
Preface

Amyloid diseases are characterized by the deposition of insoluble fibrous amyloid proteins. The word “amyloid” indicates a starch-like compound, and though a misnomer, continues to be the accepted term for this group of protein conformational disorders. Approximately 30 different proteins can form amyloid and although there is usually no homology in their amino acid sequence, all share a β -pleated secondary structure. Historically, these β -pleated deposits were detected by histological dyes, and the characteristic fibril structure confirmed with electron microscopy. As these amyloids were purified and sequenced, various in vitro techniques were developed, often using synthetic peptides and/or highly purified amyloid derived from diseased tissue. Development of animal models occurred concurrently and some of these diseases can now be passed on to animals by injecting them with amyloid-rich tissue fractions, suggesting an infectious nature for these proteins. For other amyloidoses, transgenic technology has been necessary for recapitulating the disease. Together, these in vitro and in vivo models have been used to understand the etiology and pathogenesis of amyloid diseases as well as to screen for drugs that can block amyloid formation and/or disassemble the fibrils.

Several of these methods and protocols are detailed in *Amyloid Proteins: Methods and Protocols*, using examples from various amyloids. The volume is divided into three parts. Part I contains in vitro assays, starting with a few chapters that focus on preparation of amyloid and its precursors (oligomers and protofibrils). These are followed by chapters detailing specific analytical methods for studying these proteins. Part II describes cell culture models and assays for production of amyloid proteins, and Part III consists of protocols for amyloid extraction from tissue, its detection in vitro and in vivo, as well as nontransgenic methods for developing amyloid mouse models. Most of the chapters follow a similar format and are detailed protocols for performing a particular procedure. However, certain chapters focus more on the general principles and theoretical issues of a particular method.

It is my hope that these articles will be useful both for students and scientists new to the amyloid field as well as for seasoned investigators learning new techniques to further their research.

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