

IMMUNOTHERAPY

The Cancer Research UK Southampton Centre has an international reputation for research into immunotherapy, which involves using the body's own immune system to fight cancer. Research in Southampton laid the groundwork for the life-saving blood cancer drug Rituximab, and our scientists continue to lead the field with new advances in cancer vaccines and antibody treatments.

Our immune system protects us from diseases, including cancer. Normally our immune system spots and destroys faulty cells but sometimes these cells can escape detection and develop into tumours. Immunotherapy is a relatively new form of treatment that re-awakens the immune system so it can fight cancer. Engaging the immune system in this way might have long-lasting benefits, if the immune system can 'remember' the cancer and stop it coming back. Some forms of immunotherapy also have fewer side-effects for the patient, meaning treatments can be kinder than chemotherapy and radiotherapy.

SOME OF OUR IMMUNOTHERAPY RESEARCHERS IN SOUTHAMPTON

Our immune system is crucial in protecting us from bacteria, viruses and even cancer. **Professor Tim Elliott** and his team are trying to understand how the immune system decides which targets to attack and which to ignore. He's focussing on two important molecules which are key players in this process and influence whether our immune system kicks into action. This research could shed light on why cancer cells aren't dealt with in some cases, allowing the disease to develop. This could also mean new targets are found for more anti-cancer therapies.

Dr Edd James has recently been awarded a Drug Discovery grant from Cancer Research UK to try and develop new immunotherapy treatments. His work focuses on killer T-cells, which can seek out and destroy cancer cells, but only if they receive the correct signals from the tumour. Dr James' latest research looks at a molecule called ERAP1, which alters the signals the cancer cells give out, allowing them to "hide" from the immune system. He hopes to develop new therapies which can change or inhibit this molecule, thereby re-awakening the immune system so it can destroy the cancer cells.

Antibodies are natural molecules in our immune system which work by locking onto their targets and neutralising them or earmarking them for destruction by immune cells. They can be cleverly altered in the lab so that they specifically seek out cancer cells. **The Southampton Antibody and Vaccine Group** aims to make these antibodies even more effective, so they last longer in the body and stick better to cancer cells. Harnessing the power of our immune system to fight cancer could have a big impact on improving survival.

Professor **Christian Ottensmeier** is an expert in cancer immunotherapy. He and his team are designing and developing new ways to train the immune system to seek and destroy cancer cells. Professor Ottensmeier is leading several clinical trials to test these new treatments in cancers including head and neck and lung cancer.

IMMUNOTHERAPY CLINICAL TRIALS IN SOUTHAMPTON

Cancer Research UK funds the Southampton Clinical Trials Unit, an expert team of mathematicians, trial co-ordinators and data specialists who work closely with researchers to design, run and analyse large clinical trials. The Clinical Trials Unit take advice from doctors and patient representatives when taking on new projects and focus on treatments with the most potential to make a difference to people living with cancer.

Many of the trials being run out of Southampton involve new immunotherapy treatments, and below are a few examples of trials that are just starting:

CONFIRM - This trial will see whether the immunotherapy drug Nivolumab, which has already been successful in treating advanced melanoma and kidney cancers, can help boost the body's immune system to fight mesothelioma, a hard-to-treat cancer often caused by exposure to asbestos.

POLARISE - This trial will test a combination of immunotherapy treatments in patients with metastatic prostate cancer – where the cancer has spread, usually to the bones, lymph nodes, lungs or liver.

ACCEPT – **Dr Andy Davies** has recently been awarded a late phase clinical trial award from Cancer Research UK to run this study, which looks at using a combination of immunotherapy drugs to treat patients with large B-cell lymphomas.

RiVa – This trial, led by lymphoma clinician Dr Sean Lim, is looking at whether combining two different immunotherapy treatments – one to increase the number of immune cells and one to enhance their ability to destroy cancer cells – can improve treatment options and outcomes for lymphoma patients. Dr Lim has also just been awarded an Advanced Clinician Scientist Fellowship from Cancer Research UK to expand this work into solid tumour cancers.

THE CENTRE FOR CANCER IMMUNOLOGY

Southampton will soon be home to the UK's first dedicated cancer immunotherapy research facility. The Centre for Cancer Immunology (CCI) is a University of Southampton building based on the Southampton General Hospital site, right next to the CRUK Southampton Centre. It will bring together immunotherapy researchers from the university, doctors and clinicians from the hospital, and experts in clinical trials to share their knowledge in this exciting and evolving field of cancer research.

The CCI will open in late 2017 and will house many Cancer Research UK-funded scientists and clinicians, as well as the CRUK Southampton Clinical Trials Unit.