Newcastle University PhD Studentship award

Title
Layer-by-Layer quantum dots-based nanotheranostics: combined drug delivery and breast cancer imaging

Value of award
Full UK/EU fees (eligibility criteria applies to EU students) and annual living allowance of £14,777 (at the 2018/19 UKRI rate)

Number of awards
1

Start date and duration
September 2019 for 3.5 years

Application closing date
31st January 2019

Overview
Breast cancer is the major cancer mortality in females. Over the last decade, nanocarrier-mediated drug delivery systems have emerged as a powerful class for antitumour agents. However to enhance their therapeutic effects and reduce the related side effects, active drug molecules should selectively accumulate in the tumour area for a prolonged period with high controllability. Today's promising solutions involve integration between drug delivery and diagnostic imaging in order to develop, design and improve therapeutic clinical protocols. This combination has given the basic contribution to theranostic field.
One of the most popular theranostic agents are the Quantum Dots (QDs), semiconductor inorganic nanoparticles with many advantages as controlled size, broad absorption spectrum, high stability, high fluorescence yield which make them very attractive tools for medical applications. Common QDs available in the market are cadmium (Cd) based and their toxicity in biological systems has been debated over the decade. Alternative approach consists into carbon quantum dots (CQDs), that are mean to be greener safer in medicine and biology, characterised by superb solubility, strong and stable photoluminescence, high specific surface area and tuneable bandgap.
The aim of this project is to develop an alternative approach for the design and manufacturing of drugs systemic co-delivery systems, to enhance the efficiency of the standard poor soluble drugs applied in breast cancer therapy. The key idea is to functionalise at the nanoscale carbon QDs by Layer-by-Layer assembly (LbL) for targeted parenteral drugs delivery and imaging.
In this project, LbL- assembly would bring several advantages: (1) the nano-coating will embed the anticancer drugs and provide a controlled release in the time, and (2) the deposition of the negative-charged nanolayer will enhance specific tumour targeting via cellular internalization, while the deposition of the positive-charged nanolayer will help to decrease the nonselective internalization by normal noncancerous cells during system circulation.

Sponsor
Engineering and Physical Sciences Research Council

Name of supervisor(s)

Dr Anh Phan and Dr Piergiorgio Gentile, School of Engineering.

Eligibility Criteria

The studentship is available to UK/EU citizens with a first-class or 2.1 degree, or a combination of qualifications and/or experience equivalent to that level. Ideally, students should have a BSc or MSc/MEng degree in chemical, mechanical or biomedical engineering, or a suitable quantitative field.

How to apply

You must apply through the University's online postgraduate application system. To do this please 'Create a new account'.

The following information will help us to process your application. You will need to:

- Insert the programme code **8030F** in the programme of study section
- Select **PhD CEAM (FT)** as the programme of study
- Insert the studentship code **ENG036** in the studentship/partnership reference field
- Attach a covering letter and CV. The covering letter must state the title of the studentship, quote reference code **ENG036** and state how your interests and experience relate to the project
- Attach degree transcripts and certificates and, if English is not your first language, a copy of your English language qualifications

Contact

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