Cancerogenesis is a growing problem of developed countries. One of the key mechanisms promoting the expansion of cancer cells is the inactivation of p53 protein, known as “the guardian of genome”. Protein p53 fulfils a crucial role by defending the cells from uncontrolled accumulation of DNA mutations, which would lead to cancerogenesis.

The inactivation of p53 protein may occur in two distinct ways, depending on the tumour type. In this project we focus on one of these types, in which p53 is able of serving its physiological functions, but its activity is inhibited by other factors, such as Mdm2 protein. Releasing p53 from negative influence of Mdm2 leads to the elimination of mutated cancer cell, thus blocking or even regressing cancer growth. For the mentioned release of p53 protein small molecules, called Mdm2 antagonists, are used. Several of those compounds are currently in the early stages of clinical trials.

Our project focuses on enhancing anticancer properties of Mdm2 antagonists. The results of our initial experiments on human cancer cell lines indicate that this may be achieved by the use of additional, supporting compounds, or by smart design of new antagonists capable of more efficient eliminating of cancer cells. In the presented project comprehensive cell line-based experiments, as well as *in vivo* studies using mice model will be conducted. This will allow us to verify our scientific hypotheses. In our work we care not only for practical, but also ethical aspects, which allow us to minimize harm done to laboratory animals, maximizing the effectiveness of work at the same time.

We hope that the results of our work will contribute to establishing strategies of better dealing with cancer.