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Nota di contenuto	Amyloid Fibrils and Prefibrillar Aggregates; Contents; Preface; List of Contributors; 1 The Amyloid Phenomenon and Its Significance; 1.1 Introduction; 1.2 The Nature of the Amyloid State of Proteins; 1.3 The Structure and Properties of Amyloid Species; 1.4 The Kinetics and Mechanism of Amyloid Formation; 1.5 The Link between Amyloid Formation and Disease; 1.6 Strategies for Therapeutic Intervention; 1.7 Looking to the Future; 1.8 Summary; Acknowledgments; References; 2 Amyloid Structures at the Atomic Level: Insights from Crystallography 2.1 Atomic Structures of Segments of Amyloid-Forming Proteins 2.1.1 Protein Segments That Form Amyloid-Related Crystals; 2.1.2 Atomic Structures of Fiber-Like Microcrystals; 2.2 Stability of Amyloid Fibers; 2.3 Which Proteins Enter the Amyloid State?; 2.4 Molecular Basis of Amyloid Polymorphism and Prion Strains; 2.5 Atomic Structures of Steric Zippers Suggest Models for Amyloid Fibers of Parent Proteins; 2.6 Atomic Structures of Steric Zippers Offer Approaches for Chemical Interventions against Amyloid Formation; 2.7 Summary; Acknowledgments; References

3 What Does Solid-State NMR Tell Us about Amyloid Structures? 3.1 Introduction; 3.2 Principles of Solid-State NMR Spectroscopy and Experiments for Structural Constraints; 3.2.1 Isotope Labeling, Magic Angle Spinning, Dipolar Coupling, and Resonance Assignment; 3.2.2 Defining the Amyloid Core by Magnetization Transfer from Water; 3.2.3 Determining the Fibril Registry; 3.2.4 Seeded versus Unseeded Fibrils; 3.3 Amyloid Fibrils Investigated by Solid-State NMR Spectroscopy; 3.3.1 A peptides of Different Length; 3.3.2 Islet Amyloid Polypeptide (IAPP/Amylin): Parallel and Antiparallel Steric Zippers 3.3.3  $\alpha$ -Synuclein: Polymorphism with Flexible Terminal Regions 3.3.4 PrP: Rearrangements to Maintain a Fibrillar Core Region; 3.3.5 Yeast Prions with Glutamine/Asparagine-Rich Prion Domains: Sup35p, Ure2p, and Rnq1p; 3.3.6 Functional Amyloid: the Yeast Prion HET-s; 3.4 Summary; References; 4 From Molecular to Supramolecular Amyloid Structures: Contributions from Fiber Diffraction and Electron Microscopy; 4.1 Introduction; 4.2 History; 4.2.1 The Historical Use of X-ray Fiber Diffraction; 4.2.2 The Historical Use of Transmission Electron Microscopy; 4.3 Methodology; 4.3.1 X-Ray Fiber Diffraction 4.3.2 Transmission Electron Microscopy 4.4 Recent Advances in Amyloid Structure Determination; 4.4.1 X-ray Fiber Diffraction; 4.4.2 Transmission Electron Microscopy; 4.5 Summary; Acknowledgments; References; 5 Structures of Aggregating Species by Small-Angle X-Ray Scattering; 5.1 Introduction; 5.2 Theoretical and Experimental Aspects; 5.3 Data Analysis and Modeling Methods; 5.4 Studying Protein Aggregation and Fibrillation Using SAXS; 5.4.1 Some General Considerations; 5.4.2 SAXS Studies of Insulin, Glucagon, and  $\alpha$ -Synuclein; 5.4.3 SDS-Induced Aggregation of  $\alpha$ -Synuclein 5.4.4 Multi-Component Fitting and Analysis of SAXS Data

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#### Sommario/riassunto

Summing up almost a decade of biomedical research, this topical and eagerly awaited handbook is the first reference on the topic to incorporate recent breakthroughs in amyloid research. The first part covers the structural biology of amyloid fibrils and pre-fibrillar assemblies, including a description of current models for amyloid formation. The second part looks at the diagnosis and biomedical study of amyloid in humans and in animal models, while the final section discusses pharmacological approaches to manipulating amyloid and also looks at its physiological roles in lower and higher organisms.

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