

## **Abstract**

Radiobiological data are already used in the clinical routine in the form of the tolerance and prescription doses used and the fractionation schedules applied during a radiation treatment. However, these data carry very limited information and they cannot be used for other treatment techniques than those they have been derived from. For this reason, the true dose-response relations of the different tumors and normal tissues should be calculated and used in the clinic instead. There are several reports in the literature referring to the radiobiological evaluation of a treatment plan but just recently researchers started deriving the relevant parameters that characterize the biological response. Up to now the problem with the extraction of accurate biological data was the lack of accurate 3D dose information as well as the short and not well-defined follow-up.

The goal of this study is to develop the tools that are necessary for determining the parameters, which describe the dose-response relations of the different tumours and normal tissues. Furthermore, similar tools will be developed for verifying clinically already published parameter sets using local patient material. At the same time, the development of a clinical data and health information database will be formed for assisting the performance of epidemiological studies and the collaboration between different institutions using the same Treatment Planning System within research and clinical frameworks. These tools will be incorporated into an already existing treatment planning system for validation and clinical application.