Cellular therapy for pediatric cancer

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The potency and specificity of immune cells suggest the possibility that their infusion in patients with cancer could overcome the resistance of cancer cells to standard treatment modalities while sparing normal tissues. Evidence is mounting indicating that administration of autologous T cells induced to express anti-CD19 chimeric antigen receptors (CARs) ex vivo can exert major anti-leukemic activity in patients with CD19+ B-cell acute lymphoblastic leukemia (ALL). This has resulted in durable remissions for many patients who were refractory to standard therapy. These initial trials have also revealed the potential serious toxicities that CAR-T cell therapies can produce, including cytokine release syndrome and neurotoxicity. Moreover, recurrent leukemic subclones lacking CD19 may escape monotherapy with anti-CD19 CAR-T cells. In these instances, CAR directed against other B-cell antigens, such as CD22, may prove to be useful.

Simplifying ex vivo cell processing, widening the range of targetable antigens and generating safer and more effective cell products are important objectives to move this field forward. Besides CAR-T cells, several other cell therapy approaches are being explored, using different receptor formulations and different cell types with the vision of building an array of immunotherapeutic options that can complement or replace standard therapy of cancer.