ParisTech

Chimie Paris ParisTech | PSL

RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM
(one page maximum)

Field: Chemistry, Physical Chemistry and Chemical Engineering

Subfield: Life and Health Science and Technology

Title: Design and development by continuous flow chemistry of new functionalized peptide nanoobjects for tumor diagnosis and therapy, with quantitative bioimaging monitoring

ParisTech School: Chimie ParisTech | PSL

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Research group/Lab: SEISAD team, iCLeHS (Chimie ParisTech PSL / CNRS 2027)
Lab location: Chimie ParisTech, 11 rue Pierre et Marie Curie, 75231 Paris Cedex 05
(Lab/Advisor website): https://iclehs.fr/research/seisad/

Short description of possible research topics for a PhD:

The development of new alternative therapeutic strategies to fight cancer by limiting the undesirable side effects of conventional chemotherapy is essential. Nanomedicine is an effective approach to meet these requirements because the coupling and encapsulation of antitumor molecules with nanovectors will allow reducing their toxicity while improving their circulation and *in vivo* targeting. The association with imaging probes will give rise to theranostic agents for image guided therapy.

The PhD proposal aims to explore the benefits and risks brought by the design and development of new self-assembled peptide-based nanoplatforms, breaking with the classical particulate nanovectors. The use of new synthesis processes in continuous flow and microflow will allow a stringent control of amino acid sequences and grafting for a fast identification of the most relevant candidates regarding structure and dynamics of self-assembly. Imaging methods will allow to control their biodistribution and evaluate their therapeutic efficacy for further applications in nanomedicine.

Required background of the student: organic synthesis, physico-chemistry, labelling, imaging

A list of 5 (max.) representative publications of the group:

1. MOLECULAR IMAGING AND BIOLOGY, 2019, 21 : 269-278
2. ANALYTICAL BIOCHEMISTRY, 2016, 502 : 8-15
3. REACT. CHEM. ENG., 2020,**5** : 1981-1991
4. ACS APPLIED MATERIALS & INTERFACES, 2018, **10**: 17107-17116