TUMOUR VACCINOLOGY

Create novel tumour vaccinology approaches that establish or enhance successful immune responses beyond what is revealed by current checkpoint therapy

CONTEXT

Recent advances in our understanding of anti-tumour immunity and the subsequent development of immunotherapies have revolutionised the treatment of some cancer types. In particular, the use of immune checkpoint therapy to enhance anti-tumour responses by targeting major immune-suppressive mechanisms has shown striking results. Impressive clinical responses have been demonstrated in patients receiving checkpoint therapies, and as a result a number of agents have been approved for clinical use. Some patients receiving checkpoint therapies have gone on to exhibit long-term remission, indicating a successful and sustained host immune response against the cancer. However, this clinical outcome is currently only observed in a subset of patients receiving checkpoint therapies, and has not been observed in all cancer types.

We know that the interactions between cancer and the host immune system are dynamic and regulated by a complex network of biological pathways. The generation of novel insights into these interactions has the potential to elucidate novel vaccinology approaches that can either establish and/or enhance successful anti-tumour immune responses beyond those observed with current therapies.

OPPORTUNITIES AND BARRIERS

Despite the huge amount of excitement and interest in the field, there remains a number of gaps in our fundamental understanding of cancer immunology and the interactions between the immune system and the host, which if investigated, could potentially result in novel and unexpected ways to elucidate successful anti-tumour responses in patients. This is the essence of the Grand Challenge.

For example, outstanding questions that could be addressed in the context of a Grand Challenge include (but are not limited to):

- What are the 'best' antigens to establish a successful immune response?
- Can we predict, at an individual patient level, which antigens will be expressed and will elicit a successful immune response?
- How should antigens be delivered to provide the correct activation signals to T/B cells?

By addressing this ambitious challenge, we hope that teams will significantly advance our mechanistic understanding of the anti-tumour immune response and create genuinely novel approaches to vaccinology that pave the way for new therapeutic vaccines for the treatment of cancer. The Panel is particularly looking for a unique perspective on this challenge and would welcome applications from teams that can address it in novel and surprising ways.

VISION AND IMPACT

This Grand Challenge calls for new and unexpected approaches that delve into the biological pathways underpinning cancer immunology and provide insights into how successful and sustained immune responses can be established in cancer patients (potentially at an individual level), that go beyond those elicited by current checkpoint therapy. It is anticipated that this knowledge will result in ways to predict and enhance the anti-tumour response and therefore greatly increase the proportion of patients that benefit from treatment with immunotherapeutic agents.