COOKSON William EOI 2022 – Imperial

Project title: Predictors of Lung Cancer response to immunotherapy

Project Summary:

Non-Small Cell Lung Cancer (NSCLC) is the principal cause of global cancer deaths. It is frequently a consequence of cigarette smoking. NSCLC is often diagnosed late in the clinical course, contributing to the poor outcomes. Although It is resistant to standard chemotherapies, immunotherapies show great promise. The identification of factors that determine response to specific immunotherapies is a research priority, as it will allow stratification of patients into appropriate therapeutic modalities, as well as discovering novel pathways. Additionally, it is of importance to predict which patients will have adverse responses to immune modulation. Known (but incompletely understood) factors that influence immune responses include specific mutations, overall mutational burden, epigenetic dysregulation, and tumour surface expression of immune receptors such as PD1-L. Even less well understood but possibly of equal importance is the host microbiome, which has an enormous potential to drive carcinogenesis, to modulate local and distant immunity, and to modify the adsorption and metabolism of therapeutic agents. Host genetic factors such as HLA type are of great significance in auto-immune diseases but their role in adverse or positive outcomes has not been investigated in immunotherapy. The proposed study will build on established recruitment of patients entering the diagnostic process for thoracic cancers in the Imperial College Healthcare Trust and its associated hospitals (including the Royal Marsden). The student will select a central topic of their interest within a co-ordinated investigative structure that includes the immune profiling of peripheral blood lymphocytes and tumour tissue, genomic studies of tumour tissue, and community and meta-transcriptomic studies of the airway and bowel microbiome. Engineering and Physical Sciences will be engaged as positive findings emerge from the study, with the primary aim of developing point-of care platforms for early diagnosis

Supervisory Team:
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- Prof. Alan Melcher, Translational Immunology**,** Institute of Cancer Research
- Prof. Miriam Moffatt**,** National Heart and Lung Institute, Imperial College London
- Prof. Andrew Nicholson**,** Lung Pathologist, Imperial College London

Clinical Specialities: Oncolcogy, Respiratory Medicine, Pathology