

## The Induction of Stress Via Social Isolation In A Rat Model: The Effects On Male Reproductive Parameters

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**Background and Aim:** The recent increase in the global prevalence of psychological stress necessitates an exploration into the potential role of psychological stress as a contributing cause to male infertility. In order to advance this, the current study aimed to assess the effect of stress, induced via social isolation in a rat model, on male reproductive parameters.

**Methods:** This study consisted of 18 male Wistar rats. Nine rats were stressed via social isolation prior to sacrifice (isolated males, IM) while the remaining 9 were housed in groups, serving as controls (group-housed controls, GHC). All rats were sacrificed by decapitation. Both epididymides were harvested for biochemical analyses (eNOS and p-eNOS expression by western blotting, Total Antioxidant Capacity (TAC) assessment by means of an ORAC assay) and sperm extraction for the analysis of sperm motility, morphology and viability parameters.

**Results:** A significant increase in corticosterone levels was observed in the IM group, confirming stress in the animal model. Analysis of sperm kinematic parameters revealed that the curvilinear velocity (VCL) ( $P = 0.0320$ ), VAP ( $P = 0.0053$ ), straight line velocity (VSL) ( $P = 0.0053$ ) and linearity (LIN) ( $P = 0.0261$ ) were significantly decreased in the experimental (IM) group. Furthermore, the percentage normal morphology decreased significantly in the stressed rats ( $P < 0.0001$ ). Total motility, progressive motility, viability as well as the percentage of rapid, medium and slow motile sperm, showed no statistical significance between the stressed IM rats and the GHC controls. Total antioxidant capacity (TAC), endothelial Nitric Oxide (eNOS) expression and testosterone levels remained unchanged.

**Discussion:** The present study showed that psychological stress induced by social isolation resulted in a significant increase in corticosterone levels coupled with a reduction in normal sperm morphology and kinematic parameters. TAC, eNOS expression and Testosterone levels were explored as possible causative mechanisms but remained unchanged. Thereby alternative mechanisms for reduced sperm quality that should be explored in follow-up studies.

**Conclusion:** Psychological stress induced by social isolation in rats negatively impacts male reproductive parameters, however, the mechanism through which this phenomenon ensues requires further elucidation beyond that of the induction of oxidative stress.