PREFACE

Breast cancer imposes a significant healthcare burden on women worldwide. For example, in India, breast carcinoma accounts for 22.2% of all diagnoses and 17.2% of all cancer deaths among women (Ali et al., 2006). In addition, preceded only by lung cancer, breast cancer is at present the second leading cause of cancer deaths (Jemal et al., 2008). Despite the substantial progress made in cancer therapy, the survival rate of breast cancer still is inversely proportional to its stage at the time of diagnosis. Therefore sort of prevention and detection of breast cancer at an early still curable stage would offer the best route to decrease its mortality rates. However, since many patients present with advanced disease, the currently applied diagnostic screening tools (e.g., mammography) obviously do not suffice for adequate breast cancer diagnosis. Obviously, the present applied prognostic and predictive markers (e.g., age, hormone receptor status and HER2/neu) lack adequate performance as well. Hence, improved markers for early detection and diagnosis, accurate prognosis and treatment prediction, applied either individually or in combination with existing modalities, are warranted to improve breast cancer care.

In cancer, a biomarker refers to a substance or process that is indicative of the presence of cancer in the body and it might be either a molecule secreted by a tumor or it can be a specific response of the body to the presence of cancer. Genetic, epigenetic, proteomic, glycomic, and imaging biomarkers can be used for cancer early detection, diagnosis, prognosis and epidemiology (Hinestrosa et al., 2007). However, cancer biomarkers are used in the detection, the chance of recurrence, accurate evaluation and management of the disease in different stages. These are helpful in predicting throughout the course of the disease which includes early detection, prognosis of the disease, prediction of how the disease will respond to drug treatment and detection of recurrence and screening of the disease. In the recent past, the immunological molecular markers such as hormonal receptors (ER/PR) and HER2/neu oncoprotein proteins are useful in the management of breast cancer (Jordan and Brodie, 2007). It make-out to predict the eventual prognosis and can assist in the determination of the most appropriate treatment for the individual. Besides, other new emerging biomarkers such as p53, ki-67 and Bcl2 could be considered for prognosis determination and prediction of response to treatment. As well, during recent past
the analysis of trace metals content, pro-and anti-oxidant status and metallothioneins expression in breast cancer tissues has gained great concern due to their role in breast tumorigenesis.

The objectives of the present research have been presented in five chapters. The first chapter emphasizes different types of risk factors which indicate the chances of occurrence or progress of stages of breast cancer. The results of the second chapter explains the association between conventional prognostic markers (tumor size, lymph node involvement, tumor grade, menopausal status and clinical stage) and immune-histological biomarkers which include ER, PR, Her2/neu, p53, Bcl2 and Ki67. The third chapter provides the valuable information on the content of trace metals in breast cancer patients. The results of fourth chapter include studies related to pro-and anti-oxidant enzyme levels in non-cancerous and cancerous breast tissue of women at different clinical stages in pre and post menopausal conditions. The results presented in the fifth chapter throws light on the metallothionein isoforms expression pattern in control tissue (Non tumor) and cancerous breast tissue (tumor tissue) of women at all clinical stages with respect to pre and post menopausal condition.

However, the author is aware of the fact that more extensive studies are required for a thorough understanding of the problem. Limitations in the availability of chemicals and equipment have precluded the author from getting into the depth of the problem and from bridging some of the lacunae that have emerged during the study. Nevertheless, he feels that he has made the best use of limited facilities available in the laboratory in carrying out experiments to evaluate different biomarkers in this study.

The dissertation presents a humble effort by the researcher towards a better understanding of the biomarkers for further studies on breast cancer. The researcher assumes the responsibility for any deficiencies presented in the text, which could be due to oversight, and earnestly requests to condone.