Post-Doctoral position

The Institut Galien Paris-Sud (http://www.umr-cnrs8612.u-psud.fr/) and the Material Institute of Paris (http://www.chimie.ens.fr/?q=en/node/4821) invite applications for a

Postdoctoral researcher's position

Project title: A 3D model of lung cancer for *in vitro* preclinical prediction of *in vivo* behavior of nanoMOFs

Project summary

Specific delivery of anticancer drugs to the lungs is still extremely challenging. Particle lung filtration (i.e., retention of particles in the lumen of lung capillaries by size exclusion) has been proposed for passive lung targeting and drug delivery. However, until now, toxic issues derived from the long-term presence of the particles in the lungs have hampered this approach.
We have recently discovered that by exploiting some of the properties of nanosized metal-organic frameworks (nanoMOFs), it was possible to achieve impressive antitumoral efficacy on an experimental lung tumor, even without the need to engineer the nanoMOFs surface. In fact, nanoMOFs targeted the lung tissue in a specific manner thanks to their unique pH-responsiveness and reversible aggregation behavior. (*Simon Yarza et al., Smart metal-organic-framework nanomaterial for lung targeting. Angew. Chem. Int. Ed.. **2017** doi:10.1002/anie.201707346*)
The aim of this project is to better understand, at the cellular level, how nanoMOFs can interact with lung cancer cells. To reach this goal 3D culture methodologies will be applied to the construction of a multicellular lung tumor model capable to reproduce in vitro the complex cancer cells/microenvironment cross-talk, therefore allowing to better understand how nanoMOFs can interact with the lung tumor tissue.
This model will be used to evaluate a small library of drug-loaded nanoMOF particles displaying different physico-chemical properties and whose surface will be functionalized with various biomolecules either covalently or non-covalently using already available surface modification approaches.
These studies will allow to generate new knowledge on the factors which play a crucial role in (i) the penetration/accumulation of the nanoMOFs through the whole tumor tissue and (ii) the effectiveness of treatments resulting from a better drug availability in the tumor. The herein proposed model, by replicating in vitro the 3D properties and the microenvironment of the lung tumors, would advance both comprehension and prediction of the in vivo behavior of nanoMOFs.

Start date: flexible (at latest December 2017).
Duration: 18 months
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Funding: RESPORE: *Reseau d'excellence en solides poreux*

An appointee to the position shall hold a doctoral degree and have the ability to conduct independent scholarly work. Suitable applicants will have a strong background in cell biology as demonstrated by publications in relevant fields. Experience with formulation and characterization of drug delivery systems is also advantageous, as is knowledge and/or experience with MOFs. The ability to work as a part of a larger research team addressing related questions is also important.

The application must be in English and include a curriculum vitae, a complete list of publications, information about research activities, a statement of interest and future research plans.