The work presented in this thesis was carried out with an aim to explore the synthetic and biological importance of imidazole derivatives using some simple cyclization and addition reactions. In particular, some novel N-substituted-2-aminoimidazoles, N-substituted-2-aminobenzimidazoles and N-substituted-2-mercaptopimidazoles have been synthesized and characterized on the basis of spectroscopic techniques. Owing to their immense biological importance these imidazoles were evaluated for anticancer, antimicrobial and antioxidant activity. The thesis consists of the three Chapters (1-3).

Chapter 1 highlights the brief introduction of imidazoles and their derivatives including the synthetic and biological potential. In addition, synthetic preview and biological significance of benzimidazole derivatives have also been reviewed.

Chapter 2 deals with the results and discussion part which has been divided into three sections:

First section describes the synthesis of 2-aminoimidazole-quinoline hybrid compounds accomplished by the reaction of (E)-2-((2-chloro-6-substituted-quinolin-3-yl)methylene) hydrazine carboximidamide with various aryl/heteroaryl α-haloketones under mild reaction conditions. All the synthesized compounds were well characterized on the basis of spectroscopic techniques and tested for their in vitro anticancer potential against two human colon cancer cell lines (HCT-116, DLD-1), human breast cancer cell line (MDA-MB-231) and normal human cell line (HUVEC).

Second section describes the synthesis of 2-aminobenzimidazole-schiff base coupled products obtained by the reaction of 1,2-diaminobenzimidazole with different aryl/heteroaryl aldehydes using ethanol as a solvent. All the synthesized compounds were characterized on the basis of spectroscopic techniques and evaluated for their anticancer potential against breast cancer cell line (MCF-7), Human fetal lung fibroblast MRC-5 and breast epithelial cell line MCF-10A.

Third section deals with the synthesis and biological significance of N-aryl-2-mercaptopimidazoles which were obtained by the reaction of 3-aminoacetophenone with various phenacylbromides followed by cyclization with KSCN in acetic acid. All the synthesized compounds were characterized on the basis of spectroscopic techniques. The antimicrobial potential against bacterial strains, S. aureus, B. subtilis and C. albicans fungal strain and antioxidant for all the synthesized compounds were evaluated using agar well diffusion method and DPPH method, respectively. It has been found that 2-
mercaptoimidazoles show a significant level of antioxidant potential as compared to antimicrobial potential.

Chapter 3 describes the detailed experimental procedure used to synthesize various key intermediates and final products. All the synthesized compounds were evaluated for different type of activity like anticancer, antimicrobial and antioxidant, etc. It also describes about the various techniques used to characterize the synthesized compounds.