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Oral Presentations

O-15

Investigation of signaling pathways to understanding Carob function for inducing spermatogenesis in an in-vitro platform

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Background: Impairment in the spermatogenesis process is the main cause of male infertility. Recently, scientists tried to improve the efficiency of male fertility treatment through the use of herbal nutraceuticals extract. Carob is being traditionally used for male infertility treatments. However, there is no scientific evidence for the principal mechanism effect of Carob on spermatogenesis-related signaling pathways.

Objective: Herein we evaluate 3 main spermatogenesis-related signaling pathways in mouse testicular cells-enrich for spermatogonial stem cells following treatment with Carob whole extract.

Materials and Methods: To evaluate the spermatogenesis-related TGF- β , BMP4, GDNF (MEK related) Signaling Pathways following treatment with Carob whole extract, after finding non-toxically Carob concentration for testicular cell culture by pi staining (2 mg/ml), isolated cells are treated by the medium containing Carob extract and one of the following small molecules: SB431542, LDN193189 and PD0325901 respectively. Cells were collected for gene expression analysis after 9 days of treatment.

Results: Our primary results suggested that by inhibiting the BMP4 signaling pathway using LDN193189 at the presence of Carob, all of the examined genes (Plzf, Gfr- α 1, Bcl-6b, Dazl, Stra8) were significantly decreased compared to Carob treat. Gene expression profiles had different patterns on inhibition of other signaling pathways.

Conclusion: It seems that the BMP4 signaling pathway is the master effector upon Carob function. Activation of this signaling pathway, directly and indirectly, effect on differentiation and self-renewal of spermatogonial stem cells to promote spermatogenesis. However, the carob contains a set of effective compounds that promote spermatogenesis by the effect on most spermatogenesis related signaling pathways.

Key words: Spermatogenesis, Spermatogonial stem cells, Carob, Signaling pathways.