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An Editorial note on Immuno Oncology

Dr. Aseer Manilal,

Department of Medical Laboratory Sciences, Arba Minch University, Arba Minch, Ethiopia.

***Corresponding author:** Dr. Aseer Manilal, Department of Medical Laboratory Sciences, Arba Minch University, Arba Minch, Ethiopia,

E-mail: Manilal_Aseer@gmail.com

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Abstract

Immuno-Oncology and Technology (IOTECH) is a new, peer-reviewed open access journal from ESMO publishing high quality original research articles, reviews and editorials focusing on novel immuno-oncology topics and developments, both clinically and preclinically. Immuno-oncology is the study and development of treatments that take advantage of the body's immune system to fight cancer. Cancer incidence rates have steadily increased over the past 20 years, while mortality rates have shown a considerable decline. Although significant variation in survival rates is still observed across cancer types (i.e. there are more 200 distinct diseases recognized), for most types, survival is improving owing to earlier diagnosis and improved treatments. Treatment has undergone a slow evolution from its start in the 1800s, with the sequential development of four main recognised modes of treatment. The first was surgery, which was made possible after the discovery of general anaesthetics in the late 1800s.

Introduction

Clinicians speculated that patients with proliferative diseases (e.g. leukaemia) might benefit from treatment with agents of this type that kill highly proliferating cells. Crucially, introduction of the first chemotherapy agents (analogues of nitrogen mustard gas) meant that cancers which were more complex or had metastasised, and could not be successfully treated by surgery or radiotherapy, could now be addressed. Furthermore, chemotherapy agents have since been developed that work at different stages of the cell cycle, and can be used in combination to prevent the development of resistance. This concept of using modern structural biology and drug discovery methods to produce small molecules, proteins, antibodies and even cellular therapies designed to target unique biomarkers associated with tumour cells, but not healthy cells, is now considered to be the 'gold standard' approach for discovering new cancer treatments. Immune checkpoint proteins are found on the surface of T-cells and act as regulators of the immune system. They are crucial for self-tolerance, and prevent the immune system from attacking the body's own cells indiscriminately, thus allowing a distinction to be made between 'self' and 'non-self'. Immune checkpoints also play a vital role in preventing uncontrolled immune responses by modulating the duration and amplitude of a physiological immune response, thus preventing collateral damage, which is why the term 'off-switch' is sometimes used to describe their role. It has long been known, but is now increasingly appreciated, that tumour cells can be recognised and disabled by the immune system. Some tumours show evidence of spontaneous regression early in their development, suggesting that the immune system may be capable of recognising and eliminating early-stage tumour cells.

Conclusion

The immune system has the greatest potential for the specific destruction of tumours with no toxicity to normal tissue and for long-term memory that can prevent cancer recurrence. Tumour specificity of the immune response resides in the recognition of tumour antigens. Viral proteins in tumours caused by viruses and mutated proteins from oncogenes or other genes, as well as nonmutated but abnormally expressed self proteins found on all tumours, have been shown to be good antigens and good targets for immunosurveillance. The tumour microenvironment can prevent the expansion of tumour antigen-specific helper and cytotoxic T cells and instead promote the production of proinflammatory cytokines and other factors, leading to the accumulation of suppressive cell populations that inhibit instead of promote immunity.