ABSTRACT

Fertilization is internal in mammals and occurs in the reproductive tract of the female during the estrus phase of the female reproductive cycle. Since the time of its formation, the spermatozoon has to be transported through the male and female genital tracts before it could reach the ovum. During this transit the spermatozoa undergoes maturation in the male genital tract and capacitation in the female tract so as to acquire the ability to fertilize the egg. The female hormones prepare the reproductive tract of the adult mammalian female for fertilization during the estrus phase of the cycle. Increase in vascularization and tissue weight, copious secretion of luminal fluids etc. are some of the physiological changes observed in the tissues of the reproductive tract, namely the cervix, uterus and oviduct, during estrus. In the present study, the interaction of the secretory proteins of the female reproductive tract with the spermatozoa has been investigated.

Chapter I is a review outlining the changes occurring in the spermatozoa during epididymal maturation and passage through the female reproductive tract. It also presents a brief account of the secretory proteins of the uterus and oviduct. The suitability of hamster as the animal model and computer assisted semen analysis system (CASA) as the method of analyzing spermatozoal movement characteristics in this work is outlined. This chapter is concluded following the enumeration of the objectives of this study.

Chapter II deals with the Materials and Methods employed, the source of the various chemicals used and the details of the animal systems used. The basic set up of the HTM-S Analyzer for sperm motility studies, composition of the media, buffers and reagents required and the techniques employed are also described.

In Chapter III, a detailed account of the experimental results is given, organized into two sections. Section A includes identification of specific secretory proteins in the reproductive tract tissues, the analysis of uterine luminal fluid of the female hamster, and purification and characterization of the major protein of the uterine fluid. Section B deals with the interaction of the
uterine fluid and its fractions with the spermatozoa of hamster with respect to motility and acrosome reaction of spermatozoa. Prior to commencing these interaction studies, the movement characteristics and maintenance of motility of hamster spermatozoa during epididymal maturation and under standard conditions of capacitation were analyzed.

Chapter IV includes the discussion of all the above results in light of the data already available at present on this subject. Conclusions are listed at the end of this chapter.