**Doctoral Training Alliance (DTA) Applied Biosciences for Health studentships starting in the academic year 2017/18**

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| **Director of Studies:** Dr David Qualtrough  For an informal discussion about the studentship, please email [david.qualtrough@uwe.ac.uk](mailto:david.qualtrough@uwe.ac.uk) |
| **Other members of the proposed supervisory team:**  Prof Norman Ratcliffe, Dr Robin Thornand Dr Ben de Lacy Costello. |
| **Title:**  Microbial impact on colorectal tumour progression: potential for early bowel cancer detection. |
| **Project Abstract:**  This is an interdisciplinary PhD project to investigate the role of the microbiome in the malignant progression of colorectal cancer, and its potential as a mechanism for early disease detection.  Colorectal cancer (CRC) is the second highest cause of cancer deaths in the UK and results in over 600,000 deaths globally per annum. These fatalities are potentially avoidable through early detection. The overall five-year survival is around 50% with this figure being inextricably linked to the advanced stage at which patients present at the clinic. Five year survival rates are >80% for an early stage tumour, decreasing to <1% for late stage disease, emphasising the need for early detection as well as increasing our understanding of the progression towards malignancy.  The major risk factor for CRC is diet, with studies showing consumption of red and processed meat increasing risk. Although the precise mechanism remains poorly understood. Increasing evidence suggests a role for the highly complex gut microbiota in disease progression. An area, due in part to its complexity, that has been long overlooked by cancer researchers, requiring a multi-disciplinary approach to understand its role in tumorigenesis. Recent evidence suggests that benign colorectal tumours become preferentially colonised with specific microbial consortia which may signpost the presence of tumours, but also influence tumour cell behaviour.  The main aim of the proposed study is to determine the impact of this shifting colonic microbiome on tumour progression itself. Furthermore, the approaches taken will address the potential of this biological change to offer up a mechanism for early detection, thereby allowing curative treatment at a much earlier stage.  The proposed PhD project has two key objectives:   1. To study the influence of specific microorganisms and their metabolites, on benign tumour development and malignant progression, using *in vitro* cell culture models. 2. To investigate the use of microbial metabolites for early detection of colorectal tumours, by assessing volatile, low molecular weight metabolites arising from models developed in objective 1. |