Preface

Estrogen is a sex hormone with profound effects on reproductive function of both male and female. In males, estrogen is present in low concentrations in blood, but can be found in high concentration in semen, and in rete testis fluids, which may be higher than serum estradiol level in the female. The importance of estrogen in male reproduction was greatly enhanced based on earlier studies clearly demonstrated that male fertility is impaired in mice lacking estrogen receptor alpha (ERα) or aromatase, together with discovery of a second estrogen receptor beta (ERβ), which was expressed mainly in the male reproductive tract. Studies have further demonstrated that targeted deletion of the aromatase, ERα, and /or ERβ gene caused a variety of testicular anomalies including infertility in mutant mice. However, clearly more studies are required to resolve the confusion persisting regarding the potential effects of estrogen on testicular activity and its mechanism of action. The role of estrogen in male reproduction has been mostly studied during reproductively active condition; however its role during different stages of aging has not yet been studied. Another promising but as yet poorly explored aspect requires detailed investigation includes “anti-diabetic effects of estradiol on male reproductive functions”. Therefore, this dissertation aims to elucidate the role played by estrogen in regulation of testicular activities during aging, spermatogenically active and diabetic conditions in male mice.

The present thesis is divided into four chapters. Chapter I describes the significance of estrogen in testicular activity of mice during aging. An attempt is also made to find out whether nitric oxide mediates the effects of estrogen on testis. Chapter II describes the effect of Letrozole, a selective non-steroidal aromatase inhibitor, associated decline in estradiol on various testicular activities in reproductively active mice. Additional aim of this study was to evaluate, whether estradiol associated suppression in testicular activities is mediated through changes in insulin sensitivity. Chapter III describes the pathway and mechanism by which tamoxifen, selective estrogen receptor modulator (SERM), affects testicular functions, using both in vivo and in vitro studies, of reproductively active mice and Chapter IV describe effects of short- and long-term treatment of 17β-estradiol and phytoestrogen on testicular activities of steptozotocin-treated and high fat fed type II diabetes-induced mice. This study was undertaken to find out whether treatment with phytoestrogen (genistein) can be as effective as treatment with estrogen in ameliorating reproductive and metabolic abnormalities of diabetes-induced male mice.