CYTOTOXICITY ANALYSIS OF CETYLPRIDINIUM CHLORIDE IN HaCaT CELLS

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INTRODUCTION: Cetylpyridinium chloride (CPC), widely used in antiseptic products, has shown antiviral potential against HSV-1, including acyclovir-resistant strains. However, quaternary ammonium salts (such as CPC) exhibit high toxicity, limiting their use via the oral route. The challenge lies in developing an antiviral formulation that is also safe for use. One possible alternative is the use of gels that allow controlled and sustained release of therapeutic molecules. Thus, the first step is to evaluate the cytotoxicity of CPC in human skin cells (HaCaT) to determine the concentrations that could be used in an antiviral gel. OBJECTIVE: To evaluate the cytotoxicity of CPC in HaCaT cells, a human keratinocyte cell line, considering different exposure times and concentrations. MATERIALS AND METHODS: Confluent cell monolayers were exposed to different CPC concentrations: 2.8, 5.6, 11.2, 22.5, and 45 μM, for 2h30min, 8h, and 24h. Cytotoxicity at the end of each period was determined using the MTT reduction assay. The negative control consisted of cells maintained under standard conditions. RESULTS AND CONCLUSION: The tested compound exhibited a dose-dependent and time-dependent toxicity profile. Concentrations 2.8, 5.6, and 11.2 μM were not considered cytotoxic at any evaluated exposure times. The concentration 22.5 μM showed variable effects depending on the exposure time: it was non-cytotoxic at 2h30min, caused 37.1% toxicity at 8h, and was 100% lethal at 24h, indicating that exposure time influenced the cellular response. The 45 μM was cytotoxic at all tested times. Based on these findings, virucidal activity will be evaluated at 22.5 μM, and a topical formulation will be developed starting from this concentration.

Keywords: ionic liquid; MTT; keratinocytes