THE FRONT ROW
at Scripps Research

Reprogramming the immune system: A new era of precision immunotherapy for cancer and autoimmune disease

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ABOUT THE LECTURE

Cancer remains one of the most difficult diseases to treat, even with advanced treatments such as chemotherapy, immunotherapy and radiation. In his Front Row lecture, Calibr-Skaggs' Vice President of Biologics Travis Young described how Scripps Research scientists are engineering a new generation of immune cells that can be turned on, off or adjusted like a dimmer switch. This innovation is designed to make cancer immunotherapy safer, more precise and potentially applicable to other conditions, including autoimmune diseases.

TOP TAKEAWAY POINTS

- The Calibr-Skaggs Institute for Innovative Medicines represents a new model for nonprofit drug discovery, allowing Scripps Research to progress its innovations from laboratory discovery through clinical trials. This approach enables Scripps to reinvest revenues from successful programs back into research, creating a self-sustaining ecosystem for developing next-generation medicines at a fraction of traditional pharmaceutical costs.

- This model also allows scientists like Young to pursue some of the world's biggest challenges, like cancer, the second leading cause of death in the U.S. In recent years, chimeric antigen receptor T-cell (CAR-T) therapy has emerged as a revolutionary approach to cancer treatment by genetically engineering a patient's own immune cells to recognize and destroy cancer cells. While highly effective, traditional CAR-T cell therapy can cause serious side effects, including a dangerous immune system overreaction and neurological symptoms—such as confusion or loss of fine motor skills—that may last days to weeks and require intensive monitoring.

- To address these challenges, Calibr-Skaggs has developed "switchable" CAR-T cells that activate only when paired with a companion molecule, allowing physicians to precisely control the therapy's intensity and potentially prevent the serious side effects of traditional CAR-T cell therapy. This breakthrough also allows researchers to reactivate dormant CAR-T cells months or years later if cancer returns, all without requiring patients to undergo another round of cell engineering.

- Beyond cancer treatment, switchable CAR-T technology shows remarkable promise for autoimmune diseases like lupus and rheumatoid arthritis. By targeting the B cells that produce harmful antibodies that attack the body's own tissues, early clinical trials have achieved complete remission in patients with lupus. Impressively, these patients no longer require immunosuppressive medications, representing a potential paradigm shift in autoimmune disease treatment.

- The ultimate vision extends beyond current costs and complexities of cell manufacturing by developing "in vivo" CAR-T cell manufacturing, where genetic engineering occurs directly inside the patient's body rather than in expensive specialized facilities. This breakthrough could democratize access to these life-saving therapies, making them available at community hospitals worldwide instead of being limited to major medical centers.

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