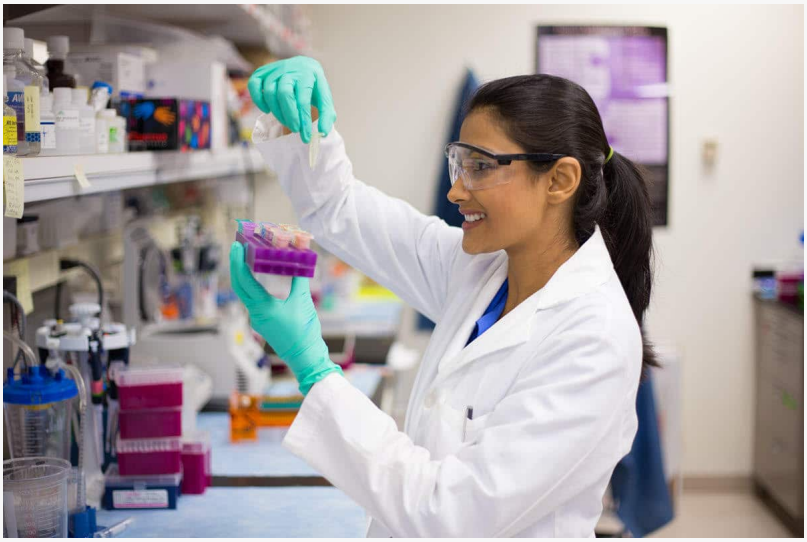
Cart T-Cell Therapy Offers New Hope for Treating Systemic Lupus Erythematosus (SLE) Patients

New advances in CAR T-cell treatment have demonstrated a successful approach for long-term remission of lupus –or even a permanent cure.



AUSTIN, TEXAS, UNITED STATES, April 18, 2023 /EINPresswire.com/ -- The Autoimmune Disease Lupus And Its Effects On The Body

The CDC estimates that circa 200,000 adult Americans suffer from lupus, officially known as Systemic Lupus Erythematosus (SLE). The disease disproportionately affects women (in 90% of cases), with Black and Latina women at the highest risk – 1.5 to 3 times more likely to develop lupus than White women.

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SLE is understood to be an autoimmune condition in which the body's immune system mistakenly attacks healthy tissue, often in recurring episodes of varying degrees of intensity and duration.

According to rheumatologists who study and treat immune system diseases of the bones, joints, and connective tissues and muscles, the most common symptoms of SLE include fatigue, painful joints, skin rashes, swollen lymph nodes, mouth ulcers, and hair loss. SLE is also associated with other conditions, including serositis (inflammation of the linings of the heart and lungs), kidney disease (particularly in male patients), and peripheral neuropathy.

What Is The CAR T-Cell Mechanism, And How Can It Treat Autoimmune Diseases Such As

Lupus?

While we can't currently pinpoint why some people begin to suffer from lupus yet others do not, researchers have developed a clearer understanding of the underlying disease mechanism.

In the case of lupus, the body's immune system receives a cellular signal to fight against suspected pathogens. However, this is a "false flag" attack – instead of attacking true pathogens, the body's immune system is mistakenly sending in B cells to attack its own natural proteins. Worse, these "autoreactive" B cells erroneously create antibodies to fight these proteins, essentially creating a vicious circle of cause and effect – the body attacks itself, creating inflammation, which aggravates the condition, causing the immune system to double down its attack.

Available therapies to address SLE symptoms, such as administering steroids and NSAIDs to reduce inflammation, do not address the underlying disease and can cause additional problems when used over the long term.

To address the root cause of SLE, e.g. break the cycle of autoimmune attacks, researchers looked for ways to interrupt or even remove B cells entirely.

One approach is to use monoclonal antibody therapies to target the surface markers on dysfunctional B cells and destroy them. Two such therapies include the anti-CD20 antibody Rituximab (available under the brand name Rituxan) and Obinutuzumab (marketed as Gazyva). Frustratingly, however, clinical trials of drugs such as Rituximab did not lead to full remission of the disease, perhaps due to the transient or incomplete effect of B cell depletion.

So researchers began to wonder: "could the body's immune system be trained to manage the errant B cells directly?"

To address this question, SLE researchers in the 2010s began to look at the success cancer

researcher were having with patient-specific CAR T-cell-based therapies as a potential option for treating lupus.

In this pioneering approach to treating cancer, researchers draw blood from cancer patients to extract disease-fighting T-Cells, then genetically modify them to train their chimeric antigen receptors (CARs) to identify and destroy cancer cells before transfusing them back into the patient's bloodstream.

Mouse Model Research Points The Way For Treating Systemic Lupus Erythematosus (SLE) With CAR T-Cell Therapy

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Researchers led by Dr. Rita Kansal at the University of Tennessee Health Science Center in Memphis began evaluating the idea of using CAR T-cell therapy for lupus by creating two different Lupus disease models in mice (NZB/W and MRL-lpr) using a combination of healthy and autoimmune compromised mice.

As described in a landmark paper published in 2019, the researchers were able to extract CD8+ T-cells from the spleens of healthy mice and transduce (e.g. genetically modify) the cells to express CD19-targeted chimeric antigen receptors (CARs).

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