

## Abstract

Harmful substances polluting the environment, including ionizing radiation, and an unhealthy lifestyle are responsible for the increased incidence of cancer. The projected outlook for the next ten to twenty years suggests an increase of 63% in newly diagnosed cases of cancer annually. Radiotherapy is an important component of cancer treatment, given approximately to 50% of all cancer patients. Despite ongoing advances in the methods of radiotherapy, quality of life continues to be lowered as a result of the radiation treatment. Novel strategies towards improvement need to be adapted, such as the use of radioprotective substances.

The goal of this thesis is to synthesize novel radioprotective agents based on the 1-(2-hydroxyethyl)piperazine moiety targeting the intrinsic apoptotic pathway, therefore protecting healthy tissue from ionizing radiation.