

Pre-Synopsis Presentation

Name of the student: Ms Durva Panchal

Research Guide: Dr. Priyanka Parte

Division: Department of Gamete Immunobiology

Title of the project: Investigation of potential chemotactic metabolites in the follicular fluid

Date, Venue and Time of presentation: 6th October - 2025, Dr Shanta Rao Auditorium at 2.00 p.m.

Abstract

Spermatozoa once released into the vagina, have to traverse through several anatomical compartments and physiological environments of the female reproductive tract, such as the cervix, uterus, and isthmus, where they undergo one of the most important and final stages of maturation called capacitation. Capacitating sperm arrive at the fertilization site, the ampulla, within minutes, guided by various mechanisms, one of the most crucial being chemotaxis. Chemotaxis refers to the directed movement of sperm in response to chemical gradients formed around the egg. Failure to bring sperm into close proximity to the egg, either due to a lack of chemotactic factors in the follicular fluid or a lack of response to these factors on the part of sperm, may likely be one of the causes of female- or male infertility, or both. This until identified as a cause, remains as idiopathic infertility. Whilst, this can be circumvented by procedures such as IVF and ICSI, selection of good quality sperm is critical for the success of these procedures. Several studies including ours, have advocated the use of chemotaxis as a mechanism to select capacitating sperm with better chances of fertilization during IVF/ICSI. It thus becomes important to investigate the potential metabolites in follicular fluid for their chemotactic activity that can be used for sperm sorting. The current study aimed to identify chemoattractants in follicular fluid. To that end, this study followed an LC-MS/MS-based metabolomics approach to decipher the differences between the pre-ovulatory and ovulatory phase oviductal fluid metabolomes in rat. The chemoattractant potential of the metabolites either exclusive to or increased in ovulatory phase oviductal fluid were tested using the 'in house' developed microfluidics-based chemotaxis assay. Several metabolites have been shortlisted, and response of rat- and human sperm to some of these metabolites has been assessed. We further validated the levels of these chemoattractants in women undergoing IVF for unexplained infertility. Work done under each objective, will be discussed in details during the presentation.

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