New studies demonstrate that modified T cells are effective in treating blood-borne cancers

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At the 2013 American Society of Hematology meeting in Dec. 2013, James Kochenderfer, M.D., investigator in the Experimental Transplantation and Immunology Branch, NCI, presented findings from two clinical trials evaluating the use of genetically modified immune system T cells as cancer therapy. These studies were performed in close collaboration with Steven A. Rosenberg, M.D., Ph.D., chief of the Surgery Branch, NCI, who is the principle investigator in the first study noted. These reports represent important advances in the understanding of gene therapy for treatment of advanced blood-borne cancers. In the first study (Effective Treatment of Chemotherapy-Refractory Diffuse Large B Cell Lymphoma With Autologous T Cells Genetically-Engineered to Express An Anti-CD19 Chimeric Antigen Receptor [#62867]), 15 adult patients had their T cells removed, were treated with chemotherapy, and then were given an infusion of their own T cells which had been genetically modified in the lab. The first report of the success of this type of therapy in lymphomas came in 2010 by Kochenderfer and Rosenberg in a patient who remains progression-free over 42 months after treatment. This team has now demonstrated that this same approach is effective in patients with diffuse large B-cell lymphoma, the most common type of non-Hodgkin lymphoma. Six patients in the trial achieved complete remission and six achieved partial remission. This approach offers an option for patients with chemotherapy-resistant large B-cell cancer who are not good candidates for other forms of stem cell transplantation. The Chimeric Antigen Receptor CD 19 technology is being co-developed with Kite Pharma Inc. under a cooperative research and development agreement with NCI's surgery branch.

In the second study (Donor-Derived Anti-CD19 Chimeric-Antigen-Receptor-Expressing T Cells Cause Regression of Malignancy Persisting After Allogeneic Hematopoietic Stem Cell Transplantation [#59886]), researchers used genetically modified T cells to treat B-cell cancers, such as leukemia and lymphoma, that did not fully respond to transplantation of stem cells from a donor. The study enrolled 10 patients who received no treatment except one infusion of genetically modified T cells that were obtained from related or unrelated stem cell transplant donors. Three of 10 patients experienced significant disease regression, with one patient showing complete remission. Significantly, none of the patients experienced graft-versus-host disease (GVHD). Toxicities were mild, and resolved within two weeks. The results are encouraging because they show that small numbers of modified T cells can cause regression of highly treatment-resistant B-cell cancers without causing GVHD. This finding indicates a possible new treatment approach for patients with aggressive forms of these cancers that have proven resistant to other treatment approaches, including stem cell transplantation from donors.

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