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Book Review

Successes & challenges of NK immunotherapy: Breaking tolerance to cancer resistance, B. Bonavida & A. Jewett, editors (UCLA, Los Angeles, CA, United States) 2021. 540 pages. Price: Not mentioned.

ISBN: 978-0-12-824375-6

This book is a comprehensive collection of information describing the basics of natural killer (NK) cells, their anti-tumour role and strategies to potentiate NK cell-mediated anti-tumour response. It describes the latest development in the field, and effectively addresses the challenges in breaking the tolerance within tumour stroma and focuses on NK cell capability to evade the resistance of cancerous cells to current therapies.

The main highlights of the book are the diagrammatic illustrations, the descriptive tables and the detailed references mentioned at the end for further reading. The text is easy to understand as it is supplemented with numerous schematics in general. A couple of chapters, however, are with very limited number of figures and table and would have been benefitted with additional schematic diagrams and tables.

The book has been broadly divided into six parts on the basis of different aspects of NK cells. The first part comprises four chapters. It discusses the general properties of NK cells along with their therapeutic applications. Beginning with grey area between innate and adaptive immunities, this section discusses the emerging role of NK cells in tumour therapy and the related challenges. This section also deals with how exosomes can heighten NK cell responses and could be useful in therapy.

The second part discusses the mechanisms of NK cell activation and details regulation via peptidases and their endogenous inhibitors. Discussion of novel strategies to enrich the population of functional NK cells that have the potential to escape the tumour inactivation is well incorporated. The section reviews the role of immunosuppressive metabolism in microenvironment regulating functions of NK cells and the critical role of peroxisome proliferator activated receptor-gamma coactivator - 1 alpha (PGC-1α) in the metabolic reprogramming of NK cells. The authors have emphasized on the significance of primary NK cells in targeting cancer stem cells and poorly differentiated tumours and highlighted that the NK cell immunotherapy can be used in combination with T-cell therapy.

The third part discusses the upcoming strategies of deriving NK cells from human and embryonic stem cells (hESCs) and induced pluripotent stem cells (iPSCs). This portion also proposes that the resistance to anticancer therapies can be overcome by targeting the tumour cell plasticity and the tumour microenvironment, leading to a valuable therapy. However, Chapter 10 related to 'phenotypic plasticity (of tumours)' does not directly relate to the topic.

The fourth section specifically focuses on the use of chimeric antigen receptor (CAR)-NK cells to overcome the impaired NK cells and the host resistance to antibody as well as cell-mediated immunotherapy. Further, the advantage of CAR-NK cells over CAR-T cell immunotherapies is discussed.

The fifth section discusses about the immunometabolic targeting of NK cells. It is the most comprehensive section with six chapters. The discussion encompasses the regulation of NK-activating receptor NKG2D, RKIP-targeting NK cell inhibitory and activating receptors and inhibition of checkpoints. It describes the dual role of NK cells during tumour progression and angiogenesis. However, shifting therapeutic modalities in breast cancer in this section to the next section should have been more apt.

Finally, the chapters in the sixth part discuss how NK immunotherapy has been utilized in various cancers such as paediatric cancers, prostate cancer, lymphomas and brain tumours. These chapters specifically list the ongoing and completed clinical trials which are of immense value as a common reference for specialized field.

Overall, this book not only provides an overview on how NK cells can be or are being exploited in immunotherapy alone but also provides an insight into how these can be exploited in combination with other anticancer therapies for both haematological and solid tumours. Since the chapters are individually written by different authors, there is occasional redundancy in information provided. Overall, this book will be a valuable asset as a reference book for clinicians, scientists, postgraduate students, pharmaceutical researchers and health providers to get acquainted with recent developments in the field of NK cell immunotherapy, thereby providing a needed direction to overcome the major challenges faced by this rapidly evolving new field.

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