Understanding prostate cancer prognosis and disease progression: interplay between lifestyle, anti-cancer immune competency, metabolism, and genetics

Theme: Infection, Immunity & Repair
Reference: MRC19IIRBa Campbell

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BACKGROUND

In the UK, there are more than 46,000 new diagnoses of prostate cancer each year and around 11,300 men die annually as a result of the disease. Whilst new therapies continue to improve clinical care, there is now great emphasis being placed on the role of lifestyle in predicting and modifying disease outcomes. Strong evidence has emerged showing that regular exercise improves quality of life, reduces fatigue and reduces incontinence in men with prostate cancer. Moreover, evidence from a range of cancers shows that regular exercise exerts anti-tumour effects, which may improve cancer-specific outcomes during therapy, and may prolong overall survival. To date, the mechanisms underpinning these anti-tumour effects are not well understood. There is growing evidence that exercise specifically enhances anti-cancer immunity, whereas other indirect mechanisms have also been proposed, including reduced low-grade inflammation and superior metabolic regulation in physically active persons. As such, analyses of how regular exercise affects mediators of tumour growth will lead to a better understanding of how lifestyle influences prostate cancer prognosis.

PROJECT

This highly interdisciplinary project will comprehensively assess the impact of regular exercise on the interplay between cancer-specific immunity and cancer-related outcomes in men with prostate cancer. Specifically, the project will assess the phenotypic and functional competency of the immune system in men enrolled onto ongoing exercise intervention studies at the University of Bristol. These existing studies will be extended by this project via advanced immunological measurements conducted at the University of Bath. The trials at Bristol include: Pre-EMpT (Prostate – Exercise and Metformin Trial, n=183) and CPET (CardioPulmonary Exercise testing in prostate cancer Trial, n=40). This PhD project will also assess the interplay between the immune system and other factors that mediate tumour growth, including inflammation (by targeted proteomics), metabolic factors (by metabolomics) and gene expression (by epigenetics) using advanced quantitative methods (bioinformatics). Accordingly, this research will provide advanced training in cutting-edge laboratory and population science techniques. TRAINING: This PhD studentship will provide training at 4 levels of scientific investigation: (i) analysis of disease processes at the molecular level, such as using targeted proteomics of inflammatory variables implicated in tumour growth and metastasis (Bath); (ii) phenotypic and functional analysis of anti-cancer immunity at the cellular level, such as by flow cytometry (Bath); (iii) evaluation of physical activity and exercise interventions at a broader whole-body level, such as clinical outcomes in patients with prostate cancer (Bristol); (iv) combinatorial bioinformatic analyses of interplay between immune parameters and metabolomics, proteomics, epigenetics and clinical data (Bristol).

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-dtp-student-2019

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

APPLICATIONS OPEN ON 24 SEPTEMBER AND CLOSE ON 23 NOVEMBER 2018.

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 form the DTP will be required to submit an application to study at Bath.