

Nanomedicine in Brain Diseases

Xue Xue

Editor

Nanomedicine in Brain Diseases

Principles and Application



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Preface

Nanotechnology had matured significantly during the last two decades as it has transitioned from benchtop science to applied technology. Understanding how the intrinsic properties of nanomaterials translate to complex biological responses is an area of intensive research. The challenge for nanomedicine is to utilize nanotechnology and develop innovative biocompatible nanomaterials that mimic tissue characteristics, cause minimal inflammation and cell loss, and have the abilities to function for a relative long period of time. Nevertheless, the application of nanomaterials to basic and clinical neuroscience is only at an early stage. This book is to overview the current strategies to use nanomaterials for brain disease and to introduce several novel nanomaterials that have excellent potentials in this field. With multiple functionalized modifications, nanomaterials are easy to traverse blood-brain barrier, and they are capable of diagnosing or treating brain diseases. Among these nanomaterials, nanozymes reduce oxidative stress via their intrinsic enzyme-like activation. Magnetic nanomaterials are vital contrast agents for MRI with their excellent magnetic orientation ability. Biomacromolecule-based nanomaterials greatly improve therapeutic efficiency through their self-assembly ability. Carbon-based nanomaterials are capable of forming a variety of special structures due to their strength and toughness, which makes them become feasible carrier for traditional drugs. Polymeric nanomaterials possess various properties that are widely used in diagnosing and treating brain disease. This book provides researchers, graduate students, and clinic practitioners with a cutting-edge and comprehensive summary of research on nanomedicine and their potential applications in clinic. I sincerely thank all the chapter authors for their great contribution to the book.

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