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Translational oncology and the new generation Immunotherapy

Bhagyashri Satam

London Metropolitan Universitry, London

Abstract

Cancer is one of the leading causes of death worldwide. The hallmark of cancer treatment has been conventional chemotherapy. Chemotherapeutic drugs are designed to target not only rapidly dividing cells, such as cancer cells, but also certain normal cells, such as intestinal epithelium. Over the past several years, a new generation of cancer treatment has come to the forefront, i.e, targeted cancer therapies. The translation oncology and engineered anticancer therapies are more reflective of chemo-guided immune modulations. The emerging anti-cancer therapies have immune stimulatory orientation to focus on immune checkpoint blockade and to rejuvenate T-cell mediated cancer cell death. Monoclonal antibodies targeting Cytotoxic T lymphocyte antigen 4 (CTLA-4) or PDL-1 are immune checkpoint inhibitors. Human body is continuously under immunosurveillance to eliminate foreign constituents. In this scrutiny cancer cells carry PDL-1 surface molecule like normal healthy cells to disguise and escape immune surveillance. PDL-1/ anti PD-1 works as tumour supressing agent and Programmed cell Death Ligand-1(PDL-1, CD274) is expressed by tumour cells and antigen presenting cells (APC). However, Programmed Cell Death-1 (PD-1, CD279) receptor is expressed by tumour infiltrating cells, B cells and T cells the interaction between PDL-1 and PD-1 receptor deactivates T cells and is manifested by decreased secretion of interleukin (IL) 2 and interferon-γ (IFN-γ). As a defence mechanism tumour cells over express PDL-1 and deregulate functioning of T cells (CD8+). PD-1 and PDL-1 interaction also CTL-4 and B7 interaction majorly contributes to inhibition of T cells. Thus, inhibiting the interaction between PD-1 and PDL-1 can show reliable effects over various malignancies and T cell mediated cancer cell killing can be retained efficiently.

This portrays just an example of hundreds of other similar signalling cascades which are further responsible for angiogenesis of cancer. The new generation therapies are even spreading their horizons to CRISPR technique which is the highly precise gene editing tool to destroy metastatic cancers. Study of exosomes is achieving potentials to study more about metastasis, angiogenesis, and cancer cell metabolism.

Following are the objectives or the questions which cove the broad range of the topic systematically:

- Why Immunotherapies should be preferred over conventional cancer therapies?
- What are the current studies on new cancer treatments?
- What are the various signalling pathways responsible for tumorigenesis?
- Can we successfully obtain cancer vaccines?
- What are the FDA approved Immunotherapies for cancer?
- How far monoclonal antibodies can treat cancer?

Biography:

Bhagyashri Satam has completed her masters in London Metropolitan University. She is a Cancer Immunotherapy postgraduate with relevant laboratory experience. Through this experience, she has developed excellent attention to detail and the ability to work under pressure. Skills and expertise include clinical oncology, cancer biology, cancer biomarkers, cancer diagnostics, metastasis, tumor biology, cancer cell biology, apoptosis, immunohistochemistry and cell signaling.

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