

Clinical dosimetry for Glioblastoma micro-brachytherapy: Treatment planning

Context:

The Cancer Research Centre of Toulouse (Team 15) proposes a PhD research project (Autumn 2014).

This research project is proposed within the frame of the development of a new therapeutic approach of glioblastoma microbrachytherapy with radioactive holmium microparticles (^{166}Ho).

Tumour volume covering should be obtained via repeated injections, in situ, with a specifically-designed injector under development by an industrial partner.

The feasibility of *predictive dosimetry* will be investigated, based on the dosimetric characterization of the injector and the topology of the tumour target. This work should lead to the development of a treatment planning system adapted to that kind of specific microbrachytherapy.

The research project will necessitate:

- Dosimetric characterization of the injector (type of needle, pressure, biomechanical characteristics of tumour tissue, radioactive microparticles, etc.),
- Definition of tumour volume from medical image sequences,
- Optimization of the injection (definition of the number and orientation of injection points) for an optimal covering of target volume.

This research project should lead to the industrial valorisation of the generated results

Applicant profile:

The applicant will necessitate skills and competences in:

- Medical imaging
- Monte-Carlo modelling of radiation transport (Gate : <http://www.opengatecollaboration.org>)
- Inverse problem modelling

A good level in scientific programming is required,

A previous experience in the medical field is desirable

Academic/industrial collaboration:

- Industrial partners involved in the project: AAA, Keosys
- Academic partners involved in the project: CRCT, clinical departments Toulouse Cancer Centre and University Hospital

Supervision and contacts:

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Equipe 15: Dosimétrie multi-résolution pour l'optimisation de la radiothérapie

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