

Evaluation of the cytotoxic and genotoxic effects of antineoplastic drugs and their metabolites detected in effluents

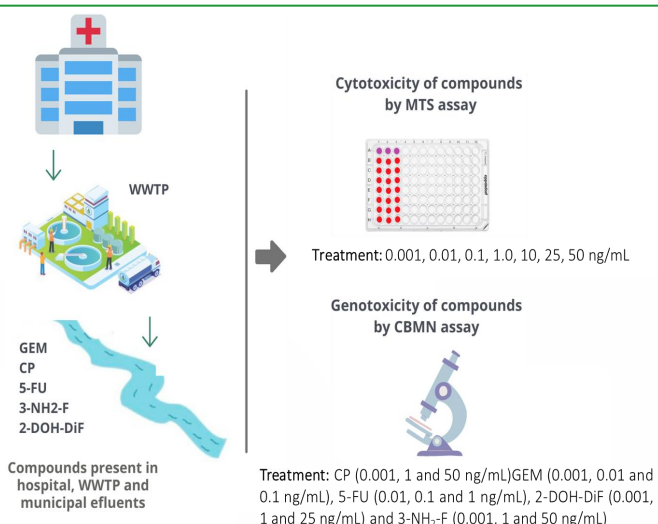
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Introduction

Anticancer drugs are among the most toxic drugs with adverse effects on the environmentally exposed organisms. In this study we evaluated the cytotoxic and genotoxic effects in HepG2 cells of the antineoplastics 5-FU, GEM, CP and the metabolites 2-DOH-DiF and 3-NH2-F in concentrations previously detected in effluents from the a large cancer hospital in Brazil.

Material and Methods



Results

Cell viability and nuclear division index (NDI)

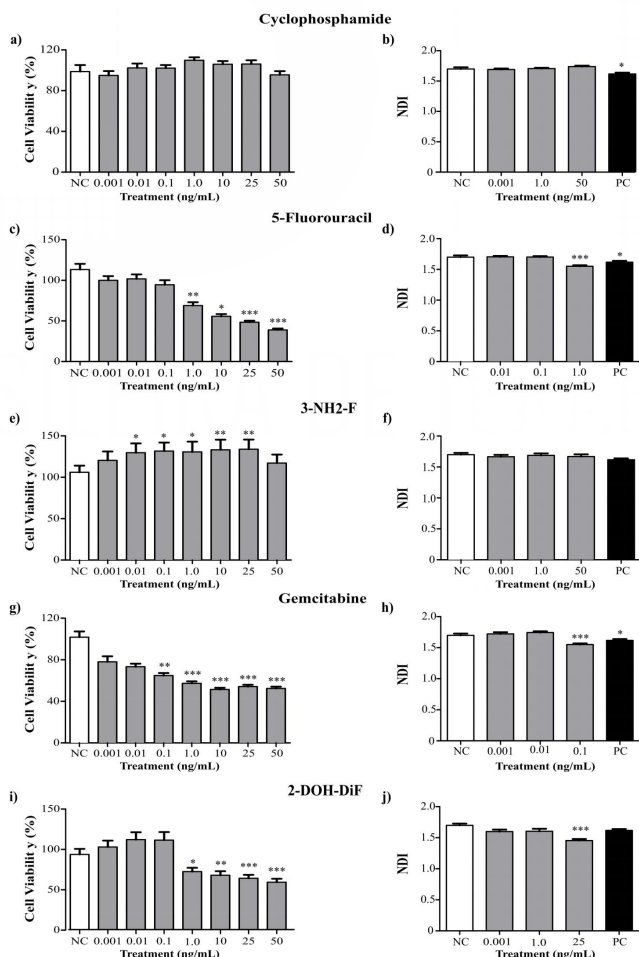


Fig. 1 Cell viability and nuclear division index (NDI) of HepG2 cells treated with CP (A, B), 5-FU (C, D), 3-NH2-F (E, F), GEM (G, H) and 2-DOH-DiF (I, J) for 72 and 24 h respectively. All data are expressed as means \pm standard deviation of three independent experiments performed in triplicates. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ when compared to negative control by Kruskal Wallis followed by Dunn for cell viability test and ANOVA test, followed by the Tukey test for NDI test

Micronuclei assay

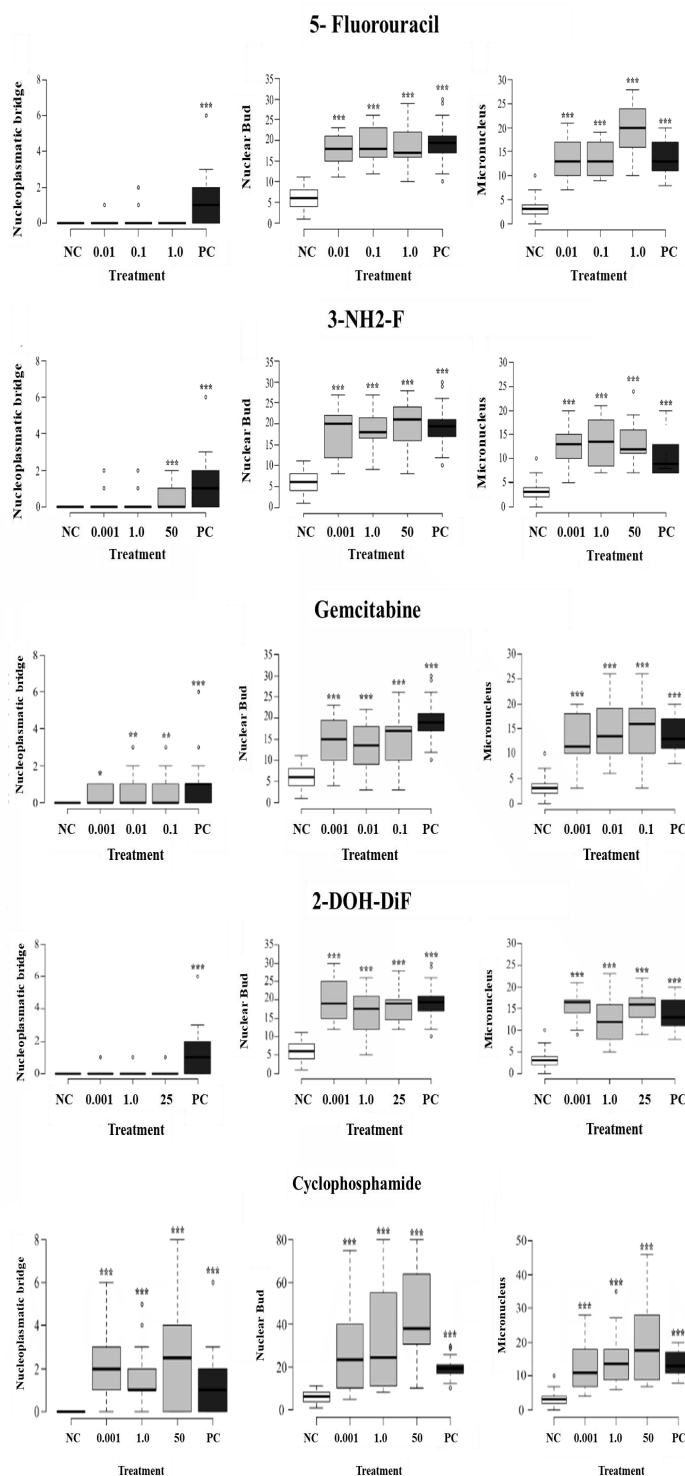


Figure 2. Genotoxicity in HepG2 treated with anticancer drugs for 24h. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ when compared to negative control by Kruskal Wallis followed by Dunn for cell viability test.

Conclusion

This study evaluated the cytotoxicity and genotoxicity of antineoplastics present in the environment. The results demonstrated damage to human cells when exposed to antineoplastics in concentrations at which they are found in effluents. This topic should receive attention for further studies, with a wider range of organisms and cells to be evaluated, in order to confirm the need for public policies that restrict the presence of these compounds in effluents.

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