

Impact of high sugar diet on male fertility – study in *Drosophila melanogaster* as a model

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The reduction in sperm quality parameters in humans with diabetes mellitus (DM), such as concentration, viability, and morphology, shows that DM can influence the reproductive capacity of individuals who have the disease which, in some cases, can also be acquired by their descendants. *Drosophila* is a promising experimental model for studying diabetes, as it presents several metabolic changes, such as signaling pathways like mammals. The aim of this research was to analyze the effects of a high sucrose diet on male reproductive functions, morphological and behavioral changes and DNA damage in *D. melanogaster* (Oregon K strain). We evaluated the effects of sucrose on longevity (average and maximum), negative geotaxis, spatial exploration, offspring size, genotoxicity (basal DNA damage), and sperm morphology. Young males (2 to 3 days old) were divided into five groups, fed with sucrose concentrations of 0%, 5%, 10% (control), 15% and 20% (weight/volume of standard medium) and placed in this diet for 48 to 72 h before mating. The results were analyzed in the first filial generation, where diets with 15% and 20% sucrose showed a 17% decline in average longevity (114 vs 95 days), an impact on locomotion with an 8% increase in displacement compared to the control group and a decline in exploration of 9% (43 vs 39 cm²), as well as a drop in the number of descendants of 47% (277 vs 146 descendants). Concentrations of 15% and 20% showed a significant increase in DNA damage at the level of neuroblasts with average arbitrary units (AU) of 158 and 170 AU, respectively, compared to the control group which had 26 AU. The data highlights the significant influence that increased sucrose consumption has on *D. melanogaster*, affecting its fertility, survival, and genetic damage. Future work will analyze the role of epigenetic mechanisms in diabetes.

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