Cancers are the leading causes of deaths in industrialized countries. Cancer therapy has traditionally relayed on cytotoxic treatment strategy (e.g, chemotherapy). Although, outcomes of chemotherapeutic treatment of cancers in clinics are hampered by their chemoresistance and severe side effects. **Therefore, our major aim is to describe one of the mechanisms of chemoresistance and find the ways to overcome it.**

An alternative strategy is the induction of senescence, which disables proliferation without inducing cell death. For a long time, it was believed that senescence is an anticancer mechanism that prevents growth of cells at risk for neoplastic transformation. Although, recent clinical studies have demonstrated that cancer cells may undergo senescence in response to anticancer therapies (TIS, therapy-induced senescence). Unfortunately, a growing body of evidence supports correlation between accumulation of TIS cancer cells and reduced survival of patients subjected to anticancer treatment. **We propose that senescent cancer cells might be one of the subpopulations of tumor-initiating cells responsible for chemoresistance and cancer relapse after chemotherapy.**

Autophagy is a catabolic process, that includes controlled lysosomal degradation of cellular macromolecules and organelles. It seems to play roles both for drug-induced cell death and as a self-protective mechanism in cancer cells. Of importance, inhibiting autophagy to overcome resistance to chemotherapy has been investigated in clinical phase I trials. Although, there are no data on long-term effects of the combined therapy, especially in context of TIS. **We hypothesize that by inhibition of autophagy we shall minimalize detrimental features of senescent cancer cells.**

To verify these hypotheses, we are planning to conduct experiments using *in vitro* cell cultures as well as animals models. Additionally, we are going to analyze the samples from cancer patients that were subjected to chemotherapies. **We believe that the new knowledge obtained from cooperation of scientists and oncologists in frame of this project will increase our understanding of cancer biology and mechanisms of cancer chemoresistance.** It may help to design better strategies for diagnosis and therapies against cancers.