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Landscape of CAR T Cell Therapy Market in Today's Era

Mariyum Mehndi Naqvi*

* *Correspondence: Mariyum Mehndi Naqvi*

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Chimeric Antigen Receptor T-cell therapy, commonly known as CAR T cell is a revolutionizing tool in the realm of cancer treatment. The therapy has gained attention due to its potential to treat different cancerous cells.

This article delves into the significance of CAR T cell therapy, exploring its history, market size, challenges, impact, and prospects.

CAR T cell therapy is a type of cell therapy in which a patient's immune system is boosted to fight against cancer. This technique has gained attention in treating leukaemia as the process involves the modification of T cells.

In this therapy, T cells are extracted from patients' blood and the cells are genetically modified to express CAR receptors under laboratory conditions. CAR receptors recognize specific types of protein that are present on the surface of cancer cells destroying cancer cells.

Initially, CAR T cell therapy was difficult to accept due to various reasons such as adverse events, lack of knowledge, and people's acceptance, but recently the therapy has gained attention due to its superiority to other medications. This resulted in the robustment of the CAR T cell therapy market. To date, almost 6 therapies have been approved by the FDA related to B cell lymphoma and multiple myeloma (MM).

The CAR T cell therapy has seen a robust growth in recent years. People's acceptance, increased knowledge of cancer biology, cellular mechanisms, and proven clinical trial results have given strength to the research sector. Many pharmaceutical and biotechnological companies started investing more in developing and commercializing CAR T cell therapy. This has led to the expansion of the global market.

Companies focused on non-curable diseases like relapsed or refractory (RR) B-cell acute lymphoblastic leukemia (ALL), CAR T cell therapy approved for certain types of non-Hodgkin lymphoma, and multiple myeloma (MM).

Despite the CAR T cell therapy expansion. The market poses several challenges that need to be addressed. Out of various challenges, cost remains the strongest barrier to the acceptance of this therapy. Its manufacturing and administration increase the treatment cost and this makes the therapy unaffordable for many patients. Although the therapy has gained a wide range of attention the safety concerns persist. Adverse events related to neurotoxicity and cytokine release syndrome require careful attention.

The ongoing research is optimizing safety profile and careful management of side effects. In addition to this, CAR T cell therapy is mainly used to treat blood cancers. This has not been proven beneficial in solid tumors, but the ongoing research is focusing on the solid tumor microenvironments to enhance the treatment efficacy.

There are also logistical issues associated with CAR T cell therapy, including the procurement, production, and prompt delivery of customized medicines. Simplifying the procedure and guaranteeing patients' timely access requires investments in infrastructure and supply chain management.

Although there is a huge challenge in CAR T cell therapy the ongoing research is addressing the current questions. Researchers are currently exploring the possibility of CAR T cell therapy in solid tumors. This is achieved by targeting tumor microenvironments or identifying cell surface markers.

Genetic engineering breakthroughs are propelling the development of next-generation CAR T cells, equipped with enhanced capabilities to combat cancer. Armored CAR cells are equipped with additional functionalities, such as checkpoint inhibitors or co-stimulatory molecules, to enhance their survival, proliferation, and anti-tumor activity. This armoring strategy combats the immunosuppressive tumor microenvironment and potentiates CAR T cell persistence.

Derived from healthy donors, allogeneic CAR T cells offer off-the-shelf availability, eliminating the need for time-consuming patient-specific manufacturing. This approach accelerates treatment initiation and expands access to CAR T cell therapy for a wider patient population.

In addition to this, CAR T cell therapy can work in combination with other therapy, this can enhance the antitumor response and overcome resistance mechanisms. Cost reductions can be achieved by collaboration of different companies, research institutes, and regulation by the governmental bodies.

CAR T cell therapy has ushered in a new era in cancer treatment, offering a personalized and targeted approach that harnesses the patient's immune system to eradicate malignant cells. The CAR T cell therapy market is rapidly evolving, with ongoing research and development efforts addressing current limitations and expanding the scope of treatable cancers.

Competing interests

The authors declare that they have no competing interests.

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