

WHAT IS CANCER IMMUNOTHERAPY?

Immunotherapy is a form of treatment that uses parts of a patient's immune system to fight a disease, including cancer. This can be achieved in two main ways:

1. **By stimulating a patient's own immune system to work harder or smarter to attack cancer cells**
2. **By giving a patient 'immune system components' such as man-made immune system proteins**

This infographic summarises the main types of cancer immunotherapy, outlines the pro's and con's of this kind of treatment versus chemotherapy and radiotherapy, and highlights some recent immunotherapy success stories.

CURRENT TYPES OF IMMUNOTHERAPY

MONOCLONAL ANTIBODIES¹



Naked monoclonal antibodies³

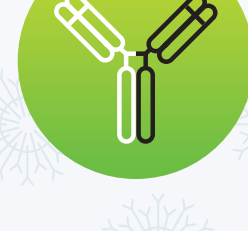
The most common cancer immunotherapy

Tell the immune system to attack cancer cells or block cancer growth

Conjugated monoclonal antibodies

Have a chemotherapy drug or radioactive particle attached to them

Attach directly to cancer cells



Bispecific monoclonal antibodies

Bind to cancer cells and activate immune cells simultaneously

Have a low effective dose

Help avoid resistance to treatment

IMMUNE CHECKPOINT MODULATORS²



PD-1 or PD-L1 inhibitors and CTLA-4 inhibitors

Target immune checkpoints on T cells

Boost the immune response by activating T-cells

The mAb, Ipilimumab, is the only FDA approved CTLA-4 inhibitor

CANCER VACCINES³



Traditional vaccines protect against oncoviruses

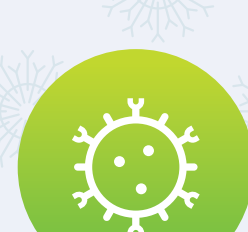
Tumour cell vaccines help provoke a stronger immune response

Antigen vaccines boost a patient's immune response and can be mass produced easily.

Dendritic cell vaccines help the body recognise cancer cells

DNA vaccines encode cancer antigens and other immunomodulatory molecules which manipulate the immune response.

ADOPTIVE CELL TRANSFER⁴



CAR T-cell therapy - Chimeric antigen receptors (CARs) are artificially added to the surface of T cells which helps them to attach to the surface of cancer cells.

TCR therapy - T cell receptors (TCRs) recognise tumour-specific proteins from the inside of cancer cells and are engineered to recognise a tumour-specific protein fragment/MHC combination.

GENERAL IMMUNOTHERAPIES



Cytokines - Molecules broadly expressed by immune cells which control the growth and activity of cells in the immune system.⁵

Colony stimulating factors - Boost the production of white blood cells in a patient's bone marrow.⁶

+ PROS CONS -



Highly Specific

More expensive than chemotherapy



Fewer side effects

Most exciting immunotherapies are not yet in clinic



Powerful, dramatic cures in certain cancers

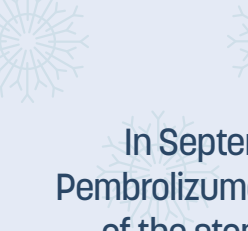
Cancers can still become resistant



RECENT IMMUNOTHERAPY SUCCESSES



In May 2017 the US FDA granted accelerated approval of pembrolizumab as a second-line treatment for all metastatic solid tumour types classified as MSI-hi or dMMR.¹⁰



In September 2017 The FDA granted approval of Pembrolizumab to treat advanced, recurrent cancer of the stomach and gastroesophageal junction.¹¹



In October 2017 the FDA approved the CART-cell therapy YESCARTA™ for the treatment of non-Hodgkin lymphoma.¹²

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