Preface

Inflammation is the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants. It is a protective attempt to remove the injurious stimuli as well as initiate the healing process for the tissues. Therefore, inflammation is tightly regulated by the body. However, if inflammation remains unchecked, it may lead to diseased conditions, such as hay fever, atherosclerosis, rheumatoid arthritis, etc.

Inflammation may be chronic or may develop following acute inflammation. Autoimmune disorder like rheumatoid arthritis (RA) is characterized by marked inflammation and associated failure to repair. Many current anti-inflammatory drugs target inflammatory mediators at different levels, yet they lack specificity and their untoward effects restrict their long term use. Hence, there is a constant demand for newer and better therapeutic alternatives.

Various approaches are needed for the control and management of RA. It may range from the very specific treatment targeted to the molecular mediators, such as anti-TNFα, anti-IL1β monoclonal antibodies, to the ethnomedicine approach of using alternate therapies (crude extract) of the medicinal plants. The aim of the present work was to find out anti-inflammatory agents, using different approaches. The first chapter focuses on the importance of crude plant extracts as promising treatment. In continuation, the active component(s) responsible for medicinal properties from one of these plants were isolated and assessed for its anti-arthritis activity. There is a probability that a compound showing anti-inflammatory activity does so by scavenging free radicals thereby showing anti-oxidant activity. So, the anti-arthritis activity of suramin was found to be due to both these properties. The altered levels of active phase proteins (also shown in the chapter 4A- Glycoproteomic studies of CIA) after the induction of arthritis were normalized using suramin. However, more specific approach of treating inflammation was to target the prime pro-inflammatory cytokine TNF-α
using peptide inhibitor which disrupts the formation of its trimer, thereby rendering the cytokine inactive. Thus the present thesis is aimed towards the study of various anti-inflammatory agents for their potential therapeutic properties. This thesis report is presented in six chapters followed by an “appendix” section. To begin with, “Introduction” is presented as Chapter 1 followed by the “review of literature” (Chapter 2), these two chapters describe about the inflammation and rheumatoid arthritis such as the disease etiology, symptoms, diagnosis and therapies. Third chapter comprises of the “materials and methods” which discusses about various reagents and experimental procedures included in the study. The results and discussions of all the experiments of the thesis work have been reported in the fourth chapter, which is subdivided into three sections, namely 4A, 4B and 4C. The section 4A comprises of the screening of medicinal plants, isolation of active compound from one of the plants and its in vitro evaluation using cell culture and in vivo study using the CIA rat model. Section 4B discusses about the anti-arthritis effect of suramin in CIA model. Section 4C elaborates the results of anti-TNFα effects of synthetic peptides using various cell culture techniques. Chapter 5 highlights the summary and conclusion of the thesis. The literature cited in the text has been covered under bibliography and has been named as chapter 6. The appendix has been presented as the last section which shows the articles which have been published and under communication.

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