Understanding sperm DNA damage:comparative analysis between donors and males in fertility consultations

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The assessment of sperm genomic integrity has become important in the field of Assisted Reproductive Technologies (ART). Recognizing its influence on fertility and reproductive outcomes, research has been conducted to try to establish reference values for DNA damage to facilitate early identification of infertility risks and improve understanding of the factors that influence the genomic integrity of spermatozoa. This work aimed to evaluate DNA damage levels (basal and oxidative) in sperm from two groups: control (A) (unselected male population with unknown reproductive health) and men undergoing fertility evaluation (B).

Thirteen samples from Group A and 9 normozoospermic samples from Group B were evaluated (individuals reporting no smoking/alcohol consumption, chronic diseases, medications, or multivitamin supplement intake). The participants' age and body mass index (BMI) were recorded. The samples were collected after a sexual abstinence period of 2-3 days and subjected to DNA damage assessment using the Alkaline Comet Assay.

We found that, regarding age, group B (36.33 years) had an age slightly higher than that associated with increased DNA damage (35 years) and significantly higher than the age of group A (25.77 years) ($p=0.001$). Concerning BMI, it was slightly higher (25.41 *vs.* 24.67 kg/m^2), although without statistical significance. Important were the results we obtained from DNA damage: our findings indicate that males undergoing fertility consultations present twice as much DNA damage in their sperm cells compared to male donors, regardless of age and BMI ($p<0.05$, $R^2=0.5$).

Despite being preliminary and constrained by the small sample size, these data highlight the significance of sperm genomic integrity in evaluating male fertility. This holds particular relevance in cases where the underlying cause of infertility is unclear or when conventional assessment techniques yield unsatisfactory results. Thus, assessing DNA damage in sperm emerges as a valuable addition to the arsenal of tools available in ART.

Funding: This work was supported by the projects UIDB/00772/2020 (Doi:10.54499/UIDB/00772/2020), and LA/P/0059/2020, funded by the Portuguese Foundation for Science and Technology (FCT).