

Morphological and immunoistochemical evaluation of cadaveric gingival specimens to estimate the post-mortem interval

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The estimation of the post-mortem interval (PMI) is a critical step in forensic medicine and remains one of the most challenging variables to determine. In general, the numerous methods currently used in estimating post-mortem interval yield to large post-mortem windows, are influenced by several factors and sometime contradict each other.

With the aim to obtain a much more accurate determination of the post-mortem interval we combined morphological ultrastructural and immunoistochemical analyses to reach a more detailed knowledge on tissue organization and degradation after death.

Samples of gingival tissues obtained from 20 cadavers at different post-mortem intervals were processed for transmission electron microscopy to evaluate ultrastructural modifications in the epithelium and connective tissue. Gingival cells and the extracellular matrix of gingival tissues have been observed by a transmission electron microscopy (TEM) in combination with the evaluation of potential post-mortem biochemical markers, with the final goal to find a tight correlation between the ultrastructural modifications, the biomarker expression and the time of death.

All the samples were also immunostained with anti-hypoxia-induced factor 1- α (HIF1- α) antibody, a transcription factor expressed in response to hypoxia, in order to evaluate the expression of HIF1- α , and to establish a correlation between the protein presence and the time of death.

Results showed nuclear chromatin changes and cytoplasmic vacuolization in both epithelial and connective tissues and a different pattern of expression of HIF1 α protein that correlate to the time of death.

In conclusion, our preliminary findings suggest that ultrastructural investigations in combination with immunohistochemistry techniques in gingival specimens may represent a new tool to accurately and systematically estimate post-mortem interval.

Keywords

Post-mortem interval, hypoxia, HIF1 α , ultrastructural morphological changes, gingiva