

# Preface

This thesis is the result of my doctoral research at the Zydus Research Centre and the Department of Chemistry at the Maharaja Sayajirao University of Baroda in Vadodara, India. This research has also been a part of my work as an associate research scientist at the Zydus Research Centre in Ahmedabad, India, where I have been affiliated since October 2007.

The thesis consists of four major sections that cover the development of a Bruton's tyrosine kinase (BTK) inhibitor for the treatment of autoimmune diseases like B-cell malignancies and rheumatoid arthritis. A part of the thesis has been published in an international journal.

The '**Introduction**' section deals with general information about B-cell function and B-cell mediated autoimmune diseases, wherein the detailed pathophysiology of the disease and the current treatment options are discussed. This was followed by an introduction to BTK inhibitors as targets for the treatment of autoimmune diseases.

In the section titled '**Results and Discussion**' the strategies and rationale for designing novel BTK inhibitors are discussed, and their synthesis route, biological activities, and molecular modelling studies are described.

The '**Experimental**' section is where the detailed procedures for the synthesis of the compounds as well as the characterization data are presented. The details of biological experiments were also described in this section.

In the final section of the thesis, the '**Spectral data**' of most of the compounds and copies of the publication are presented.

It has been a wonderful learning opportunity for myself to work on this thesis. Understanding the physiological pathways involved in autoimmune diseases and the

biological role of BTK in complex diseases was very interesting and simulative. Molecular modelling studies provided great learning opportunities and were instrumental in understanding the ligand-receptor interactions and structural requirements of the compounds that needed to be synthesized. It was an excellent learning experience for me to publish my research findings in an international scientific journal and to write my thesis.

In today's world, human life is affected by stress, pollution, unhealthy food, and viral infection, which leads to B-cell-mediated autoimmune diseases like B-cell malignancies, rheumatoid arthritis, etc. There are currently very few therapeutic options available to treat autoimmune diseases. Being a research scholar, my objective is to discover novel therapies with the goal of alleviating human suffering. The research work carried out during my PhD gives me a great level of satisfaction, as the findings from this research work may be useful to obtain a solution for an unmet need in the treatment of autoimmune diseases.

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