Project title: **"Mapping the extracellular landscapes of DNA and RNA in the blood of cancer patients with liquid biopsy"**

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Research Group: **CRUK National Biomarker Centre**

Liquid biopsy, and cell-free DNA (cfDNA) in particular, provides the opportunity to non-invasively and frequently analyse the cancer genome. Genomic and epigenomic alterations from the tumour can be retrieved from cfDNA sequencing. However, current liquid biopsy approaches are also biased to cfDNA molecules released by dying cells, only representing a fraction of the cancer clones. Even if the representation of tumour heterogeneity in the blood has been analysed by cfDNA, this vision is limited to the clones subjected to cell-death and does not represent cells that are still alive. It is unclear to what extent nucleic acids are released within extracellular vesicles (EVs), and the additional information exhibited by cell-free RNA (cfRNA) alone or linked to EVs. It is also unclear how well changes in cell phenotypes could be retrieved using cfDNA compared to other circulating markers.

The aim of the project is to establish a better understanding of the extracellular landscape of circulating cfDNA and cfRNA and how they relate to cancer biology/heterogeneity using a complete liquid biopsy profiling. The successful candidate will work at the interface between cancer genomics, liquid biopsy, extracellular vesicles, multiomics, and will benefit from the world-class infrastructure and experience of the CRUK National Biomarker Centre, and in collaboration with clinicians from the Christie hospital to maximise its translational potential.

We are looking for a hard-working, focused, ambitious person to join our excellent, friendly and interactive team. Our laboratory makes use of a broad range of *in vitro*, *in vivo* and *in silico* techniques to develop the next generation of liquid biopsy. Our approach lies at the convergence between basic cancer biology, new sequencing and molecular approaches and computational methods. We would be particularly happy to receive applications from individuals with a strong academic track record and Masters-level and/or other laboratory research experience in genomics, cancer biology or bio-engineering.

This project would enable the successful candidate to work in the world-leading research environment of the CRUK National Biomarker Centre and CRUK Manchester Institute, whilst applying cutting-edge techniques to address a critical biological and clinical problem. Students would gain broad exposure to genomics, computational biology, and oncology. Upon completion, candidates would be well positioned to pursue a career in the fascinating and expanding field of liquid biopsy and multiomics.

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