

Cancer immunotherapy and beyond.....

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Abstract:

Immunotherapy has revolutionized cancer treatment by enabling the body's immune system to target and destroy tumor cells. Approaches such as immune checkpoint blockade and adoptive cell transfer have shown remarkable promise, establishing themselves as a new frontier in oncology. However, a significant number of patients fail to respond or eventually develop resistance to these therapies. One major contributor to this challenge is the accumulation of T-regulatory cells within the tumor microenvironment. These cells suppress immune activity, fostering a tolerogenic environment that shields the tumor from immune attack. Advanced single-cell genomic analyses have highlighted the complexity and heterogeneity of these Treg populations in cancer. At the heart of Treg activity lies the transcription factor FOXP3, which orchestrates immune suppression through a dynamic network of interacting partners, including epigenetic modulators and immune tolerance regulators. These findings have shifted research efforts toward understanding how to disrupt Treg cell function to restore effective anti-tumor immunity. This seminar will explore the evolving landscape of cancer immunotherapy, with a focus on the mechanisms by which Treg cells contribute to treatment resistance. We will discuss current strategies aimed at reprogramming the tumor microenvironment, from one of immune suppression to immune activation, and highlight novel therapeutic targets that could help extend the benefits of immunotherapy to a broader patient population