shirazi. In contrast, others consider this relation as an inherent property: among them are the late Ayatollah Khou'ei, Ayatollah Asef Mohseni and Ayatollah Mohammad Mo'men. Seemingly, to have human trials research in accepting the risks of therapy is to the extent that some legal sentences must not be ignored. According to some scholars, "based on reason and law, any capture resulting in death, substantial and irreversible maim or harm, or to the desecration or humiliation of a human, is prohibited, inadmissible and unlawful". Another application of stem cells is tissue and organ transplantation and the discussion of transaction of these organs; is a person allowed to capture his/her organs so that he/she can move them to others? In this context, the transfer of organs during the life of owner is permissible if he/she is safe of any physical harm, but if it causes to a harm which is not considered rationally, it is permissible.

Materials and Methods: In therapeutic stem cells researches, first it must be checked whether the patient is able to make such a contract legally and juristically. Regarding the interdisciplinary studies of jurisprudence and law, the present paper is aimed to study and recover the relations between a human and his/her physical organs, that is disputed by many of jurists and lawmen.

Results: In conclusion, in stem cell researches, as long as there are the requirements in terms of intellectual and religious domination of man over his body, a capture (to an organ) would be allowed as well. The forbidden and unlawful cases are those which result in death, substantial and irreversible maim or harm, or desecrate and humiliate a person. Therefore, in two areas of production and therapy application of stem cells, a human trial as long as does not violate lawful sentences, while capturing organs, is permitted to capture his/her selfbody organs.

Conclusion: In conclusion, in stem cell researches, as long as there are the requirements in terms of intellectual and religious domination of man over his body, a capture (to an organ) would be allowed as well. The forbidden and unlawful cases are those which result in death, substantial and irreversible maim or harm, or desecrate and humiliate a person. Therefore, in two areas of production and therapy application of stem cells, a human trial

as long as does not violate lawful sentences, while capturing organs, is permitted to capture his/her selfbody organs.

Keywords: Research Contracts, Stem Cells, No-Harm Rule, Tissue Transplant

Ps-3: Effect of Combination Therapy with Bone Marrow Stromal Cells (BMSCs), Triiodothyronine and Exercise on Cerebral Ischemia in Mice

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Background: Despite of extensive medical advancement, yet stroke treatment is an important issue in health care system. Since stem cells couldn't alone lead to satisfying results in stroke treatment, manipulated stem cells or combination therapies have been considered. This study was designed to explore effect of combination stem cell with thyroid hormone and exercise on stroke induced apoptosis and endogenous neurogenesis. **Materials and Methods:** Cerebral ischemia, by Middle Cerebral Artery occlusion (MCAO), was induced for 45 minutes and reperfusion was allowed for 7 days in albino mice. Bone marrow stromal cells (BMSCs) were injected intracerebroventricularly 24h after ischemia. Mild exercise and T3 injection (20 µg/kg/daily S.C) were started 24h after MCAO and continued for 6 days. Animals were randomly divided into seven groups: sham, PBS (as control), BMSCs, TH, EX, BMSCs+TH, BMSCs+Ex and BMSCs+TH+Ex. Apoptosis (Tunnel positive cells) and neurogenesis (BrdU positive cells) were evaluated at 7th day after MCAO.

Results: Combination of stem cell transplantation along with exercise and thyroid hormone significantly reduced the number of TUNEL positive cells and increased BrdU positive cells. There was a significant difference between the BMSCs+EX+TH with other treatment groups except with BMSCs+EX and EX groups in BrdU positive cells (P<0.001). Also, there was significant differences between the BMSCs+EX+TH with other treatment groups (P<0.01) except with BMSCs+EX group in TUNEL-positive cells (P>0.05).

Conclusion: Our results suggested that TH and exercise could increase BMSCs efficacy in recovery of stroke in an experimental model of cerebral ischemia. Further preclinical and clinical studies are necessary to approve this strategy for treatment of stroke patients.

Keywords: Cerebral Ischemia, Exercise, Thyroid Hormone, Stem Cell Therapy

Ps-4: TNF- α Induction by Parvovirus B19 in Human Bone-Marrow Mesenchymal Stem Cells

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Background: Chronic inflammation plays an important role in tumor initiation, progression and invasion. Additionally, it has been proved by abundant data that the inflammation can be induced by many factors, including viral and bacterial infections. Parvovirus B19 (PVB19) is a common human pathogen which has notable tropism to human bonemarrow erythroid progenitor cells. However, it has shown that the virus can enter human bone marrow mesenchymal stem cells (hBM-MSCs) and persist in the infected cells lifelong. We hypothesized that the infection of hBM-MSCs as the fundamental cellular component of bone marrow niche by PVB19 may lead to secretion of pro-inflammatory cytokines.

Materials and Methods: hBM-MSCs were *in vitro* expanded in a standard medium and cultured up to passage three under standard conditions. The cells were then transfected with a plasmid containing B19 genome via Nucleofector. Total RNA was extracted from all studied groups 36 h subsequent to transfection, and the expression level of TNF- α was examined using qRT-PCR.

Results: Data analysis from qRT-PCR showed the significant increase in the expression of TNF- α gene in the cells which were transfected with B19V (P<0.05).

Conclusion: Until today, several researchers have indicated the persistence of B19V in a wide variety of tissues, especially bone marrow with active gene expression. Although more researches are required, our findings for the first time suggest the importance of B19V infection of hBM-MSCs to establish an inflammatory microenvironment in the bone marrow and its involvement in inflammation related diseases of hematopoietic organ. In conclusion, based on our results, molecular assay to diagnose B19V infection of hBM-MSCs prior to stem cell therapy is strongly recommended.

Keywords: Bone Marrow, Chronic Inflammation, Infection, Mesenchymal Stem Cell, Parvovirus B19

Ps-5: Effect of Esteradiol Treated Mesenchymal Stem Cell in Amilorating Animal Model of Multiple Sclerosis

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Background: Preliminary studies revealed that mesenchymal stem cells (MSCs) therapy is a worthwhile strategy to downregulate pathogenic immune responses in multiple sclerosis (MS). Nevertheless, insufficient implantation of cells to damaged brain and spinal cord has limited their potential therapeutic effects. There is evidence that estradiol (E2) enhances homing of stem cells. This study was done to investigate the therapeutic effects of E2 treated MSCs in experimental autoimmune encephalomyelitis as an animal model of MS.

Materials and Methods: EAE was induced in Wister rats by guinea pig spinal cord homogenates and complete Freund's adjuvant. Therapies were initiated at day 12post immunization