

PhD position: Targeted Radioenhancing Nanoparticles for Neuroblastoma

This PhD project develops ultrasmall, intravenously deliverable hafnium oxide nanoparticles to improve radiotherapy for high-risk neuroblastoma, a pediatric cancer with poor prognosis and limited treatment options.

Neuroblastoma remains a major unmet clinical need because high-risk disease is still associated with poor outcomes despite multimodal treatment, while conventional radio-chemotherapy is constrained by toxicity to healthy tissue. Radiotherapy-enhancing nanoparticles offer a promising route to increase local tumor damage without simply escalating X-ray dose. Hafnium oxide nanoparticles are attractive radioenhancers because hafnium strongly absorbs X-rays, leading to enhanced local energy deposition and free-radical generation during irradiation. Clinical studies have already demonstrated the translational potential of this approach, but current strategies rely on direct intratumoral injection of relatively large particles, which limits treatment to accessible tumors.

This project addresses that limitation by designing ultrasmall nanoparticles suitable for intravenous delivery and tumor targeting, with a specific focus on neuroblastoma. Building on established expertise in **nanoparticle synthesis and surface chemistry**, this project will optimize nanomaterial design for circulation, targeting, and therapeutic performance in **neuroblastoma organoids**, enabling preclinical evaluation in physiologically relevant 3D models.

This PhD position sits at the interface of nanochemistry, and translational cancer research, and offers the opportunity to contribute to a next-generation strategy for making radiotherapy more selective, effective, and clinically accessible for difficult-to-treat pediatric tumors.

Your profile

You have a degree in Chemistry or Biochemistry. You either have experience with nanoparticles or with biochemical/biological research. You are curious to both the chemical and the biological aspects of the project. You are proficient in English.