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Opinion Article

Maternal Immune Responses to Allogeneic Spermatozoa and Semi-Allogeneic Foetus

Jorgeey Berrie*

Department of Obstetrics and Gynecology, Women's Specialized Hospital, Riyadh, Saudi Arabia

ABOUT THE STUDY

Interactions between spermatozoa and fallopian ducts may affect fertilization. The goal was to look into the production of cytokines, chemokines, and growth factors in human fallopian tube epithelial cells (OE-E6/E7) subjected to spermatozoa. The interaction of sperm and fallopian tube epithelial cells is critical in conception, early foetal development, implantation, and reproduction. Several variables affect this interaction. For example, sperm contains proteins that are alien to the female reproductive tract's defence system. As a consequence, successful fertilization and early embryonic development are linked with the modulation of maternal immune responses to allogeneic spermatozoa and semi-allogeneic foetus without hindering effective pathogen immune responses. The fallopian tube is an ideal microenvironment for oocyte development, sperm capacitation, fertilization, and gamete transfer and conceptus both appear Growth factors, cytokines, and chemokines are all secreted by the fallopian tubes. In general, cytokines and chemokines are molecular mediators that help to maintain environmental balance, endometrium cell growth, menstruation, and implantation. They also control the innate and adaptive defence systems. Immunity is influenced by growth factors produced by secretion cells in the ampulla and the ampulla-isthmus junction. These factors both directly and tangentially control the secretion of some cytokines and chemokines from female reproductive system epithelial cells. The concentration of chemokines, cytokines, and growth factors in the human Female Reproductive Tract (FRT) changes depending on whether the situation is normal or pathological, such as infection or endometriosis. Cytokines are also produced by different groups of immune cells in the reproductive system and can interfere with reproduction. In rodent models, the interplay of spermatozoa and lymphocytes revealed that cytokines, chemokines, and growth factors may cause infertility by influencing the immune reaction to the spermatozoa as well as disrupting the fertilization process and early embryonic development. In this study, the expression of genes implicated in the cytokine pathway, such as Leukemia Inhibitory Factor (LIF), rose in endometrial tissue after coitus were discussed. Other studies found that spermatozoa control the production of cytokines and growth factors in porcine models after insemination and influence the pattern of cytokine expression in human cervical epithelial cells. The interplay of sperm components, such as cytokines, chemokines, and growth factors, with uterine epithelium cells and local leukocytes within the uterus. Functions as a stimulant, causing a cascade of cytokines and other molecules to be released.

This situation progressively increases the secretion of numerous regulatory cytokines. Previous research has looked at how spermatozoa affects the gene expression levels of some cytokines and chemokines released by uterus epithelium cells. Furthermore, it was discovered that sperm DNA damage altered the Toll-Like Receptors (TLR) signalling pathway in human fallopian tubes, potentially leading to the upregulation of particular cytokines. Cytokines, chemokines, and growth factors are well known to play an important part in cellular signalling as well as a regulating role in sperm-fallopian tube interactions. Furthermore, research that looked at the production of cytokines only looked at a subset of these genes. As a result, immunologic research on the mother immunological responses to allogeneic spermatozoa may be useful. The purpose of this study was to look at the expression of cytokines, chemokines, and growth factors in human fallopian tube cell line epithelial cells (OE-E6/E7) in the presence and lack of spermatozoa. A Three-Dimensional (3D) Thermo-reversible Gelation Polymer (TGP) culture method for organoid culture of rat Fallopian Tube (FT) Epithelial Stem Cells (FTESCs) without cell isolation was developed in this research.

Whole FT cells (FTCs) were injected into the TGP after FT tissues from 6- to 8-week-old Intelligent Character Recognition (ICR) rodents were digested with collagenase. Many groups in the TGP developed after 6 days of culture. Some of the cells in the spheres were positive for 5-Ethynyl-2'-Deoxyuridine (EdU), a cell development measure. In addition, all of the spheres created in the TGP were marked for EpCAM and LGR5. Some cells in the spheres were stained for PAX8, a secretion cell marker, while others were labelled for TUBB4, a ciliated cell marker. These findings suggest that the 3D TGP culture method is a valuable tool for *in vitro* organoid culture of FTESCs.

Correspondence to: Jorgeey Berrie, Department of Obstetrics and Gynecology, Women's Specialized Hospital, Riyadh, Saudi Arabia, E-mail: berriejor@gmail.com

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