

DESCRIPTION FOR THE GENERAL PUBLIC

Male reproductive health in human is an important research field in biological study. The decline of semen quality and reproductive functions among men during the past sixty years is mainly caused by environmental factors. The effect of elevated temperature on the male reproductive tract is one of not frequently investigated factors. The previous experiments suggest that an increased scrotal temperature of approx. +4°C may have a negative impact on the germinal epithelium and on the epididymis in man. Endogenous scrotal/testicular hyperthermia has deleterious effects on testis function in cryptorchidism and varicocele. Exogenous heat stress may be provoked by sitting or sleeping postures, clothing, sauna baths, driving for long periods, occupational exposure to high environmental temperature, and obesity. Some jobs as licensed drivers, cooks, steelworkers, blowers may be a reason of elevated temperature on the male genital tract and heat stress. The pathophysiologic mechanisms that lead to heat stress associated disturbance of spermatogenesis and provoking infertility are not yet to be completely understood. There is a spectrum of testicular functions among infertile men with hyperthermia ranging from mildly deranged spermatogenesis to severe dysfunction. To overcome the limits of conventional seminological parameters we propose using more informative methods including flow cytometry, ELISA, fluorescent microscopy, thin-layer chromatography.

The main objective of the research proposed in the Project is to investigate the molecular pathway(s) responsible for the onset of male infertility associated with testicular hyperthermia. Mechanisms involved in heat induced-germ cell damage including apoptosis, oxidative stress response, immune/autoimmune reaction will be investigated in recruited population of 300 males (fertile men as control, infertile men with history of cryptorchidism, infertile men with varicocele, licensed driver individuals, and infertile men not exposed to continuous hyperthermia). The most important goal will be to find a relationship between hyperthermia and sperm epigenetic profiles.

The Project is designed to assess all factors, which may have influence fertility status in population of men with heat stress. The value of such complex observations would be significant, and would support efforts to select new biomarker(s) for infertile males with hyperthermia-induced infertility. Understanding the molecular mechanisms of genital heat stress would establish better targeted therapies in male infertility associated with testicular hyperthermia.