

Preface

Advances in drug delivery strategies have been phenomenal throughout the past few decades. The discovery of new drugs has been keenly matched by developments to ensure their effective delivery. Often, drugs considered hopeless have been revived through the design of drug delivery systems. Optimizing drug dosage regimens based on understanding the disease condition, developing patient-friendly systems to address compliance and other innovative approaches is the order of the day. Nevertheless the same has been challenged arduously by the development of resistance, particularly in cancer and infectious diseases. The threat today is the development of not just multidrug resistance but total drug resistance, which could spell impending doom.

Targeted drug delivery presents an optimal strategy to tackle such challenges. From ensuring high drug localization at the sites of action, and hence improved therapy, to limiting drug toxicity in other organs, targeted drug delivery presents a host of opportunities to revolutionize medicine. Such delivery relies heavily on nano drug delivery systems and presents manifold opportunities. Nevertheless, targeted drug delivery using nanosystems is fraught with numerous challenges.

The objective of this book is to serve as a complete reference guide for targeted drug delivery and as a ready reference for all aspects related to the theme. The book has been structured into eight sections to address the need of beginners and established researchers. Part I is an overview of the basic principles of drug targeting and possible applications therein. Part II covers the important subject of disease-based targeting with a focus on cancer and infectious diseases. Part III and IV discuss in sequence-relevant aspects related to organ-based and organelle-based targeting.

Physicochemical approaches exploited for targeting are elucidated in Part V. This includes different stimuli-responsive approaches including magnetic, thermal, and pH-dependent strategies. Prodrug-based conjugates and conjugates with polymers and lipids are also highlighted in the same section. Carrier-based approaches follow in Part VI. This part details applications of various types of nanocarriers in targeted drug delivery such as functionalized lipidic carriers, inorganic nanocarriers, and carbon nanotubes, to name a few. A study of nanocarriers in targeted delivery is incomplete without characterization techniques, addressed in Part VII. The major

challenges in the commercial success of targeted delivery systems are the regulatory hurdles and the toxicity-related issues. This is discussed in the last part of the book, Part VIII.

The book is the amalgamation of the experience and expertise of all the contributors in the field of targeted drug delivery. It is an exhaustive compilation of the multi-faceted arena of targeted drug delivery, ranging from conceptualization to product development and design and also to aspects of commercialization. Young researchers who plan to initiate research in this important field would find this book extremely relevant and handy. The book would also cater to the needs of advanced researchers in the field.

The editors also take the opportunity to express their gratitude to all the contributors for their support. Special thanks are due to Prof. Michael J. Rathbone. Editors are thankful for the valuable assistance received from Dr. (Ms) Anisha D'Souza, Mr. Ashish Kumar Agrawal, and Mr. Kaushik Thanki.

Finally, we wish to conclude by saying that this has been a true learning experience.

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