

## Conferencia: Química orgánica y de polímeros para la síntesis de compuestos con aplicaciones biológicas

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**12:15 h**

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I have recently joined the University of Birmingham as a Birmingham Fellow working on Biomedical Applications of Nanotechnology. After graduating from the University of Santiago de Compostela in Spain, where I did my PhD on natural product synthesis, my research has moved to the chemistry-biology interface and the development of novel polymeric materials for nanomedicine. The multidisciplinary nature of my research has been refined through different post-doctoral positions, both in the UK (Durham and Nottingham) and Spain (Santiago de Compostela) where I had the chance to develop polymeric materials for biocatalysis, cell recognition and adhesion, MRI, synthetic biology and novel antibiotics.

The main focus of our current research is the development of novel polymeric nanomaterials that can sense, image and treat microbial infections. In order to do so, 3 main areas are being explored in parallel:

- Stimuli-responsive nanomaterials as imaging probes to detect microbial pathogens.
- Nanomaterials to interfere with 'non-conventional' targets of bacterial infection such as adhesion, quorum sensing, iron scavenging or bacterial membranes.
- Functional nanomaterials for the delivery of conventional antibiotics in a targeted way.

In combination these 3 areas work towards the development of "multivalent" functional antibiotics that can target more than one aspect of bacterial infection. The materials prepared this way will be able to mimic pathogens in their ability to overcome host defences, compromising this way the ability of bacteria to adapt and minimising the development of antibiotic resistance.

In this presentation "Química orgánica y de polímeros para la síntesis de compuestos con aplicaciones biológicas" I will give a brief summary of my research career and describe how synthetic chemistry, computational science and biological assays can be combined to understand how novel materials interact with biological systems.

### **Selected Publications**

1. Lui, L. T. *et al.* Bacteria clustering by polymers induces the expression of quorum-sensing-controlled phenotypes. *Nat. Chem.* **5**, 1058–1065 (2013).
2. Yaşayan, G. *et al.* Well-defined polymeric vesicles with high stability and modulation of cell uptake by a simple coating protocol. *Polym. Chem.* **3**, 2596–2604 (2012).
3. Xue, X. *et al.* Synthetic Polymers for Simultaneous Bacterial Sequestration and Quorum Sense Interference. *Angew. Chem., Int. Ed.* **50**, 9852–9856 (2011).
4. Fernandez-Trillo, F. *et al.* Dendritic MRI Contrast Agents: An Efficient Prelabeling Approach Based on CuAAC. *Biomacromolecules* **12**, 2902–2907 (2011).
5. Fernandez-Trillo, F. *et al.* Reversible Immobilization onto PEG-based Emulsion-templated Porous Polymers by Co-assembly of Stimuli Responsive Polymers. *Adv. Mater.* **21**, 55–59 (2009).
6. Fernandez-Trillo, F. *et al.* Fine-tuning the transition temperature of a stimuli-responsive polymer by a simple blending procedure. *Chem. Commun.* 2230–2232 (2008).