1. Record Nr. UNINA9910298603503321

Autore	Zhang Jiapu
Titolo	Molecular Dynamics Analyses of Prion Protein Structures : The Resistance to Prion Diseases Down Under / / by Jiapu Zhang
Pubbl/distr/stampa	Singapore : , : Springer Singapore : , : Imprint : Springer, , 2018
ISBN	981-10-8815-2
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (XXIX, 375 p. 596 illus., 278 illus. in color.)
Collana	Focus on Structural Biology, , 1571-4853 ; ; 10
Disciplina	572.6
Soggetti	Proteomics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Preface -- Basic Knowledge -- Part I Prion Resistance Species -- Rabbits -Wild-type and Mutants -- Dogs -Wild-type and D159NMutant -- Horses, Buffaloes, and Pigs -- Chicken, Turtles, and Frogs -- Other Species -- Part II b 2-a2 Loop -- Wild-type Mouse 37 oC and 19.85 oC Structures -- Mouse Mutants -- Other Species with an Ordered b 2-a2 -- Part III Human Mutants -- Human Mutants -- Human PrPC Monomer, Dimer and Its M129V Mutant -- Human Peptides -- Part IV PrP Binding/Docking -- PrP Bounded to Antibodies, Nanobody, RNA aptamer, etc -- Potential Antiprion Drugs -- Part V Prion Peptides with Cross-b Structures -- Mathematical Formulas for All PrP Peptides' cross-b structures -- Hydrogen Bonds Between Two Optimized Fundamental Chains of Each Model -- References. .
Sommario/riassunto	Unlike bacteria and viruses, which are based on DNA and RNA, prions are unique as disease-causing agents since they are misfolded proteins. Prion diseases are called "protein structural conformational" diseases. This monograph is the book on molecular dynamics (MD) simulations nearly for all the known normal prion protein (PrPC) PDB entries in the Protein Data Bank (PDB) and associations. Pig is a species that is largely resistant to prions, and chicken, turtles, frogs are species resisting prion infection too; firstly, this book will address all PrP strong immunity species (such as rabbits, dogs, horses, water buffaloes, pigs, chicken, turtles, frogs), compared with high susceptibility species. Other PrP models and doppel models are also MD studied in this book. Secondly, all the mutants of mouse PrP and human PrP are well studied

by this book. Mouse mutations in the 2-2 loop and the C-terminal will bring clear structures with highly and clearly ordered loop structures. Human mutations will cause prion diseases such as Creutzfeldt-Jakob diseases (CJDs), Gerstmann-Sträussler-Scheinker (GSS) syndrome, fatal familial insomnia (FFI), etc. Deep MD analyses of mouse and human mutants are done in this book. Thirdly, PrP binding with antibodies/compounds etc. is well MD studied in this book. The informatics of potential antiprion drugs known will be revealed. Lastly, cross- structure PrP peptides are well studied. This book is ideal for practical computing staff in the fields of computational physics, computational biology, computational chemistry, biomedicine, bioinformatics, cheminformatics, materials, applied mathematics and theoretical physics, information technology, operations research, biostatistics, etc. As an accessible introduction to these fields, this book is also ideal as a teaching material for students.