

Project title: Retrospective Clinical Validation of Radiotherapy Recurrence and Treatment Predictive Biomarkers in Muscle-invasive Bladder Cancers using Large Clinical Trial Samples

Project Summary: Bladder cancer has become the 10th most commonly diagnosed cancer worldwide with more than 500,000 patients diagnosed each year. Muscle-invasive bladder cancer (MIBC) is an aggressive phenotype of bladder cancer that displays poor prognosis. The current treatment landscape for localised MIBC involves radical cystectomy, despite its treatment associated mortality and impact on quality of life. Radical radiotherapy is a NICE approved bladder sparing alternative to cystectomy. Overall radiotherapy achieves similar survival to cystectomy but there has been hesitation over its use due to a concern some patients may fail to respond to radiotherapy and would have benefited from primary cystectomy. Therefore, there is an urgent need to identify predictive and prognostic biomarkers to guide the choice of treatment strategies (between surgery and radiotherapy) for bladder cancer patients. Such a biomarker would reduce the risks of receiving radiotherapy whilst expanding the accessibility of bladder sparing treatment whilst maintaining or improving cure rates.

Prior collaborative work between Huddart and Sadanandam laboratories has identified a molecular subtyping classifier “NMF71”, which can predict recurrence (prognosis) and potentially personalised treatment to radical radiotherapy. This initial work was analysed using 44 patient samples that were part of the CoMB clinical trial cohort. Results illustrate that patients belonging to the NMF71 subtype-4 (basal phenotype) were more likely to respond to radiotherapy in MIBC. However, these results must be validated in a larger cohort to confirm the prognostic value of the biomarkers generated. In collaboration with Clinical Trials and Statistics Unit (CTSU), ICR, we have identified clinical trial cohorts RAIDER, CoMB (additional patients), and BC2001 which can be used to validate the NMF71 biomarkers. Moreover, we will collaborate with Dr Melody Ni from Imperial College to perform Health Economics related to this project for implementation in the clinic.

The clinical PhD student will

1. Collaborate with experienced clinical researchers.
2. Learn cutting-edge techniques for identifying predictive and prognostic biomarkers that guide treatment decisions.
3. Develop proficiency in bioinformatics and statistical analysis using larger patient cohorts.

The candidate will contribute to advancing bladder cancer treatment options and make a meaningful impact on patient care.

Supervisory Team: Dr Anguraj Sadanandam, Dr Melody Ni, Prof Robert Huddart, Prof Emma Hall, Dr Maggie Cheang

Clinical Specialities: N/A