



Preclinical

# CAR T-Cell Therapy: Revolutionizing Cancer Treatment One Trial at a Time

A powerful form of immunotherapy known as chimeric antigen receptor (CAR) T-cell therapy has been under development for more than a decade. Only a select few institutions have been capable of harnessing the necessary resources for the clinical development of CAR T-cell therapies including manufacturing, quality assurance and delivery of this cutting-edge treatment.

**Thanks to the success of drugs like Novartis' Kymriah™ and proof that this treatment can provide clinical benefit in some forms of cancer, CAR T-cell therapy has emerged as one of the most innovative and promising treatments in cancer research today.**

TD2 has worked with companies to bring this therapeutic approach to market and has become well-versed in planning and executing CAR T-cell proof of concept preclinical studies that have included the demonstration of significant anticancer activity against a variety of hematological and solid cancers. We take pride in these successes, as this emerging data provides clinical and regulatory pathways for these CAR T-cell therapeutics.

The last five years have been full of new discoveries and challenges in this area of cancer research, and we have compiled some of our findings to help companies make effective decisions when embarking on the development of a CAR T-cell program.

## **What Should Companies Consider When Developing a CAR T-Cell Therapy?**

CAR T-cell therapies are not your average drug development program. There is much to consider when starting a new program, especially when it comes to tumor type and patient selection. Here are some recommendations when planning your preclinical development path:



### **Type of Cancer**

The first topic to address is what type of cancer patient you are planning to treat. CAR T-cell therapy has shown outstanding results the last few years, especially in hematological cancers such as leukemia and lymphoma, with many patients showing a complete response to treatment. CAR T-cell therapy can be used to treat solid tumors as well, with some tumors having been completely eradicated in mice during preclinical studies. When planning preclinical trials, understanding growth of the tumor model in the preferred host location and staging tumor burden is key. Often, subcutaneously placed tumors are adequate and give straight-forward efficacy readouts, but orthotopic and dissemination models may also be used. Keep in mind, dosage often differs when choosing hematological or solid tumors.

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### State of the Cells

It is important to measure the viability of the CAR T-cells during the cryogenic, thawing and washing processes. Scientists must account for cell loss during the freezing and processing stages to ensure availability of sufficient viable cells during treatment.

TD2 can begin with cryopreserved or fresh CAR T-cells. To initiate the treatment process, we use fluorescent-based counting methods rather than manual dye counting to learn more about the viability of the CAR T-cells. Fluorescent counting helps to more accurately determine cell count and viability, therefore ensuring the appropriate number of healthy CAR T-cells are administered for treatment.



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### Study Duration

Preclinical trials can range significantly in duration based on the tumor model chosen and tumor location. While efficacy with CAR T-cell treatment may be significant, the occurrence of graft versus host disease (GVHD) may occur at some point during the study. Companies need to balance the duration of the study with the anticipated emergence of GVHD to ensure adequate, high quality efficacy data is captured. It is also critical to measure the in-life CAR T-cell persistence assessments via blood draws. Additionally, a frequently used method to determine treatment persistence is a tumor rechallenge study, where the ability of remaining CAR T-cells to eradicate new tumor growth is studied. These approaches offer powerful data while minimizing the use of additional animals.

TD2 is an organization that not only executes your preclinical studies, but also provides a consultative approach to ensure best results and continuity with a clinical and regulatory strategy. Having performed more than 75 studies with many ongoing, and strong experience with CAR T-cell handling and processing, TD2 has the specialized oncology knowledge and project management expertise needed to design and execute these preclinical programs in support of the clinical and regulatory goals of your programs. TD2 has the latest technology available for use in studies for in vivo and ex vivo analysis, such as optical imaging, cell counting and flow cytometry.



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Dr. Jon Terrett, Head of Immuno-Oncology  
Research and Translation  
CRISPR Therapeutics

“TD2 has been an extremely valuable and flexible partner for CRISPR Therapeutics, performing many CAR T-cell mouse studies across multiple antigen targets in a number of oncology indications,” says Dr. Jon Terrett, Head of Immuno-Oncology Research and Translation at CRISPR Therapeutics.

TD2 is an ideal partner who can increase the efficiency of your CAR T-cell therapy development activities. In addition to our extensive experience in CAR T-cell therapies, we have a broad background in other cell-based therapies, bispecific antibodies and humanized mouse models often employed in IO drug development.

## Ready to Get Started?

We fast-track your research and specialize in oncology, and our expert team aims to save you time, money and resources. You'll also get exclusive access to an integrated and diverse suite of preclinical tools as a TD2 client that can provide strong experimental support for a well-defined clinical and regulatory strategy.

[Contact us to get started today >](#)