Immunotherapy: Harnessing the Immune System against Diseases

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Abstract

Immunotherapy modulates both the innate and adaptive immune systems, making it an effective cancer treatment option. However, its application is restricted due to low delivery efficiency, probable off-target damage, and nonimmunogenic malignancies. Recent breakthroughs in biomaterial-based delivery methods, involving immune cells, bacteria, and their derivatives, solve these restrictions. The broad spectrum of microbiota in the stomach influences the host immune system and the efficacy of immunotherapy in cancer patients. Fecal microbiota transplantation can transform patients who have failed earlier therapies into patients who are responsive to the same medication. Researchers are attempting to find and cultivate particular microorganisms for cancer immunotherapy. This article outlines the immunological roles of commensal bacteria in cancer therapy and lists current clinical studies. The innate immune system, which comprises a sizable proportion of immune cells in solid tumors, presents an alternative immunotherapeutic approach. This method is now being studied for gastrointestinal malignancies and has yielded preliminary results. However, the intricacy of regulation governing the plasticity and functioning of innate cells in the microenvironment has hindered effective attempts. Immunotherapy's rapid advancement encounters barriers like poor response rates and negative effects. Researchers require to advance immunotherapy by developing DNA and nucleic acid delivery vehicles and employing DNA nanostructures as vaccine delivery methods. This review will look at how DNAmediated immunity may be exploited to prevent and cure diseases, as well as current advances and prospective applications.

Keywords: Immunotherapy, Cancer Immunotherapy, Anti-Tumoral, Commensal Microbiota, Immune-Based Medication

I. Introduction

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