

QUALITATIVE ASSESSMENT OF VISIBLE NUCLEI IN HAIR ROOTS

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This study evaluates a fluorescent staining method using the minor-groove DNA binding dye, 4', 6-diamidino-2-phenylindole (DAPI) to visualize nuclear DNA (nuDNA) content and nuclei morphology in human hair root cells. The procedure was successful in staining nuclear material in anagen and telogen hairs, regardless of soft tissue presence or human anatomical origin. We find that the dye can reveal an abundance of nuclei in hairs that were previously assumed to be unsuitable for nuDNA typing. In addition, our findings indicate no interference by DAPI on DNA analysis workflows, including DNA extraction, quantitative PCR, and short tandem repeat (STR) typing. Furthermore, the method remains steadfast for hairs washed by sonication as well as hairs retrieved from Permout™ mounting medium. More importantly, staining revealed a variety of nuclei morphologies and nucleic acid distributions across the hair root region. When validated, this quick and quantitative screening method can increase the likelihood of obtaining a nuDNA profile from hairs that are traditionally sent directly to mitochondrial DNA analysis for lack of adhering soft tissue.