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Editorial

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Cancer immunotherapy: an evolving paradigm

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The inhibition of the host's natural immune response by tumor cells was widely reported in the early phases of the development of oncology therapy, and the concept of employing the host's immune system to treat cancer, i.e. tumor immunotherapy, is not new. However, as a result of early theoretical constraints, clinical application of immunotherapy did not go smoothly and lagged significantly behind radiation and chemotherapy. The path has been winding, but the future now seems promising. Immunotherapy research has advanced enormously as a result of the maturing of immuno-editing theory and the creation of numerous technologies, despite a number of unsuccessful endeavors and clinical studies. Since around 1998, the US Food and Drug Administration (FDA) has approved a variety of tumor immunotherapies, including cytokines (interleukin-2, interferons), cancer vaccines (Provenge), immune checkpoint inhibitors (ipilimumab), and cellular therapies (chimeric antigen receptor-T (CAR-T)), signaling a boom in the field.

With scores of licensed immunotherapies and tens of thousands of continuing clinical trials, the recent breakthroughs in the field have been amazing. As in the past, the area has undergone ups and downs, with immunotherapy yielding promising results while still confronting considerable obstacles, such as the possibility of severe immunological adverse effects, limited efficacy and response rates, and the development of cancer resistance. Consequently, there is an urgent need for more comprehensive basic research and improved clinical trials.

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Today's tumor immunotherapy research encompasses basic research, pre-clinical translational work, and clinical study, and is a significant example of an interdisciplinary research field, with academics and clinicians from a variety of disciplines collaborating to address these challenges. New tumor immunotherapy research will concentrate on basic cancer immunology exploration, immune marker discovery based on multi-omics analysis and computational science, and novel immunotherapeutic technologies and medication development enabled by cell engineering and pharmacological research.

In the special issue on "Cancer Immunology and Immunotherapy," we present a series of reviews, article, and case report. In one review, Gao et al. (2022) provide an overview and perspective on available tumor immune checkpoints and matched target drugs. This is accompanied by a description of the anti-tumor mechanisms of tertiary lymphoid structures by Chen et al. (2022), as well as a consideration of combinations with similar immunotherapies. In another review, Gu et al. (2022) discuss the benefits and drawbacks of CAR-T therapy after recurrence in B-cell malignancies and give an intriguing case report on secondary donor-derived cluster of differentiation 19 (CD19) CAR-T therapy in acute lymphoblastic leukemia (Kong et al., 2022). In addition, Qu et al. (2022) have focused on the hotspot on ferroptosis and aberrant iron metabolism in cancer development, which provided profound insight into cancer combination therapy. Besides, Fang et al. (2022) identify the unique mechanism of up-frameshift 1 (UPF1)-eukaryotic translation initiation factor 2α (eIF2α)-activating transcription factor 4 (ATF4) in regulating lung adenocarcinoma tumor growth.

Through this special issue, we hope to present a unique and up-to-date view on cancer immunotherapy, allowing readers to comprehend current methods of discovery, emerging technologies, clinical accomplishments, and obstacles in the field. We hope that readers appreciate this special issue and are grateful to our authors and reviewers for their efforts.

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