

## Seminario tractor 1 (ST1) - Interacción (nano)materiales y (bio)moléculas

Salón de actos do iMATUS, 13 de abril de 2023

Hora: 12 a 14 h

### PROGRAM

*12:00 Adriana Cambón Freire*

#### **Interaction of nanomaterials with biomolecules**

Nanomaterials are under continuous research because their potential as biomedicines, being promising drug delivery systems and/or theragnostic nanoplatfoms. In vivo application of those nanoplatfoms requires a better knowledge on those nanomaterials interaction with human biomolecules at the body conditions, as example, to evaluate the system stability under enzymatic degradation or under plasma proteins bonding. Several characterization techniques to resolve the nanomaterial-biomaterial interaction mechanisms will be presented with a especial focus on the calorimetry technique to reveal the protein corona formation.

*12:30 David Serantes Abalo*

#### **Computational methods to simulate the behaviour of magnetic nanoparticles in viscous media: several examples focused on magnetic hyperthermia**

Magnetic nanoparticles have been intensively investigated over the last decades as promising biomedical agents, based on their good biocompatibility and the possibility of remote actuation by harmless magnetic fields. However, actual implementation at the daily routine practice level is scarce. In this work we will describe some computational approaches that can help understanding the behaviour of the particles in the biological viscous media, and also to predict novel scenarios. We focus on the case of the particles being subjected to AC magnetic fields.

*13:00 Vicente Domínguez Arca*

#### **Unravelling the heat dissipation profiles in photo- and magneto-thermally excited nanoparticles**

Much has been debated about the need to reveal the mechanisms underlying heat transfer from nanoparticles in which the temperature has been increased, either by photothermia or magnetothermia. We propose a set of results based on molecular dynamics simulation that shows the profiles of the thermal relaxation of these particles and the heat flux towards the surrounding medium, usually water. These simulation experiments have been carried out using both maghemite magnetic nanoparticles and gold nanoparticles. In both cases, the differences in heat dissipation due to the presence of polymeric coatings on the particles have been studied.

*13:15 Antonio Topete Camacho*

#### **Estudio de la interacción de células Natural Killer y nanopartículas terapéuticas fotoactivables**

Since the appearance of CAR T cells for the treatment of lymphomas, the study and development of cellular immunotherapies has acquired great relevance for the treatment of difficult-to-manage cancerous tumors. Natural Killer (NK) cells are part of the innate immune system repertoire and, like cytotoxic T cells, possess cytotoxicity mechanisms against cancer and infected cells, and are being used for the development of cancer immunotherapies. This conference will address the study of the interaction of NK cells with therapeutic photoactivable gold and PLGA nanoparticles, functionalized with antibodies to target the cytotoxic granules of NK cells. Through a series of tests, the interaction of NK cells with these nanoparticles was studied, as well as the effects of the latter on the viability, expression of activation and inhibition receptors, and specific cytotoxic capacity of NK cells against breast cancer cell lines.

*13:30 PREGUNTAS, CONCLUSIONES Y OBSERVACIONES FINALES*