

Institute for Advanced Biosciences

Opening for PhD position (CIFRE) – Autumn 2021

Organic chemistry / Nanomedicine / Cancer therapy

Project description:

Photodynamic therapy is a promising cancer treatment that relies on light-activable therapeutics called photosensitizers. These are typically porphyrins or phthalocyanines, which generate highly cytotoxic reactive oxygen species when excited with non-thermal visible light. This can be done locally to treat malignancies in a specific manner with minimal damage to healthy tissues. New photosensitizers to treat cancer with PDT have emerged in recent years and are now in clinical trials. To improve the biocompatibility and efficacy of photosensitizers, lipid nanocarriers have been developed, of which only Visudyne® is clinically approved for non-cancer applications.

At the Institute for Advanced Biosciences (IAB, Grenoble), we are developing innovative nanoliposomes for light-controlled drug delivery, photodynamic therapy, radiotherapy, and medical imaging. Novel photosensitizers are necessary for these purposes, and the synthesis of such photosensitizers is being explored by PorphyChem (Dijon). Through this industry-academic partnership (CIFRE) we are looking for an enthusiastic PhD student, for which the research project will involve:

1. The synthesis of novel porphyrin and phthalocyanine photosensitizers (@Porphychem);
2. The encapsulation of these novel photosensitizers into nanoliposomes (@IAB);
3. The investigation of the toxicology, uptake/biodistribution, and therapeutic effects of these novel photosensitizers in state-of-the-art *in vitro* (3D) and *in vivo* cancer models (@IAB).

We look for a candidate with:

- A solid background in organic chemistry
- Affinity for cross-disciplinary research on the interface with chemistry, biology, and physics
- Excellent English communication skills

We offer:

- Training in state-of-the-art porphyrin and phthalocyanine chemistry.
- Training in nanoliposome preparation and characterization techniques.
- Training in 3D cell culture and *in vivo* models of cancer, microscopy, and quantitative imaging.
- A collaborative work environment involving Porphychem (industrial partner), and the Institute for Advanced Biosciences (academic partner), along with various national and international collaborators.

For more information, please contact:

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Description host institutes:

The Institute for Advanced Biosciences (IAB) is a center for biomedical research located on the Medical Campus in Grenoble, France. The IAB is a joint research center of the Grenoble-Alpes University, the French National Institute of Health and Medical Research (INSERM), as well as the National Center for Scientific Research (CNRS). Within the group *Cancer Targets and Experimental Therapeutics*, led by *Dr. Jean-Luc Coll*, our main objective is the translation of



optics and nanomedicines in pre-clinical and clinical trials, in particular for applications in oncology.

<https://iab.univ-grenoble-alpes.fr/>

Within this group, *Dr Mans Broekgaarden* works as a Tenured PI of INSERM and is on the Board of Directors of the International Photodynamic Association. He obtained his PhD from the Academic Medical Center (group Michal Heger) of the University of Amsterdam and performed a postdoctoral fellowship at the Wellman Center for Photomedicine (group Tayyaba Hasan), a thematic research center of Harvard Medical School in Boston. The PhD student will be co-supervised by *Dr Lucie Sancey* (HDR), a CNRS research director.

PorphyChem, with *Dr Benoit Habermeyer* as its CEO, is a company specialized in the synthesis of photosensitizers such as porphyrins and related compounds with applications in the fields of health, environment, and energy. To facilitate commercial uses of novel lead compounds, PorphyChem has the capability of large-scale synthesis of porphyrins and phthalocyanines.



<https://www.porphychem.com/>