Example Project Descriptions

Professor Bart Cornelissen, Improving Radiotherapy.

Late-stage prostate cancer remains challenging to treat, especially in cancer that has spread to other organs, and is resistant to testosterone removal therapy (castration). The large majority of prostate cancers display a protein on the cancer cells' surface called 'prostate-specific membrane antigen', or PSMA for short. Drugs have been developed that bind to the PSMA protein. These drugs have been attached to a radioactive isotope, lutetium-177 (177Lu). The radiolabelled drug binds to the tumour after injection into the blood, and irradiates the tumour from within. This therapy, called 177Lu-PSMA, is used increasingly worldwide, is becoming available in the UK. Contrary to standard radiotherapy, 177Lu-PSMA hits multiple tumour sites, and metastases, at the same time. However, little attention is paid to the individual's tumour, beyond the amount of 177Lu-PSMA uptake. Furthermore, individual (radio)biological responses are not considered. We previously developed an imaging agent that allows the measurement of this biological response to radiotherapy, by visualising and quantifying how much DNA damage is caused. Here, we will: (1) visualise the amount of DNA damage in prostate cancers in mice, as a measure of therapy success; (2) combine 177Lu-PSMA with drugs that will increase the amount of DNA damage, and improve cure rates.

This project has now been funded by PCRC. If you would like to find out more, please visit https://www.prostate-cancer-research.org.uk/project/improving-radiotherapy/

Dr Jorge De la Rosa, PTEN: Finding the off switch.

Half of patients with advanced prostate cancer have an alteration ("mutation") of a gene called PTEN in their tumours. Genes such as PTEN prevent healthy cells becoming cancerous, and are known as "tumour suppressors". However, when these genes are altered and do not work properly, cancers can develop. In this project we will use new genetic tools to study the many tumour suppressors that are found altered in human prostate cancer. We aim to understand why and how combined defects in PTEN and other tumour suppressors cause prostate tumours to spread throughout the body ("metastasize"). To do this we will alter in the mouse's prostate the mouse PTEN gene and many other tumour suppressors simultaneously. Some of these combinations will lead to prostate tumours that spread. We will study these metastatic tumours to identify their faulty genes. We will also generate human prostate cells with the same combinations of mutations to confirm their relevance to human disease. We will search for the Achilles' heel of these spreading cancers by identifying genes that are needed for their survival, but are not required by normal cells. Our work will reveal novel genetic causes of metastatic prostate cancer and new therapeutic opportunities.

This project has now been funded by PCRC. If you would like to find out more, please visit https://www.prostate-cancer-research.org.uk/project/pten-finding-the-off-switch/