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Natural Compounds as Therapeutic Agents for Amyloidogenic Diseases

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Preface

A large group of human diseases are characterised by the deposition of insoluble proteinaceous lesions, termed amyloid. The underlying pathogenic process in these disorders involves the misfolding and self-assembly of native monomeric proteins into toxic, multimeric aggregates. Indeed, “protein misfolding” is one of the most researched topics in *cell biology* and *sub-cellular biochemistry* in recent years. To date, more than 20 amyloidogenic proteins have been identified, including amyloid-beta and tau in Alzheimer’s disease, alpha-synuclein in Parkinson’s disease, huntingtin in Huntington’s disease, superoxide dismutase in amyotrophic lateral sclerosis, prion protein in Creutzfeldt-Jakob disease and islet amyloid polypeptide in type 2 diabetes mellitus. Collectively, these disorders inflict an enormous economical burden on societies, whilst being devastating at a personal level. It is therefore of paramount importance to understand their origin and learn how to treat, or prevent, them. At present, there are no approved therapies that target amyloid formation directly, but a wealth of experimental and epidemiological evidence now indicates that various naturally derived compounds have beneficial anti-amyloid effects.

This book volume was written with the aim of disseminating the state-of-the-art and most recent knowledge of the field, highlighting the most promising nutra-therapeutics derived from natural compounds or extracts. The focus is mainly on Alzheimer’s disease and related dementias; however, Parkinson’s disease and other forms of cerebral amyloidosis are also discussed. Evidence is presented based upon published studies that have undergone rigorous scientific peer review. Researches include a combination of *in vitro* (biophysics, biochemistry, molecular and cellular biology), *in vivo* (fruit fly, transgenic mice and rats) and epidemiological (human) studies, so as to provide the reader with a holistic scientific approach. Among the therapeutic agents that are discussed in detail, we find Mediterranean diet and olive oil polyphenols, teas and catechins, natural phenolic compounds and bioflavonoids. Given the recent surge of public interest in herbal medicines, a chapter is devoted to evidence-based traditional Chinese medicine in brain ageing. Individual chapters are written by established scientists in their relevant fields; sufficient background is given in each chapter by way of introduction to the non-expert reader. Hence, this book should be of interest to a wide audience, including academia, various health professionals, the nutraceutical industry and undergraduate students reading for pharmaceutical, medical, biology and chemistry degrees.

I conclude by stating that, on a personal level, the most noble goal of this book is that with our collective contributions to scientific progress, we aim to provide hope for the future and hope for the many people suffering from as yet incurable amyloid diseases. This book is, after all, dedicated to them.

Msida, Malta

Neville Vassallo

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