

**Master 2 internship project
Year 2025-2026**

Laboratory/Institute: Institute for Advanced Biosciences

Director: Dr Arnoult

Team: Targeted therapies, early diagnosis and cancer imaging

Head of the team: Dr Coll

Name and status of the scientist in charge of the project: Dr Faure, assistant professor

HDR: yes ☒ no ☐

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Program of the Master's degree in Biology:

☐ Microbiology, Infectious Diseases and Immunology ☐ Biochemistry & Structure
☒ Physiology, Epigenetics, Differentiation, Cancer ☐ Neurosciences and Neurobiology

Title of the project: Targeting cancer cells: innovative nanoparticles delivering therapeutic siRNA to overcome chemoresistance.

Objectives (up to 3 lines):

The project focuses on the evaluation of novel bioengineered nanoparticles capable of selectively targeting cancer cells and delivering therapeutic siRNA to overcome chemoresistance.

Abstract (up to 10 lines):

Chemoresistance remains one of the major hurdles in the treatment of cancer. Recent studies have highlighted the role of alternative splicing mechanisms in the process of acquired chemoresistance. The project aims at designing and characterizing next-generation bioengineered nanoparticles with the dual capability to selectively target cancer cells and to deliver therapeutic siRNA to counterbalance chemoresistance mechanisms activated in cancer cells.

The student will work at the interface of nanotechnology, cellular biology, and cancer research. The project involves assessing the targeting efficiency of nanoparticles in different cancer cell lines, analyzing therapeutic siRNA delivery ability by nanoparticles, and evaluating their cytotoxicity. This work will contribute to the development of next-generation siRNA-delivering nanotherapies and offers a unique opportunity to be part of an emerging and translational field in cancer nanomedicine.

Methods (up to 3 lines):

Cell culture, cellular transfection assays, electrophoresis gel, flow cytometry, fluorescence and confocal microscopy, western blot, RTqPCR, spectrophotometry and DLS for nanoparticle characterization

Up to 3 relevant publications of the team:

Moro S, Omniri M, Jourdan M, Bernardo P, Thureau A, Coll J-L, Renaudet O, Le Guével X, Faure V, "Self-assembled peptide-gold nanoclusters with siRNA targeting telomeric response to enhance radiosensitivity in lung cancer cells." Small Sciences 2024.

de Fraipont F, Gazzeri S, Cho WC, Eymin B, "Circular RNAs and RNA Splice Variants as Biomarkers for

Prognosis and Therapeutic Response in the Liquid Biopsies of Lung Cancer Patients". Front Genet. 2019.

París Ogáyar M, Ayed Z, Josserand V, Henry M, Artiga Á, Didonè L, Granado M, Serrano A, Espinosa A, Le Guével X, et al. "Luminescence Fingerprint of Intracellular NIR-II Gold Nanocluster Transformation: Implications for Sensing and Imaging." ACS Nano. 2025.

Requested domains of expertise (up to 5 keywords):

Cellular and molecular biology/ RNA-targeted therapies/ cancer