World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:12, No:06, 2018

Dys-Regulation of Immune and Inflammatory Response in in vitro Fertilization Implantation Failure Patients under Ovarian Stimulation

Authors : Amruta D. S. Pathare, Indira Hinduja, Kusum Zaveri

Abstract : Implantation failure (IF) even after the good-quality embryo transfer (ET) in the physiologically normal endometrium is the main obstacle in in vitro fertilization (IVF). Various microarray studies have been performed worldwide to elucidate the genes requisite for endometrial receptivity. These studies have included the population based on different phases of menstrual cycle during natural cycle and stimulated cycle in normal fertile women. Additionally, the literature is also available in recurrent implantation failure patients versus oocyte donors in natural cycle. However, for the first time, we aim to study the genomics of endometrial receptivity in IF patients under controlled ovarian stimulation (COS) during which ET is generally practised in IVF. Endometrial gene expression profiling in IF patients (n=10) and oocyte donors (n=8) were compared during window of implantation under COS by whole genome microarray (using Illumina platform). Enrichment analysis of microarray data was performed to determine dys-regulated biological functions and pathways using Database for Annotation, Visualization and Integrated Discovery, v6.8 (DAVID). The enrichment mapping was performed with the help of Cytoscape software. Microarray results were validated by real-time PCR. Localization of genes related to immune response (Progestagen-Associated Endometrial Protein (PAEP), Leukaemia Inhibitory Factor (LIF), Interleukin-6 Signal Transducer (IL6ST) was detected by immunohistochemistry. The study revealed 418 genes downregulated and 519 genes upregulated in IF patients compared to healthy fertile controls. The gene ontology, pathway analysis and enrichment mapping revealed significant downregulation in activation and regulation of immune and inflammation response in IF patients under COS. The lower expression of Progestagen Associated Endometrial Protein (PAEP), Leukemia Inhibitory Factor (LIF) and Interleukin 6 Signal Transducer (IL6ST) in cases compared to controls by real time and immunohistochemistry suggests the functional importance of these genes. The study was proved useful to uncover the probable reason of implantation failure being imbalance of immune and inflammatory regulation in our group of subjects. Based on the present study findings, a panel of significant dysregulated genes related to immune and inflammatory pathways needs to be further substantiated in larger cohort in natural as well as stimulated cycle. Upon which these genes could be screened in IF patients during window of implantation (WOI) before going for embryo transfer or any other immunological treatment. This would help to estimate the regulation of specific immune response during WOI in a patient. The appropriate treatment of either activation of immune response or suppression of immune response can be then attempted in IF patients to enhance the receptivity of endometrium.

Keywords : endometrial receptivity, immune and inflammatory response, gene expression microarray, window of implantation
Conference Title : ICRI 2018 : International Conference on Reproductive Immunology
Conference Location : Paris, France
Conference Dates : June 25-26, 2018

Open Science Index, Biomedical and Biological Engineering Vol:12, No:06, 2018 publications.waset.org/abstracts/92201.pdf