Perspective

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Alteration of Tumor Progression Can Become a New Therapeutic: A Perspective

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Perspective

Although cancer is a highly researched field, there is still a long way to go to fully understand and unearth tumor processes. However, one thing we know for sure: Cancer biology is continually changing as new genetic mutations develop that make patients, eventually, irresponsive to treatments in advance stages [1]. Thus, tumor shrinkage and control of the spread are key issues in treating cancers, and in this sense, molecular testing has opened the door to additional treatment options. Migration, metastasis and apoptosis of cancer cells are areas of research interest in cancer biology, with promising results for future treatments.

Somatic Mutation Theory help us understanding cancer at cellular level of organization, suggesting that cancer is a problem of regulatory control of cell proliferation mainly due to the mutations or deregulation of a specific genes. Cancer is a dynamic disease with multiple genomic changes and complex acquired or primary mutations and gene rearrangements.

Some early studies also suggest that matching the genetic changes observed in tumors of some unresponsive patients with treatments that specifically target these genetic changes improves the outcome in patients with advanced stage of cancer. Later studies have supported and corroborated the use of genomic testing in both, unresponsive to treatment patients or in some type of cancers that are hard to treat, showing a longer remission and survival rate in patients when specific mutations could be targeted with an existing therapy. One of these examples would be the epidermal growth factor receptor (EGFR) –overexpressed in various solid tumors– associated with poorer prognosis. Yet the strength of evidence expected for establishing the clinical utility of pharmacogenomics-guided drug therapy continue to be an important barrier for the implementation of this testing in clinical practice.

So far, we know that cancer immunotherapy –particularly in those patients with few treatment options– improves the quality of life and extends the survival in patients. Blocking the immune checkpoints –proteins that prevent the immune system from becoming overactive, leading to excess of inflammation or autoimmune disease– is a current strategy approach that seems to work relatively well in some patients. However, there are still a lot of questions that we need to answer in order to improve cancer outcomes. Why the immune checkpoint inhibitors work only in some cancers? Why even within the same type of cancer some patients respond to immunotherapy and others do not? It is obvious that we need to find out new methods to categorize patients with worse prognosis, and we also need new treatments to be able to personalize cancer therapy.

Beyond immunotherapy –which stimulates the patient's immune system against cancerous cells in order to promote immune-mediated anti-tumor responses–, considerable advances in cancer treatments have taken place in the last couple of years, including new combinations of traditional treatments, promising immunotherapy success, and advances in precision medicine-based approaches. Adoptive transfer of gamma delta (γδ) T cells has gained momentum as a potential new immunotherapeutic approach for targeting various hematological malignancies. Many approaches have been developed so far including cancer immunization, chimeric antigen receptor T-cell therapy (CAR-T), oncolytic viruses, cytokine treatment, checkpoint blockade or dendritic cells (DC) therapy, just to mention some. Probably, the combination of all these in a target therapy will be the next step to develop new and improve treatments to improve cancer outcomes.

Reference

1 Benz EJ (2017) The Jeremiah Metzger lecture cancer in the twenty-first century: An inside view from an outsider. Trans Am Clin Climatol Assoc 128: 275-297.

