CELL VIABILITY STUDIES ON CACO-2 FOR MOLECULARLY IMPRINTED POLYMERS FOR CARBAMAZEPINE

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INTRODUCTION: Carbamazepine is a drug with low solubility and high permeability which is used in the treatment of convulsive disorders, epilepsy, among others. It presents a high risk of toxicity due to its low therapeutic index, requiring individual dose regulation. It acts by blocking voltage-dependent sound channels present in neural cells. Therefore, for carbamazepine to reach its binding site, it needs to cross the blood-brain barrier (BBB). The BBB acts as a mediator of the passage of substances from the blood to the central nervous system, preventing the access of proteins, macromolecules and various drugs. Therefore, it is often necessary to increase the dose of the drug to achieve therapeutic efficiency, which can increase the risk of toxicity. To address this challenge and bypass the BBB, various controlled drug delivery systems have been developed. Among these, the use of molecularly imprinted polymers (MIPs) coated as nanocarriers has shown great potential. MIPs are three-dimensional nanostructures, with high selectivity. NIPs are non-molecularly imprinted polymers, used for comparison purposes. OBJECTIVE: Synthesize four types of polymers (MIP, NIP, MIP@transferrin and NIP@transferrin) and test their cytotoxicity. MATERIALS AND METHODS: The synthesis of the polymers was carried out by polymer by *in situ* dispersion. Cellular studies were conducted in human colorectal adenocarcinoma cell line (Caco-2). The cells were seeded at a concentration of 2.5×10^4 cells/cm². The viability tests were performed at concentrations of 0.1, 0.2, 0.5, 1 and 2 mg/L for each polymer, in relation to the carbamazepine-polymer association, they were performed at these same concentrations for polymer and drug 10 times more. RESULTS: The results indicated that all polymers did not present cellular toxicity at all concentrations tested. Intrinsic carbamazepine presented an IC50 of 1.27 mg/L. However, the association of polymers with carbamazepine presented an increase in IC50: 1.415; 1.085; 0.8821; 0.7261 mg/L, for MIP-Carbamazepine, NIP-Carbamazepine, MIP@Transferrin-Carbamazepine and NIP@Transferrin-Carbamazepine, respectively. This may be due to the presence of binding sites. CONCLUSION: The polymers did not show cytotoxicity at the concentrations tested, demonstrating potential to be used as nanocarriers in the delivery of carbamazepine. The next step will be to perform permeation studies.

Keywords: Blood-brain barrier; Drug delivey; Transferrin.

Acknowledgments: This study was supported in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001. To CNPq and FAPEMIG for financial support.