Université catholique de Louvain **UCL** SECTEUR DES SCIENCES ET TECHNOLOGIES

Institut de la Matière Condensée et des Nanosciences

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences

Mademoiselle Vusala IBRAHIMOVA

Master en sciences chimiques

Development of Polypeptide-Based Multifunctional Nano-Assemblies for a Theranostic Approach

Photodynamic therapy (PDT) becomes a major area in cancer treatment due to its selectivity and lesser damage to healthy cells compared to traditional treatment methods like surgery, chemotherapies, etc. In this thesis, we developed photosensitizer (PTS) functionalized polypeptide-based theranostic nano-assemblies to be used in photodynamic therapy. The singlet oxygen generation and fluorescence properties of the PTS provide simultaneous diagnosis and therapy of the tumor.

An asymmetric and multifunctional derivative of an aza-dipyrromethene boron difluoride chelate (aza-BODIPY) fluorophore was synthesized to be used as a photosensitizer. To carry the photosensitizer to the tumor, we developed the synthesis of PTS functionalized amphiphilic block copolymers consisting of poly(ɤ-benzyl-L-glutamate) as hydrophobic block, and poly(ethylene glycol) as hydrophilic block. The self-assembly in water of these copolymers, differing in terms of PTS localization and PEG chain length, was studied, and we showed that they are able to form micelles or vesicles. Moreover, we investigated the PTS activity in these nano-assemblies as a function of concentration, morphology of the nano-assemblies and PTS localization in the nano-assemblies by spectroscopic techniques. Finally, the efficacy of the nano-assemblies has been evaluated *in vitro* on HeLa and B16F1 cells.

Mercredi 31 août 2016 à 10h00

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