

Project Details	
Project Code	MRC21IIRBa Turner
Title	Examining the influence of inflammation and lifestyle on anti-tumour immunity in men with prostate cancer
Research Theme	Infection, Immunity & Repair
Summary	Strong anti-tumour immunity is thought to protect people from developing cancer and limit disease progression in patients. In a randomised clinical trial, and with other mechanistic work, this studentship will use cutting-edge immunological techniques, to examine how inflammation and lifestyle factors, including exercise, influence immune-competency in healthy people and men with prostate cancer.
Description	<p>BACKGROUND: In the UK, the number of men with, and who die of, prostate cancer has been rising. There are now 48,487 new prostate cancers diagnosed each year and 11,714 men die annually from the disease. Although new therapies are improving clinical outcomes, increasing emphasis is being placed on understanding how lifestyle factors influence disease pathogenesis. Strong evidence shows that regular exercise for example, improves quality of life, reduces fatigue and limits incontinence in men with prostate cancer. Moreover, evidence from a range of cancers shows that regular exercise exerts anti-tumour effects, which may reduce the risk of developing cancer in the first place and may improve outcomes (such as cancer-related progression and death) in patients. The mechanisms by which lifestyle influences anti-tumour immunity are not well understood. However, it is likely that inflammation has a central role, interacting with one set of mechanisms that are stimulated by single exercise bouts, and also interacting with different mechanisms brought about by long-term regular exercise. For example, the short-term effects of exercise include neuroendocrine activation and transient changes to immune cell trafficking, whereas long-term regular exercise impacts overall immune profiles and immune-competency.</p> <p>PROJECT: This interdisciplinary research has two work packages. In the first work package, serum from 110 men with prostate cancer randomised into a long-term (6-month) exercise intervention trial will enable systemic pro-inflammatory processes to be investigated in relation to exercise and disease progression (The Pre-EMpT randomised clinical trial; BRISTOL). In addition, paired pre- and post-intervention samples of immune cells collected in a sub-group of 20-30 men will enable exercise-related changes in cellular immune-competency to be explored. The second work package will recruit healthy men and patients with prostate cancer on a “watch and wait” treatment regimen to take part in a mechanistic single-bout exercise study examining anti-tumour immunity (BATH). All men will be monitored over 12 months to examine immune function, and in those patients with prostate cancer, disease progression assessed. In both work packages, cutting-edge laboratory techniques (BATH) will be used in parallel with advanced statistical methods and bioinformatics (BRISTOL).</p> <p>TRAINING: This studentship will provide thorough training at four levels of scientific investigation: (1) analysis of physiological processes and disease at the molecular level, such as assessing inflammatory factors implicated in tumour growth; (2) phenotypic and functional analysis of immunity at the cellular level with flow cytometry</p>

	and cell culture techniques; (3) measurements at the whole-body level, such as assessing cardiorespiratory fitness and body composition or monitoring and prescribing exercise; (4) statistical and bioinformatics assessment of all study data. Important generic research skills will also be developed (e.g. scientific writing, presentation skills, wider dissemination of research etc).
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