Colorectal cancer in terms of incidence ranks second among both men and women. Epidemiological studies have shown that the risk increases with age and it is estimated the risk of developing this type of cancer doubles with each decade of life. The most common method of therapeutic treatment of cancer is chemotherapy, and the main purpose of its use is the reduction of the tumor mass. In colorectal cancer the following chemo is used: fluorouracil, capecitabine, irinotecan, oxaliplatin. The use of these drugs leads to a wide spectrum of side effects, including disorders of DNA, RNA and proteins, as well as thymine deficiencies caused by5 - fluorouracil. This may lead to disturbances of growth and cell death. Another common method of treatment for patients with colorectal cancer is radiation therapy used both before and after surgery. As a result, under the influence of ion, genetic material can be damaged - DNA is damaged by free radicals, resulting in oxidative damage. It has been demonstrated that ionizing radiation and radiotherapy much faster damage and destroy cancer cells than normal cells. This have been used in the treatment of tumors. Many patients however do not respond to that kind of treatment. Therefore, it becomes obvious to ensure effective treatment and the lowest toxicity when choosing appropriate therapy. The selection of appropriate methods should largely be based on the clinical picture of the patient and phenotypic characteristics of the tumor. That is why it is important to search for new genetic factors enabling efficient tumor therapy. In order to protect the genome against the formation of DNA damage and their accumulation, cells have developed mechanisms to repair them. It is proved that disturbances present in the cells DNA repair mechanisms, may affect the efficacy of the cancer therapy. The studies shown an association between mechanism of DNA base excision repair (BER) and the risk of developing colorectal cancer. Moreover, in the case of cancer it has also been observed compound risk of developing cancer disorders in mitochondrial DNA repair. In the case of cancer reduced levels of mRNA Sirt3 - "guard mitochondria", the main deacetylases involved in numerous cellular processes has been demonstrated. Sirt 3 deacetylase ability to adjust the level glucosidase OGG1, the main enzyme responsible for the identification and excision of oxidative amended nitrogenous base significantly affects the efficiency of removal of DNA damage in cells. In our project, we try to answer the question about the pro or anti-cancer nature of the protein Sirt3. The study will be based on silencing and inducing overexpression of the gene Sirt3 in CRC cell lines and normal cells of the intestine. The results will help to better understand the molecular mechanisms underlying colorectal cancer and may help in the future to develop better methods of diagnosis that allow for the classification of the patients into risk groups and their placement under preventive programs.