

Preface

Alzheimer's Disease (AD) is an age-related neurodegenerative disorder, which accounts for more than 80% of dementia cases worldwide in older people. It is characterized by the deposition of A β plaque and neurofibrillary tangles. The disease leads to progressive loss of memory, functional ability to learn and is primarily characterized by the progressive loss of memory associated with other cognitive deficits.

Despite decades of study on the etiology of disease and also significant efforts by the pharmaceutical industry to develop therapies, there is no effective treatment available to cure AD or inhibit its progression significantly. However, there are four drugs *viz.* donepezil, galantamine, and rivastigmine, approved by USFDA, acting on cholinergic pathway and memantine acting on NMDA receptor. Given the complex and multifactorial nature of the disease, the development of multifunctional ligands was considered a better option.

The present study is being divided into six chapters:

Chapter 1 deals with Alzheimer's disease (AD), pathophysiology, and current treatments for AD.

Chapter 2 provides insight into the literature reports related to the relevant work.

Chapter 3 includes the hypothesis, rationale, and plan of the work.

Chapter 4 deals with the rationale for synthesizing and evaluating novel ferulic acid glycine/piperazine amide/benzylpiperazine/tryptamine derivatives. The designed molecules were promoted to synthesis and *in-vitro* enzyme inhibition studies. The potent molecules obtained from the *in-vitro* study were further investigated for enzyme kinetics, antioxidant, metal chelation, A β modulation, and neuroprotection study. Furthermore, lead compounds were selected for *in-vivo* studies in AD animal models to evaluate the working memory and learning response.

Chapter 5 includes the general synthetic procedure involved in the synthesis of targeted compounds and their biological evaluation.

Chapter 6 deals with the conclusion and final summary.