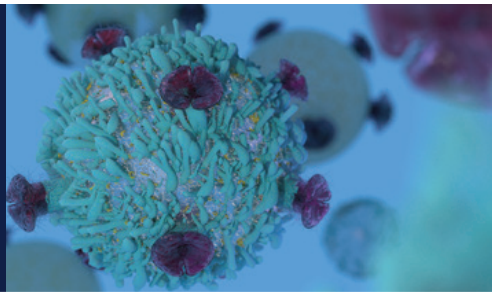
CAR T cell therapy treatment and research

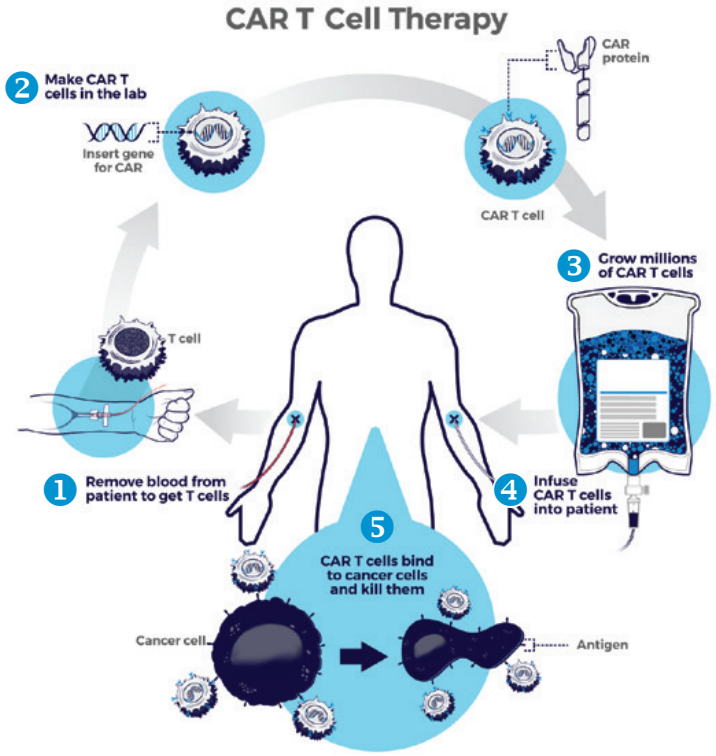


UCSF is a leader in the newest forms of cellular immunotherapy, which have been shown to be particularly effective in the treatment of B-cell non-Hodgkin lymphoma (NHL) and B-cell acute lymphoblastic leukemia (B-ALL).

What is CAR T cell therapy?

FDA-approved chimeric antigen receptor (CAR) T cell therapy uses a patient's immune system to fight certain hematologic cancers, such as B-cell non-Hodgkin lymphoma (NHL) and B-cell acute lymphoblastic leukemia (B-ALL).

CAR T cell therapy is a one-time treatment when these conditions have resisted all therapeutic options or have relapsed a second or subsequent time. The therapy has resulted in long-term remissions for many NHL and B-ALL patients.



CAR T cell therapy is a type of treatment in which a patient's T cells are genetically engineered in the laboratory so they will bind to spcific proteins (antigens) on cancer cells and kill them. 1 A patient's T cells are removed from their blood. Then, 2 the gene for a special receptor called a chimeric antigen receptor (CAR) is inserted into the T cells in the laboratory. The gene encodes the engineered CAR protein that is expressed on the surface of the patient's T cells, creating a CAR T cell. 3 Millions of CAR T cells are grown in the laboratory. 4 They are then given to the patient by intravenous infusion. 5 The CAR T cells bind to antigens on the cancer cells and kill them.

Source: CAR T-cell therapy infographic. National Cancer Institute website. Accessed December 21, 2018. https://www.cancer.gov/about-cancer/treatment/research/car-t-cell-therapy-infographic.

FDA-approved indications for CAR T treatment

NON-HODGKIN LYMPHOMA

For adult patients with relapsed or refractory large B-cell lymphoma after two or more lines of systemic therapy, including:

- Diffuse large B-cell lymphoma (DLBCL) not otherwise specified
- Primary mediastinal large B-cell lymphoma (PMBCL)
- High-grade (double-hit) B-cell lymphoma
- Transformed lymphoma

B-CELL ACUTE LYMPHOBLASTIC LEUKEMIA (B-ALL)

For patients up to 25 years of age with B-ALL that is refractory or in second or later relapse.

UCSF Helen Diller Family Comprehensive Cancer Center

UCSF Health CAR T cell therapy treatment and research

Providing specialized treatment for patients with acute and chronic blood conditions, **UCSF Hematology and Blood and Marrow Transplant** treats the full range of malignant and nonmalignant blood conditions. Our clinical and research teams are internationally renowned for their pioneering work in disorders of the blood and bone marrow, including cell-based immunotherapy for cancer.

With the first FDA-approved checkpoint inhibitor, ipilimumab (Yervoy), initially developed and tested in patients by UCSF-affiliated physicians and scientists, UCSF holds a unique place in the history of cancer immunotherapy. Our team continues to work at the forefront of the field and is actively involved in CAR T cell treatment and research.

- Certified treatment center for FDA-approved therapies Yescarta (axicabtagene ciloleucel) and Kymriah (tisagenlecleucel)
- Accredited by the Foundation for the Accreditation of Cellular Therapy (FACT) for Immune Effector Cellular Therapy, signifying our quality-based processes to facilitate desirable outcomes for patients receiving these new therapies
- Expertise in managing possible short- and long-term side effects of treatment, including cytokine release syndrome (CRS) and neurotoxicity
- Expertise in use of highly sensitive testing for measurable (minimal) residual disease to verify and follow treatment responses

CLINICAL TRIALS AND RESEARCH

As a leader in the newest forms of cellular therapy, UCSF offers a robust research program. Examples of current cellular therapy trials for adults focused on hematologic cancers and multiple myeloma include:

- A Phase 1 Study of bb21217, an Anti-BCMA CAR T Cell Drug Product, in Relapsed and/or Refractory Multiple Myeloma
- A Phase 1, Multicenter, Open-Label Study of JCAR017, CD19-Targeted Chimeric Antigen Receptor (CAR) T Cells, for Relapsed and Refractory (R/R) B-Cell Non-Hodgkin Lymphoma (NHL)
- A Phase 2, Multicenter Study to Determine the Efficacy and Safety of bb2121 in Subjects with Relapsed and Refractory Multiple Myeloma

Additionally, research is ongoing to evaluate CAR T therapy for patients with solid tumors of the breast, prostate, brain, lungs and other organs. **For information on all trials, visit https://clinicaltrials.ucsf.edu.**

OUR TEAM

Charalambos (Babis) Andreadis, MD
Hematologist (Lymphoma)
Mobile: 415-238-1909

Bita Fakhri, MD, MPH
Oncologist (Leukemia, Lymphoma)
Mobile: 832-603-3891

Aaron Logan, MD, PhD
Hematologist (Leukemia)
Mobile: 650-521-4711

Thomas Martin, MD
Hematologist (Myeloma)
Associate Director, Myeloma Program
Mobile: 415-786-0885

Nina Shah, MD
Oncologist (Myeloma)
Mobile: 646-335-3506

Jeffrey Wolf, MD
Hematologist (Myeloma)
Director, Myeloma Program
Mobile: 925-822-2168

Sandy Wong, MD
Hematologist (Myeloma)
Mobile: 617-633-6053

1.19-WDV-54

INFORMATION/REFERRALS

- **New patients**
  Phone: 415-353-2051
  Fax: 415-353-7765
- **Existing patients**
  Phone: 415-353-2421
  Fax: 415-353-2467
- **Clinical trials**
  Phone: 415-353-2051
  Fax: 415-353-7765

UCSF Helen Diller Family Comprehensive Cancer Center