



School of Pharmacy PhD Projects 2014

Project Title Enhanced radiosensitivity of prostate cancer using targeted gold nanoparticles

Supervisors Dr Jonathan Coulter, Dr Helen McCarthy

Description External beam radiotherapy is a primary treatment modality for localised prostate cancer. Pre-clinical evaluation of high atomic number materials such as gold nanoparticles has shown significant potential in relation to increasing the sensitivity of tumour cells to ionising radiation. However, to date, the most encouraging data has been obtained from *in vitro* models where cell lines are directly exposed to non-targeted preparations.

Early *in vivo* experiments have relied exclusively upon the leaky nature of the tumor vasculature and the poorly drained lymphatic system for passive accumulation of the nanoparticles, in a process known as the enhanced permeation and retention effect. This strategy alone is unlikely to result in sufficient tumour accumulation of the nanoparticles to achieve significant radiosensitisation.

During this project, the PhD student will generate a gold nanoparticle designed to actively target prostate tumours. A significant body of evidence has shown that the sigma receptor is highly over-expressed on the surface of prostate tumors. Using anisamide (a potent ligand of the sigma receptor) bound to the surface of a stabilised GNP; we will initially investigate the potential of this gold nanoparticle preparation to sensitise prostate cancer cells *in vitro*. Most importantly we will establish the ability of anisamide functionalised gold nanoparticles to specifically target and sensitise prostate tumours using *in vivo* techniques.

Start Date 1 October 2014

Keywords Gold nanoparticles, radiation, active targeting, prostate cancer

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How to Apply

Postgraduate applications should be made using Queen's Online:

<http://go.qub.ac.uk/pgapply>

Please note that there are two application processes: one for admission to the university and another for postgraduate awards.

Further Information

Additional information for prospective postgraduate students can be found on the School of Pharmacy website:

<http://www.qub.ac.uk/pha>

and the Queen's Postgraduate website:

<http://www.qub.ac.uk/home/ProspectiveStudents/PostgraduateStudents/>