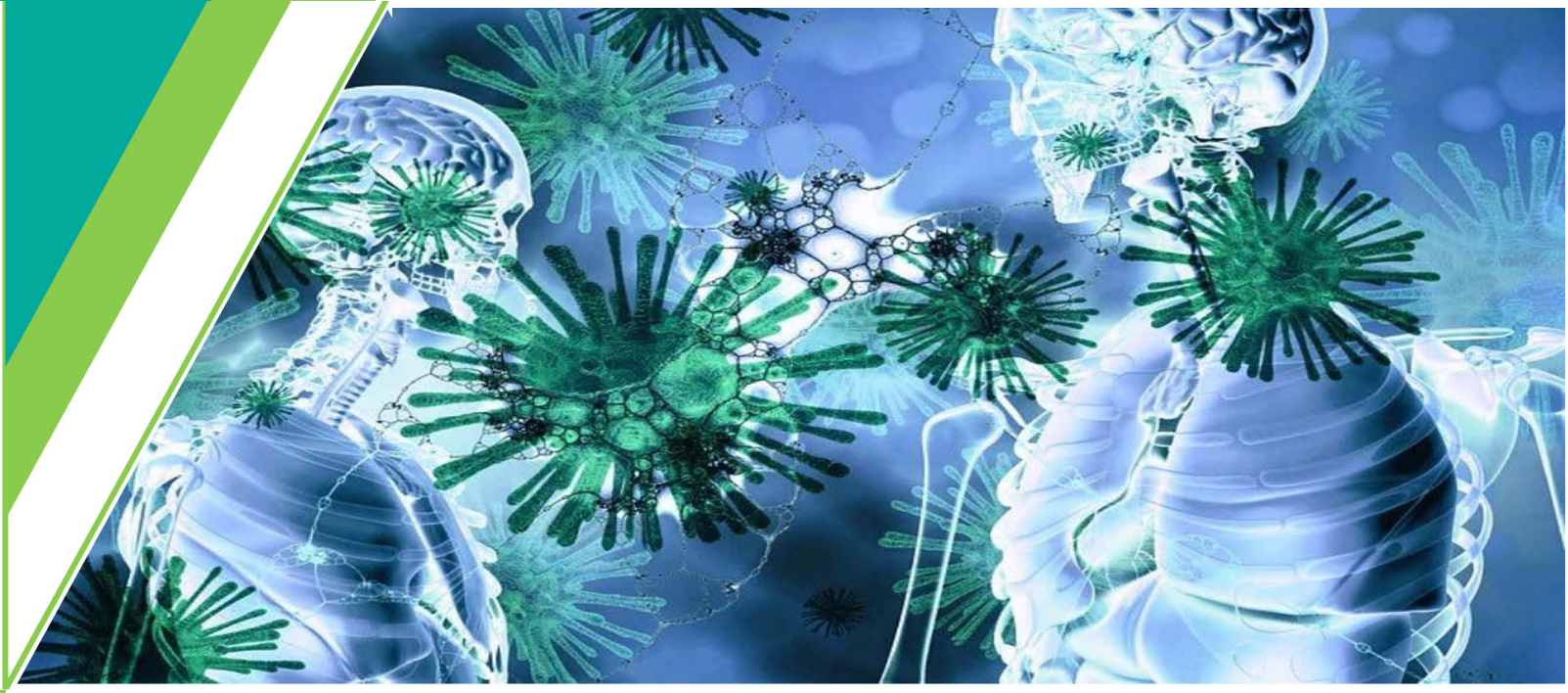

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THE APAC TIMES

Emerging Innovations In Cancer Immunotherapy

CANCER IN THE CURRENT SCENARIO

According to the World Cancer Report, as per the estimated cancer burden in India in 2018, there are about 1.16 million new cancer cases, 784,800 cancer deaths, and 2.26 million 5-year prevalent cases in India's population of 1.35 billion. The report said that "***one in 10 Indians will develop cancer during their lifetime, and one in 15 Indians will die of cancer***." Among the most prevalent in India are cancers of the breast, head and neck, lung, stomach and colon. Together, these account for **49 per cent** of all new cancer cases.

WHO in their recent report have warned that global cancer rates could rise by **60 per cent** over the next 20 years unless cancer care significantly develops and gets established in low and middle-income countries. In fact, reports show that death rates due to cancer in the US have been decreas-ing gradually for the last 3 decades, typically 1.5% per year, while in India the death rate is rapidly increasing. We are struggling with inadequate infrastructure and poor access to healthcare. Did you know that India has merely **0.98 oncologists per million population**? Understandably, the patient waiting time at most oncology departments is far from ideal! And in cancer treatment, more than anything else, time is of the essence. It is often the biggest differentiator between those who survive and those who succumb to the disease.

Making It Personal

Years of research has established that cancer is an extremely heterogeneous disease. Every cancer is different, as is every patient battling the condition. We see differences not only between

cancer cells from different patients, but also between cancer cells within the same patient. Naturally, a '***one-size-fits-all***' approach cannot work! We need to adopt a multi-disciplinary approach to cancer care, customize it to each cancer and, finally, for each patient.

The idea is to translate our better understanding of the biology of cancer to ensure better care for patients. Today, we know that cancers that arise in any organ are not just one disease, but rather a collection of distinct diseases with varying responses to different treatment strategies.

Many combinatorial approaches using chemotherapy and immunotherapy are also being employed as they have shown significant outcomes. The challenge is to identify the most effective, minimally toxic treatment for each patient especially now in the **COVID-19** era.

In this regard, continuous research on targeted and personalized treatments led to development of personalized immunotherapy using Dendritic Cells (DCs). These are part of our immune system and play a major role in recognizing the abnormal or *altered* '*self*' cells (resulting from cancer). Post recognition, these DCs signal the primary Immune cells (T-lymphocytes) to mount an immune response and attack the abnormal cells thereby eliminating them.

But cancer outsmarts our Immune system as it disguises itself and escapes this Immune surveillance. How do we overcome this challenge? Personalized DC therapy is made from patient's own tumor tissue (cancer cells) and also their white blood cells to make a population of customized DCs that are educated in the lab enabling them to recognize and target the patient's cancer *specifically*.

Dendritic Cell Therapy (DCT)

Requirements: Patient's Monocytes and tumor tissue.

Time of Manufacturing: 8 days only

Doses: 6 doses are prepared that are administered every 15 days.

Adverse effects: very mild to negligible as completely personalized treatment.

Can it be used adjuvantly with other treatments? Yes

Mode of action and outcomes: Post administration, DCs enter circulation and migrate to the nearest lymph node and come in contact with resting T-lymphocytes. Post successful interaction and signal communication with DCs, the T-lymphocytes become *activated* and begin to proliferate. A single primed DC is capable of activating hundreds of DCs which intern divide into hundred thousand. This population of cancer attackers then circulates to recognize and destroy the cancer cells.

In addition, studies have revealed that DCs also elevates IFN-γ levels with a corresponding decrease in T_{reg} cells levels all further enhancing the immunity of the cancer patient. Hence along with improved over all survival (OS), DCs are also attributed to a significant improvement in the quality of life (QOL).

In India, APAC Biotech has been approved for marketing and supplying personalized DCT (APCEDEN®). APAC has tied up with hospitals PAN India and with its established logistics network is making DCT accessible to patients in all regions.

APAC BIOTECH PVT LTD

69, JCM, DLF PHASE II
GURGAON, HARYANA-122002, INDIA
PH: 0124-4207575
Email: info@apacbiotech.com
Website: www.apacbiotech.com