



**The Cancer
Research Institute**

www.cancerresearch.org

 Scientia



Founded in 1953, the Cancer Research Institute (CRI) is the world's first non-profit organisation dedicated exclusively to harnessing the power of the immune system to defeat cancer. This important branch of research has led to a new class of cancer treatments known as cancer immunotherapy, believed to be the most promising new approach in the fight against cancer. These treatments strengthen and sustain our immune system's natural ability to track down and kill cancer cells, wherever they are in the body. The Cancer Research Institute supports cancer immunotherapy research all over the world, through a variety of different means, from funding academic research projects to accelerating clinical studies by creating partnerships across industry and academia, and encouraging patients to enrol in clinical trials of new immunotherapies. Here, we speak to Dr Jill O'Donnell-Tormey, chief executive officer of CRI, who tells us all about the organisation and what the future holds for this new approach to cancer therapy.



To start, please give us a brief introduction to the Cancer Research Institute (CRI), and tell us a little about its history.

The Cancer Research Institute (CRI) is the world's first non-profit organisation dedicated exclusively to harnessing the immune system's power to conquer all forms of cancer. Established in 1953, CRI has supported the laboratory and clinical research of more than 3,000 scientists at top academic institutions around the world, whose work has enabled the development a new class of immune system-based cancer treatments called immunotherapy. Considered the most important breakthrough in cancer treatment today, immunotherapy has already transformed the treatment of some cancers, and promises ultimately to revolutionise the treatment of all cancers.

Why is harnessing the immune system's power the best strategy to adopt in the fight against cancer?

Conventional treatments like chemotherapy and radiation have reached their maturity in terms of effectiveness. New treatments for cancer are urgently needed. Scientists funded by the Cancer Research Institute have demonstrated that the immune system is capable of seeing and eliminating cancer, and that it is possible to intervene therapeutically in patients whose immune systems are no longer able to keep cancer under control. Immunotherapy offers significant advantages over conventional treatments. Rather than directly targeting tumours, immunotherapy treats a patient's immune system, 'educating' it to identify cancer targets, 'empowering' it to act against

cancer unimpeded, or 'reinforcing' it with boosted numbers of tumour-targeting immune cells. As a result, the dynamic and complex immune system is better equipped to keep pace with cancer, not only during treatment, but also long after. Early clinical studies have also indicated that immunotherapy can work well in combination with conventional treatments, enhancing the overall benefit to patients.

Describe some of the many ways that CRI promotes and supports cancer immunotherapy research?

The Cancer Research Institute supports scientific research along the entire spectrum of discovery. CRI funds young postdoctoral fellows working under the tutelage of world-leading immunologists, facilitates translational research that brings insights from the clinic back to the laboratory with the goal of improving immunotherapy's effectiveness, and accelerates clinical research through partnerships across industry and academia that power innovative drug combination studies. CRI convenes scientists from throughout the field at annual meetings and workshops. And CRI encourages patients to enrol in clinical trials of promising immunotherapies – an essential step in the development of new treatments.

What are the main types of cancer immunotherapy that are currently available to patients, and what are the most promising treatments currently under development?

Currently the type of immunotherapy that has generated the most

interest and has seen the most success in treating patients is called checkpoint blockade. Antibodies like those that naturally play a role in the immune system are engineered in the lab to interfere with specific pathways known to inhibit the immune system. The most prevalent targeted pathways include CTLA-4 and PD-1/PD-L1. By blocking these pathways, checkpoint blockade therapy 'takes the brakes off the immune system', neutralising the signals that stop immune cells from attacking cancer. These treatments have proven effective in melanoma, lung cancer, kidney cancer, head and neck cancer and others. Another promising immunotherapy is CAR T cell therapy. These T cells are taken from a cancer patient, engineered to express a chimeric antigen receptor (hence 'CAR') targeting a specific protein found on cancer cells, grown to exponential numbers, and then given back to the patient. This approach has been highly successful in treating leukaemia, and is now being tested in other types of cancer. Personalised therapeutic cancer vaccines that target patient-specific mutations are an exciting area of research today that could offer yet another immunotherapy approach in the near future. Finally, older generations of antibody therapies have been available to patients since the late 1990s, including Herceptin for breast cancer and Rituxan for lymphoma, for example.

Where does CRI receive its funding from?

The Cancer Research Institute relies on philanthropic support from individuals, corporations, and foundations. CRI also participates in combined campaigns through the Community Health Charities. CRI does not receive funding from the government, and raises its operating budget each year.

What are the main routes by which cancer researchers can avail of CRI grants and fellowships and how does CRI ensure that its funding is best allocated?

For our open application programs, such as the CRI Irvington Postdoctoral Fellowship Program or CRI's Clinic and Laboratory Integration Program, scientists may apply directly to CRI for funding for projects within the field of tumour immunology. Application instructions and forms are available at www.cancerresearch.org. All funding decisions are guided by a Scientific Advisory Council composed of world-leading immunologists and tumour immunologists, and including three Nobel Prize winners and 26 members of the National Academy of Sciences. Scientists seeking funding for clinical research can apply to become members of CRI's global clinical trials network.

Who are your main collaborators, and what countries are involved in CRI funded research?

CRI's longest standing partner is the Ludwig Institute for Cancer Research, with whom CRI co-manages its global CVC Clinical Trials Network. This international network of more than 60 leading clinicians with expertise in immunotherapy clinical trials powers CRI's innovative clinical research program, the Clinical Accelerator. Both the members of this network as well as the larger community of scientists funded by the Cancer Research Institute span the globe, ranging from Japan and Australia to countries in Europe and North America. CRI also partners with disease-specific cancer research and patient advocacy organisations to provide CRI's expertise in immunotherapy for the benefit of different cancer patient communities. Such partnerships may result in clinical trials that are co-funded by partnering organisations, or educational programming such as webinars, patient summits, and

literature designed to provide patients with a basic understanding of immunotherapy as a springboard for further discussion with their doctors.

What are the biggest challenges facing cancer immunotherapy today, and how is CRI working to overcome these challenges?

A key hurdle in the field is the difficulty scientists have accessing tissue samples from patient biopsies pre-, during, and post-treatment with immunotherapy. These precious tissue samples are important because they allow scientists to see what is happening (or not happening) inside the tumour immunologically. Such observations would permit scientists to better identify the causes of immunotherapy success or failure in individual patients and could lead to improved treatment strategies overall. CRI's Clinic and Laboratory Integration Program and Clinical Accelerator facilitate this by providing funding for tissue acquisition and immunological analysis. A second challenge is the lack of awareness of cancer immunotherapy options for patients. To address this, CRI has developed theanswerstocancer.org, a website for patients and caregivers who are seeking information about cancer immunotherapy and who wish to connect with other people who have received immunotherapy treatment. The site has also proven useful to healthcare professionals such as community oncologists and oncology nurses whose patients have expressed interest in immunotherapy treatment.

Finally, can you please share your thoughts on the future of cancer immunotherapy, and the role of CRI in that future?

There has been significant progress recently in the successful application of immunotherapy to treat some cancers. This is only the beginning, however, and more research is needed if we are to realise immunotherapy's full potential. Nevertheless, immunotherapy is well on the way to becoming a backbone of treatment for many types of cancer, and we at the Cancer Research Institute believe it one day will become the standard of care for most if not all cancers. In this not-too-distant future, cancer will be understood to be an immunological problem. And while chemotherapy, radiation, and surgery will continue to have a place in cancer treatment, it is likely these will be used in combination with immunotherapy treatment. The Cancer Research Institute will continue to lead the way in cutting-edge laboratory and clinical research, breaking down research silos, encouraging collaboration, and solving for the complex challenges that are certain to arise. Throughout, CRI will continue to seed the field with the brightest scientific minds, ensuring a steady stream of talent and inquiry to drive future innovation in the field of cancer immunotherapy.



www.cancerresearch.org