PREFACE

This thesis is the outcome of my Ph.D. work carried out at Zydus Research Centre, Ahmedabad, India and the Department of Chemistry, The Maharaja Sayajirao University of Baroda, Vadodara, India.

The thesis consists of four major sections, Introduction, Designing, Result and discussion, experimental details and overall summary part covering various aspects of inflammatory diseases and development of the JAK inhibitors for their treatment.

In an **'Introduction'** section, pathophysiology of the disease and the current therapeutic options are discussed, followed by an introduction JAK inhibitors as novel targets for the treatment of inflammatory diseases.

The '**Designing**' section deals with the general information, rational for the the designing of novel JAK inhibitors.

The '**Results & Discussion**' section summarized discussion on synthesis, biological activities and molecular modeling studies of the novel compounds.

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

In the **'Appendix-I'** abbreviation used in thesis are enclosed.

In the **'Appendix-II'** Copy of spectra (^{1}H NMR, ^{13}C NMR, ESI-MS and HPLC / UPLC) of representative compounds from each series (intermediates and final

compounds) are enclosed, followed by copies of our publications.

Working for this thesis has been a great learning experience for me. Understanding the physiological pathways involved in inflammatory diseases and the biological role of JAK in this complex disease was very interesting and simulative. Molecular modeling experiments provided good learning and were instrumental in understanding the ligand receptor interactions and structural requirements of the compounds to be synthesized. Presenting the work in the form of publications was equally a good learning experience.

Human suffering is increasing day by day owing to various life threatening diseases and due to absence of treatment or resistance to treatment. Current understanding of inflammatory diseases and treatment options are good but not adequate enough. Hence every endeavor in the direction of developing novel therapies in this area would be a significant contribution towards alleviating human suffering.

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