

PROTECT-DTI: A Multicenter Federated Imaging and Clinical Integration Program to Preserve White Matter in Stereotactic Brain Radiotherapy

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Background

Stereotactic radiotherapy (SRT) achieves excellent local control for brain metastases but may induce **cognitive and functional impairments**, partly related to damage to critical white matter pathways.

Diffusion MRI (dMRI) and tractography enable **in vivo identification of functional white matter bundles**, offering a potential strategy for **organs-of-interest redefinition**.

However, clinical adoption remains limited due to:

- Lack of **harmonized acquisition protocols**
- Variability in **tractography pipelines**
- Limited integration into **treatment planning systems**

Aim

To develop and clinically implement a **harmonized, multicenter workflow for white matter tract preservation in brain SRT**.

Methods

A three-year transnational consortium was formed involving **six radiotherapy departments** across four countries, supported by academic research laboratories and European regional development funding (Fig 1.). The project is organized into **four work packages**.

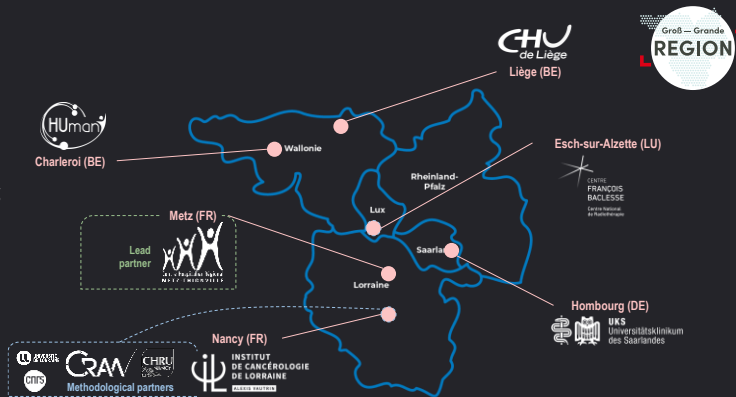


Figure 1. Regional map showing participants of the PROTECT-DTI project.



www.protect-dti.com



1. Technical & physical aspects of MRI acquisition

Lead: CHR Metz-Thionville (FR)

Study DTI consistency in a multicenter, longitudinal context
Optimize acquisition sequences: duration & quality

2. Integration of DTI into radiotherapy workflows

Lead: Centre François Baclesse (LU)

Deploy strategies for axonal fiber extraction
Simplify integration into radiotherapy clinical software

3. Organize a phase II / III clinical trial

Lead: Universitätsklinikum des Saarlandes (DE)

Prepare all clinical aspects needed for a trial in patients with brain metastases

Ambition: a cohort of 300–400 patients across all participating centers.

The consortium's annual flow is ~400–500 patients / year.

4. Dissemination of knowledge within and beyond the consortium

Lead: Institut de Cancérologie de Lorraine (FR)

Support and deploy optimal communication of results from WP1–3 to healthcare professionals and the general public

Interreg



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PROTECT-DTI

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