High cancer mortality is correlated with the lack of effective oncological treatment. Glycopeptide antibiotics of the bleomycin family are used in the treatment of many cancers. The anticancer activity of bleomycins is enhanced by trace elements such as arsenic and copper. Antimony and cadmium may also show similar properties. Antimony has been used in tropical medicine for many centuries. Due to the few indications of its toxicity in humans, scientists have high hopes for its usage in anticancer therapy. Cadmium is poorly distributed in the Earth's crust, but its concentration increases in urbanized and industrialized areas. Presumably, its presence in the environment may affect the effectiveness of treatment in cancer patients. The goal of this project is to understand the mechanisms of increased cytotoxicity of phleomycin in the presence of antimony and cadmium. The studies undertaken will answer the question whether these elements lead to an increase in the level of double-stranded DNA breaks. Next, we will assess whether inhibition of DNA repair processes or DNA damage response in the presence of these compounds takes place. We will also check the effect of these trace elements on expression and function of proteins, which are crucial for the resistance of cells to bleomycins. The selection of *Saccharomyces cerevisiae* baker's yeast as a model organism, that has been used for many years in research on DNA damage, is a guarantee that the results obtained within this project can be considered representative of higher eukaryotes, including humans. The results of this project will certainly broaden the general knowledge of the antimony, cadmium and phleomycin toxicity mechanisms. In the future, the results of our research may help in the development of innovative anticancer therapies based on combination therapy of bleomycins with metalloids. In addition, the results obtained on the interaction of cadmium with bleomycins may open a new field of research on the impact of environmental conditions and heavy metal on effectiveness of anticancer therapies.