Scientific Letters

Poster Communication 40

Application of the Buccal Micronucleus Cytome Assay for Genotoxicity Detection in Dogs

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Abstract

Background: In Europe, concern for animal welfare has been steadily increasing, covering both ethical considerations and health aspects [1]. Consequently, veterinary research has increasingly prioritized the search for biomarkers that can anticipate the development of serious diseases. Among the available approaches, the Buccal Micronucleus Cytome (BMCyt) assay stands out as a low-impact method, relying on cells collected from the buccal mucosa to assess genomic damage and chromosomal alterations. [2]. Higher occurrence of cellular irregularities, including the presence of micronuclei, has been closely linked to an elevated likelihood of developing conditions such as cancer, neurodegenerative diseases, and premature ageing, often linked to exposure to genotoxic and cytotoxic agents. While this method has been well established in human studies, research involving animals remains limited [3]. **Objective:** This work aims to outline an improved method for obtaining exfoliated buccal cells from dogs, while also examining a marker of genomic instability through both light and fluorescence microscopy techniques. **Methods:** Specimens were obtained from six female dogs housed in breeding facilities, including gestating females, with the purpose of evaluating chromosomal instability. Using methodologies adapted from human studies, key nuclear alterations were successfully detected and measured. **Results:** The results showed a greater proportion of micronuclei relative to findings reported in earlier studies. Methodological aspects, including the reduction of artefacts and the need for adequate personnel training, are essential for reliable analysis. **Conclusions:** This study confirmed the reliability of the BMCyt approach for collecting and analyzing canine samples, while also enhancing insight into the role of micronuclei as indicators of early pathological changes in this species.

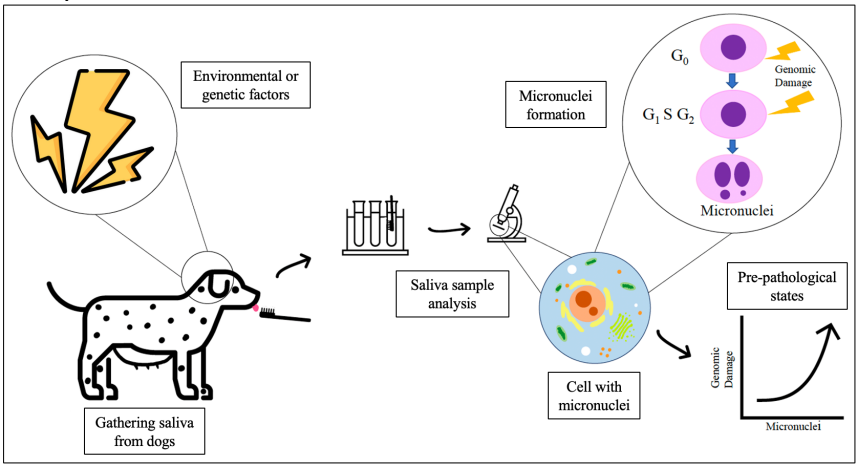

Figure 1. Key aspects involved in the collection and analysis of micronuclei as biomarkers of stress-related genotoxicity.

Keywords: genomic damage; exfoliated buccal cells; saliva; biomarker; animal welfare

Acknowledgments/Funding

This work was supported by FCT - Fundação para a Ciência e Tecnologia, I.P., in the scope of the project UID/04378/2025 (DOI identifier 10.54499/UID/04378/2025), and UID/PRR/04378/2025 (DOI identifier 10.54499/UID/PRR/04378/2025), of the Research Unit on Applied Molecular Biosciences - UCIBIO and the project LA/P/0140/2020 (DOI identifier 10.54499/LA/P/0140/2020) of the Associate Laboratory Institute for Health and Bioeconomy - i4HB.

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