



Development of a cancer-on-a-chip device to study the role of insulin-like growth factor binding protein-6 and immune cell tumour infiltration in breast cancer

Theme: Infection, Immunity & Repair

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In this interdisciplinary PhD project, we will develop a cancer-on-a chip microfluidic device to study interactions between tumour cells and the microenvironment. The aim is to maximise the output from tissue samples, integrate biosensors and develop assays for monitoring the recruitment of circulating immune cells. The microfluidic device will be combined with in vitro and in vivo models as well as patient samples for systematic investigation of the mechanistic role IGFBP6 has in breast cancer.

Breast cancer is one of the most abundant cancers worldwide. In 20% of patients, tumour cells will escape to other parts of the body and lead to secondary cancers (metastases), which correlates with poor prognosis and has limited treatment options. Tumour progression involves crosstalk between tumour cells and the tumour microenvironment (fibroblasts, immune cells and extracellular matrix). Studying cancer cells in 2D cultures often does not represent the complex microenvironment and there is a necessity to develop better models for preclinical testing and understanding tumour progression. 3D cultures and microfluidic devices have been shown to improve physiological relevance of cancer models and better predict therapeutic response.

The PhD studentship will provide interdisciplinary cutting-edge training. One part will include training in designing, simulating and manufacturing a microfluidic cancer-on-a-chip device in the Centre for Biosensors, Bioelectronics & Biodevices (C3Bio) at the University of Bath (Dr Estrela, Dr Moschou). The second part focuses on the study of the role of IGFBP6 in breast cancer and the use of the device. The student will receive training in cancer cell biology, a range of molecular & cell biology techniques, including 2D & 3D co-cultures, immune functions at the cellular level, and techniques, such as flow cytometry and patient sample analysis (Dr Jungwirth, Dr Turner, Bath). IGF/IGFBP signalling analysis will be supported by Dr Perks (Bristol). Prof Smalley (Cardiff) will provide in vivo sample preparation & organoid culture training.

IMPORTANT: In order to apply for this project, you should apply using the DTP's online application form: <https://cardiff.onlinesurveys.ac.uk/gw4-biomed-mrc-doctoral-training-partnership-student-appl>

You do NOT need to apply to the University of Bath at this stage – only those applicants who are successful in obtaining an offer of funding from the DTP will be required to submit an application to study at Bath.

More information on the application process may be found here:
<https://www.gw4biomed.ac.uk/doctoral-students/>

APPLICATIONS CLOSE AT 17:00 ON 25 NOVEMBER 2019.