

Abstract

Fertilization is a unique biological event where male and female gametes fuse together to produce a new organism. Before the gametes are able to fuse, however, they must undergo a series of controlled changes. For the male gamete, capacitation and acrosome reaction (AR) must occur, which take place during the sperm migration through the female genital tract. Unfortunately, while the process of capacitation has been known for over half a century, the molecular basis and influential factors behind it are not fully understood. Although estrogens have been considered mainly female reproductive hormones, there is increasing evidence suggesting that these steroids have an important role also in regulation of male reproductive functions. Sperm come into the contact with estrogens during their formation in the male and female genital tract, indicating that the hormone may play an important role in sperm maturation. In this study, we examined the importance of three endogenous estrogens (E1 -estron, E2 - 17β estradiol, E3 - estriol) and one synthetic estrogen (EE2 - 17α ethinylestradiol) on sperm maturation during capacitation and AR. Stimulatory effect were observed with all tested estrogens on both capacitation and zona pellucida induced AR. Moreover, we have determined that the stimulatory effect on capacitation depends on both estrogen concentration as well as capacitation time, and that these effects can vary amongst individual animals. This study also dealt with the detection of estrogen receptors (ERs) in sperm and their link to these estrogenic effects. We determined that while these ERs partially mediate estrogenic effects on sperm, these effects are likely caused by non-receptor mechanisms as well.

Key words: capacitation, acrosomal reaction, estrogens, estrogen receptor