
Preface

Alzheimer's disease (AD) is the most common neurodegenerative disorder and one of the most feared diseases due to the manner in which it robs its victims of their memories. Frontotemporal dementia (FTD) is perhaps somewhat less well known among the public, but it is also a prominent cause of dementia that produces devastating changes in personality and a decline in interpersonal interactions. The two conditions are often considered siblings, for while they are distinct disorders targeting different brain regions and producing unique clinical symptoms, there is some overlap in their molecular neuropathology (such as the presence of inclusions containing the microtubule-associated protein tau) and genetic risk factors (such as apolipoprotein E).

Both conditions were originally described around the turn of the last century but languished without significant research effort for decades. In the 1980s, breakthroughs in pathobiochemistry and genetics led to identification of molecular players in these diseases, enabling a very fruitful period of biomedical research that continues to intensify. Recent years have seen a growing interest in the neurobiology of neuronal dysfunction in these conditions with increasing application of complex techniques from molecular and cellular neuroscience. Thus, the diversity and sophistication of methods and protocols used for research on AD and FTD continue to grow. It is not uncommon, and actually is expected in many journals, to see publications that include techniques as divergent in their required expertise as behavior, electrophysiology, confocal microscopy, and hardcore biochemistry. Consequently, projects in AD and FTD research may require individual investigators to branch out into complex approaches for which they have not received abundant hands-on training. The goal of this book is to make many of those techniques more accessible.

The book is intended for scientists of all kinds studying AD and FTD. Realizing that many of the approaches will be foreign to some users, the protocols are presented in a step-by-step fashion with complete materials lists and user notes describing the “real story” about how to make the method work.

The book begins with an overview of the two diseases and modern approaches to research on them. Many of the molecules associated with AD and FTD are notoriously difficult to work with, so the first half of the book (Chaps. 2–10) details specialized protocols for working with amyloid- β peptide, tau, and apolipoprotein E. The second part (Chaps. 11–18) focuses on experimental systems for studying AD and FTD, including cell and animal models, and outcome measures that can be used to assess neuronal function in these systems.

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