

## SUMMARY

### SELECTED STILBENES, CATECHINES AND XANTHINES AS INTERCEPTORS OF THE DNA-INTERCALATORS

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Present dissertation consists of two papers, the first of which was published in 2010 in *Journal of Toxicology and Environmental Health, Part A* (doi: 10.1080/15287394.2010.491044) and second which appeared in the *Food Chemistry* journal in 2017 (doi: 10.1016/j.foodchem.2017.01.083). Their subject matter includes interactions between selected natural substances of plant origin and two chosen DNA intercalators.

Xanthines and polyphenols are one of the most commonly consumed substances of plant origin. Due to their biological properties, they have been the subject of interest for physicians, pharmacists and dietitians, and products containing these substances are commonly referred as beneficial to health. In most studies on the antitumor activity of natural plant compounds, their activity is explained by their antioxidant properties. However, beyond the possibility of capturing free radicals, many of these substances are characterized by the ability to scavenge some aromatic DNA intercalators.

Using spectroscopic methods, the interceptive properties of selected polyphenols (epigallocatechin gallate, catechin, quercetin and rutin) in mixtures with mitoxantrone as well as selected xanthines (caffeine, theophylline and theobromine) in mixtures with acridine orange were compared. Interceptive potential of resveratrol – the principal representative of stilbenes, which belong to the polyphenol family – was determined in the presence of both mutagens. In addition, the analyzes were carried out in the three-component systems like: mitoxantrone-DNA-interceptor.

Spectrophotometric and spectrofluorimetric measurements allowed to estimate the homo-association constants of the intercalating molecules as well as the hetero-association constants of the mutagen-interceptor complexes. From the all substances used for the study,

quercetin distinguished by the highest hetero-association constant with mitoxantrone. The association constant calculated for the acridine orange-resveratrol complexes was found to be one hundred times higher than those obtained for the acridine orange with methylxanthines. In addition, results obtained from conducted fluorescence lifetime measurements suggest that the process of creating a hetero-complexes of the studied molecules takes place mainly in the ground state.

The results confirmed that xanthines and polyphenols used for this study are able to intercept the molecules of selected mutagens, thus minimizing their toxicity. This allows to assume that properly planed supplementation of food for patients during and after chemotherapy with analyzed compounds of plant origin can protect their healthy cells against damage caused by the non-selective pharmaceuticals.

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