

Lundi 12 juin 2023

à partir de 10h30

Salle de conférence du CBM

[Attirez l'attention du lecteur avec une citation du document ou utilisez cet espace pour mettre en valeur un point clé. Pour placer cette zone de texte n'importe où sur la page, faites-la simplement glisser.]



# Séminaires



## 10h30 - 11h00 : Katel HERVÉ-AUBERT, Maître de conférences, HDR Design of nanosystems for diagnostic and treatment of cancers

The design and engineering of multifunctional nanoparticles for targeted drug delivery applications is an important area of biomedical research. Due to the outstanding benefits offered by multimodal functionalities, hybrid nanostructures can nowadays be utilized efficiently in the early diagnosis and targeted therapy of aggressive diseases such as cancers. In this context, our team EA 6295 Nanomedicines and Nanoprobes (NMNS) develop synthesis and biofunctionalization of hybrid nanovectors. Three types of nanosystems will be presented : (i) PEGylated iron oxide nanoparticles functionalized with antibody fragment (scFv) to specifically target cancer cells<sup>1,2</sup> ; (ii) formulation nanoprobes to detect miRNA biomarkers in serum<sup>3</sup> ; (iii) gold nanoflowers of tunable size and absorption wavelength in the red & deep red range for SERS spectroscopy<sup>4</sup>.

<sup>1</sup> Alric et al, RSC Adv. 2016, <sup>2</sup>Nguyen et al, Pharmaceutics 2022, <sup>3</sup> Vilimova et al, RSC Adv. 2022, <sup>4</sup> Pacaud et al, Spectrochimica Acta Part A 2020



## 11h00 - 11h30 : Stéphanie DAVID, Maître de conférences, HDR Formulation of non-viral nanovectors for nucleic acid delivery for breast cancer treatment

Breast cancer is the most common cancer in women. Chemotherapy treatment options involve severe side effects, limited efficacy and the emergence of resistance. One possibility for improving treatments is to use nucleic acids (NA) such as small interfering RNA (siRNA) capable of inhibiting the synthesis of proteins involved in cell survival (i.e. survivin or Bcl-xL) or decoy DNA (dcDNA) blocking transcription factors (i.e. STAT3). The team EA 6295 Nanomédicaments et Nanosondes in Tours is developing different nanovectors (NV) for NA delivery (i) NV based on iron oxide nanoparticles (SPION) functionalized either with antibody fragments (scFv) or with cell penetrating peptides (CPP). <sup>1-3</sup> These NVs are assembled by electrostatic association with NA (siRNA or decoy DNA) and cationic polymers to deliver NA (NV-NA). (ii) Lipid-based nanoparticles (LBNP)

based on lipid nanocapsules coated with chitosan for a simultaneous delivery of Lapatinib and anti-survivin siRNA.<sup>4</sup> These injectable NV allow to protect NA from degradation in serum, to target cancer cells and to facilitate the internalization of NA in cancer cells.

<sup>1</sup> Bruniaux et al. IJP 2017, <sup>2</sup> Bruniaux et al. IJP 2019, <sup>3</sup> Ben Djemaa et al. EJPB 2018, <sup>4</sup> Eljack, S. et al. Pharmaceutics 2022



## 14h00 - 14h30 : Emilie ALLARD-VANNIER, Maître de conférences, HDR

platform of nanomedicines with theranostic properties for breast cancer therapy such as superparamagnetic iron oxide (SPIONs) or lipid-based nanocarriers. Two family of ligands have been used to functionalize these nanosystems; scFv (single chain variable fragment)<sup>1,2</sup> and CPP (cell penetrating peptide). The efficacy of these nanosystems has been studied at a cellular level (cell uptake and trafficking). In the lab : HER2 in the so called HER2+ breast cancer model and EGFR in the so called EGFR+ breast cancer (TNBC). A few examples of active targeting using scFv will be presented. We also studied the efficacy of these nanosystems on pegylated SPIONs or on liposomes. We also studied the efficacy of these nanosystems on drug conjugate (ADC/FDC)<sup>4,5</sup> according to antibody format, DAR (drug to antibody ratio) and on these same models.

**Séminaire reporté au 16 juin 2023**

<sup>1</sup> Alric et al, J. Nanobiotechnol 2018, <sup>2</sup> Nguyen et al, EJPB 2020, <sup>3</sup> Ben Djemaa et al, Biomacromolecules 2019, <sup>4</sup> Aubrey et al, Bioconjugate Chem 2018, <sup>5</sup> Ait Mohamed Amar et al, EJMC 2022

Emilie ALLARD-VANNIER, Stéphanie DAVID, Katel HERVÉ-AUBERT  
Invitées par Matthieu Réfrégiers

NMNS – NanoMédicaments et NanoSondes - Tours