Title of thesis:

Detection of experimental minimal disease using PCR

Abstract of thesis:

Introduction: Minimal residual disease is a presence of viable tumor cells in the body during or after cancer treatment. These cells can not be detected by usual methods. Diagnosis is based on proof of differences between tumor and healthy cells using very sensitive methods. In experimental medicine, there is a need for detection of human cells in mouse tissues after xenotransplantation. That's why I introduced a sensitive PCR method capable of detecting minimum quantities of human cells in animal tissues.

Material: I worked with human lymphocytes, neuroblastoma cell line, cell line derived from Ewing sarcoma, tissue samples from commonly used laboratory animals - mouse, rat, rabbit, monkey, dog, guinea pig and rat brain tissues from the injection site where they were delivered human $CD34^+$ haematopoietic progenitor cells, and tissue from the lesions.

Results: I set the sensitivity of PCR method $1:10^5$ using dilution test. In the experiment with various animal's tissue I showed that the method detect only the presence of human DNA. I tried applicability of the method in an experiment of monitoring human $CD34^+$ hematopoietic progenitor cells in mice brains. I proved that $CD34^+$ cells implanted into the brain migrate to the lesion site. The credibility of the results was confirmed by magnetic resonance imaging and immunohistochemistry.

Discussion and conclusion: I introduced and in the experiment showed that the PCR technique can be used to monitor the fate of transplanted stem cells in the host organism. In previous studies stem cells in the bone marrow were marked and monitored. Hematopoietic progenitor cells characterized by the presence of CD34 antigen are the focus of ongoing research. These cells have the capacity for extensive self-renewal and pluripotent differentiation and are used medically to ensure long-term recovery of bone marrow in human patients.