# *9th Yazd International Congress and Student Award on Reproductive Medicine with 4th Congress of Reproductive Genetics*

## Oral Presentations

### O-54
### Investigation of immunosuppressive-immunomodulatory markers in amniotic fluid-derived mesenchymal stem cells from women who experienced recurrent pregnancy loss

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**Background:** The amniotic fluid contains a heterogeneous population of different cells that are produced prior to the gastrulation process. Therefore, it is expected that mesenchymal stem cells derived from the amniotic fluid will have high plasticity between mature and pluripotent stem cells. Due to unique features of these cells such as high cloning potential, high self-renewal capacity along with chromosomal stability and low immunogenicity as well as anti-inflammatory and immune-modulating properties, it has attracted more and more attention from researchers.

**Objective:** The aim of this study was to investigate the immunosuppressive genes in mesenchymal stem cells isolated from amniotic fluid of women with a history of recurrent pregnancy loss (RPL) and the effect of gamma interferon as an immunological stimulus on the expression of these genes.

**Materials and Methods:** The study group included pregnant women with a history of unexplained RPL. The control group consisted of pregnant women with at least one healthy child, no history of miscarriage, and normal hormonal and immunologic profiles. In this study, mesenchymal stem cells (MSCs) isolated from amniotic fluid from RPL and non-RPL women. On the other hand, each cell line was examined under 5 different treatment groups, control and 4 groups with 20 and 100 IU IFN-γ per ml of medium over two periods of 24 h and 72 h. Finally, the relative mRNA expression level of immune-suppressive/modulator gene including two indole amine-2 and 3-dioxygenase 1 and 2 in AF-MSCs in both groups were evaluated and compared using Q-PCR.

**Results:** The average expression of candidate gene *IDO1* and *IDO2* showed a significant increase in the RPL group rather than non-RPL, specially under treatment with 100 IU IFN-γ and after 24 h. Interestingly, expression of both genes *IDO1* and *IDO2* decrease after 72 h in RPL and non-RPL groups ($p = 0.05$).

**Conclusion:** Immunosuppression by MSCs, which is currently recognized as a powerful tool in preventing acute rejection, graft therapy, and regenerative medicine, is not an inherent potential but is induced by environmental factors. Various studies have identified that some potential causes of unexplained RPL are due to immunological factors. The results of this study, especially for indole amine-2 and 3-dioxygenase genes, do not rule out such a possibility. Despite the unknown role of AF-MSCs in the abortion mechanism, the results of this study suggest that there is a significant difference between the mRNA level of understudied genes between AF-MSCs in the RPL and non-RPL group. Due to the absence of such a similar study, it cannot be fully interpreted, however, these cells appear to represent genetic compartments of couples with a history of RPL that may defective in immunological factors. However, planning for further investigation of these uncertain immunological mechanisms appears to be valuable in the future.

***Key words:*** *Recurrent pregnancy loss, Immunosuppressive gene, Mesenchymal stem cells, Amniotic fluid, Quantitative gene expression.*