RECENT MARKERS IN BREAST CANCER

ESSAY

Submitted for partial fulfilment of Master Degree in

General Surgery

رسالة

Presented By

Tarek Rashad El-Sayed

M. B. B. Ch.

Supervised By

Prof. Dr./ *Hussein Abd El-Alim Boshnak*

Assistant Professor of General Surgery

Ain Shams University

Dr. / *Gamal Mohamed Mabrouk*

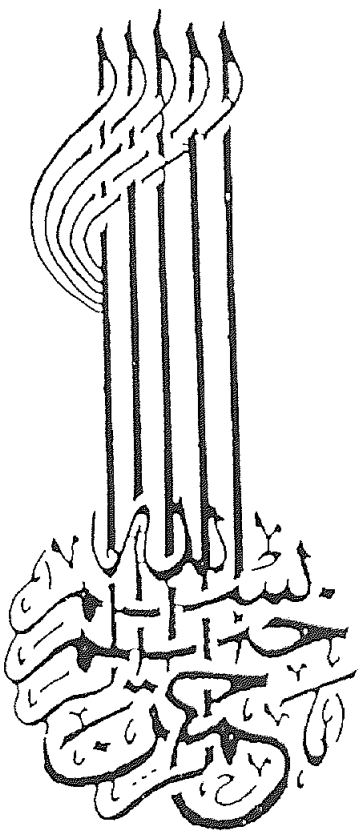
Lecturer of Biochemistry

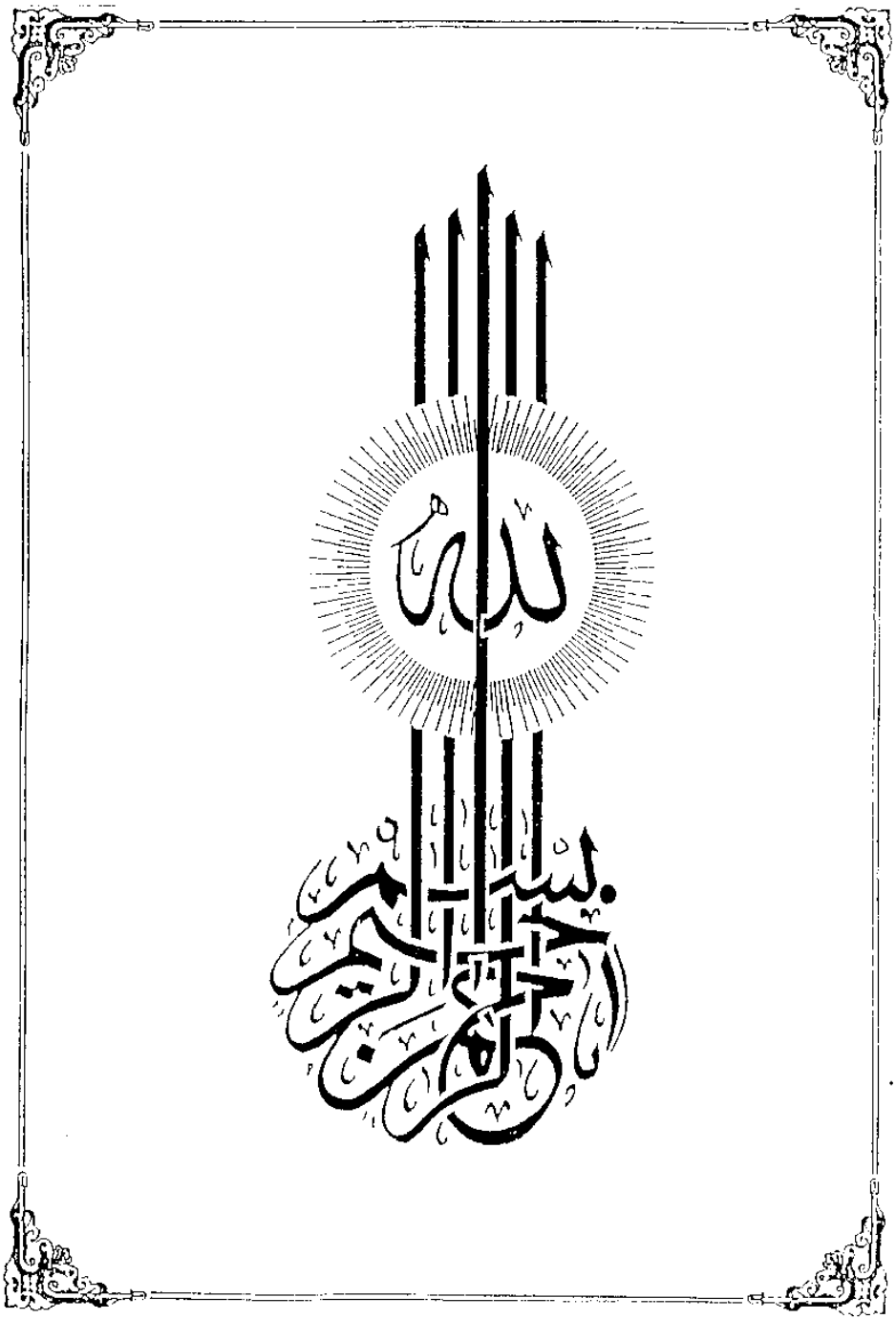
Ain Shams University

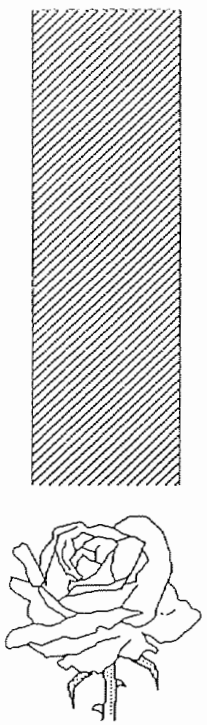
Faculty of Medicine

Ain Shams University

1992


بسم الله الرحمن الرحيم





To

My Parents

ACKNOWLEDGMENT

First and foremost, I feel always indebted to God, the most kind and the most merciful.

I wish to express my sincere gratitude and cordial thanks to Prof Dr. *Hussein Abd El-Alim Bashnak,* Assistant professor of General Surgery, Ain Shams University who inspired this work;his planning, ideas and wise guidance created this work.

Also, I am greatly indebted and very grateful to Dr. *Gamal Mohamed Mabrouk,* Lecturer of Biochemistry, Ain Shams University for his extremely helpful advice, encouragement and enthusiasm.

The candidate

1992

List of Abbreviations

ADH : *Atypical ductal hyperplasia.*

$CA_{15\text{-}3}$: *Cancer antigen 15-3.*

CEA : *Carcino embryonic antigen.*

CIS : *Carcinoma in situ.*

DCIS : *Ductal carcinoma in situ.*

EGF : *Epidermal growth factor.*

ERs : *Estrogen receptors.*

I.D.C. : *Invasive ductal carcinoma.*

Kd. (kd) : *Kilodalton.*

Mr. : *Molecular weight.*

PRs : *Progesterone receptors*

CONTENTS

Chapter (I)

Introduction

INTRODUCTION

Diseases of the breast attracted medical interest as long ago 3000 B.C. during the advanced civilization of Egypt (the age of Pyramids). It is not surprising that breast cancer should be considered today 4000 years later, the best studied and understood of the tumors that afflict man kinds. Breast cancer is unique amongst the common cancers in that it continues to claim the victims for 20 years or more after effective local treatment *(Iglehart, 1991)*

The prognosis of patients who present with operable breast cancer is extremely variable and tremendous efforts have been made over the years to identify additional factors which may be measured at the time of presentation which will give an accurate indication as to the likely prognosis of a given patient *(Perren, 1991)*.

Tumor markers have greatly facilitated the treatment of patients by early diagnosis and accurate reflection of residual microscopic lesion. In recent years many potential new prognostic markers of biochemical nature have been described for breast cancer and some have found their way into wide spread clinical use *(Staker et al., 1988)*. The fruits of these markers are already becoming apparent *(Slamon, 1987)*.

This essay is an attempt to clarify some of these recent biological markers for breast cancer such as :-

- Steroid hormone receptors
- PS2 (gene, m-RNA, protein)
- C-erb.B-2 or HER2/neu oncogene
- Cathepsin D
- Mammary Serum Antigen (MSA)

Chapter (ii)

Surgical Anatomy of the Breast

SURGICAL ANATOMY OF THE BREAST

I. Gross Anatomy of the Breast

Knowledge of the anatomy of the breast is required not only for the performance of surgical procedures, but also, in planning the therapeutic radiation, predicting sites of locally recurrent disease and assessing the adequacy of surgical procedures *(Iglehart, 1991)*.

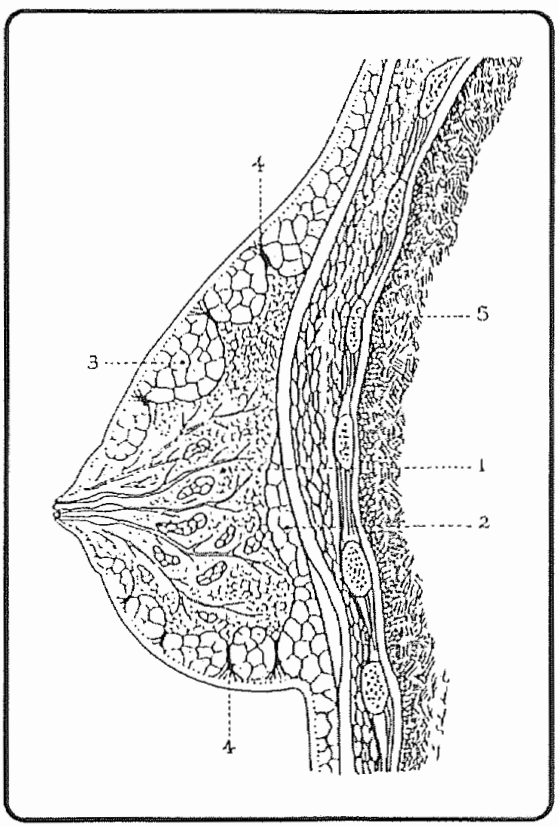


Figure (1) Sagittal section of the normal breast, showing its relation to the chest wall and the rib cage. 1, The mammary gland tissue. 2, Retromammary fat. 3, The investing envelope of subcutaneous fat. 4, The fibrous septa (Cooper's Ligaments). 5, Fat and pectoral muscle layer beneath the deep fascia. *(From* Sabiston D.C. Text Book of Surgery, 1991)

The breast consists embryologically and morphologically of group of exceedingly highly specialized cutaneous glands, and therefore is a constituent element of superficial layers of the costal region. Its function in female, the frequancy of breast lesions and the importance of the lymphatic extension in the breast lesions, warrant special consideration *(Mc Vay, 1984).*

The breast parenchyma lies cushioned in fat between the layers of superficial pectoral fascia. Between the deep layer of the superficial fascia and the fascial investment of the pectoralis major muscle, the breast rests on a thin layer of loose areolar tissue, retromammary space, containing lymphatics and small vessels. When one performs total mastectomy, the correct plane is found under the pectoral fascia and includes the retromammary space *(Fig.1)* *(Iglehart, 1991)*.

A mamma consists of glandular tissue (mammary gland proper) and fibro-adipose tissue between its glandular lobes and lobules, together with blood and lymphatic vessels and nerves and covered by skin *(Fig.2) (Williams, 1989).*

In young adult females, each breast is a rounded eminence lying within the superficial fascia chiefly anterior to the upper thorax but spreading laterally to a variable extent. Its shape varies greatly in individuals and races and at different ages, beeing hemispherical, conical, variable pendulous, pyriform or thin and flattened *(Williams, 1989).*

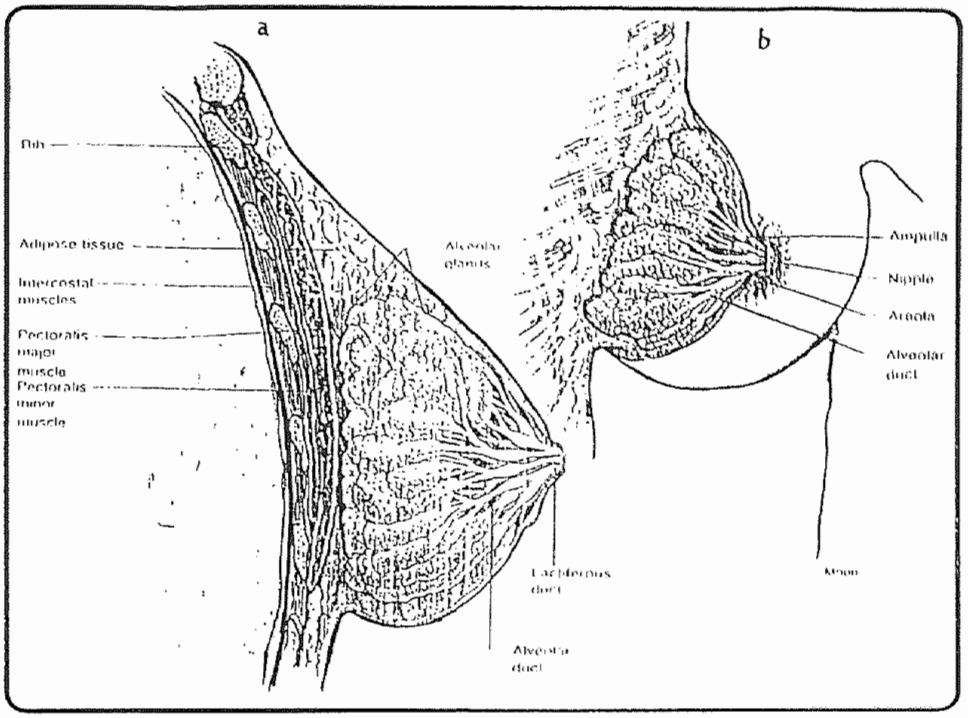


Figure (2) : Structure of the breast. (a) Sagital section (b) Anterior view From Hole J.W. Human Anatomy, 1985).

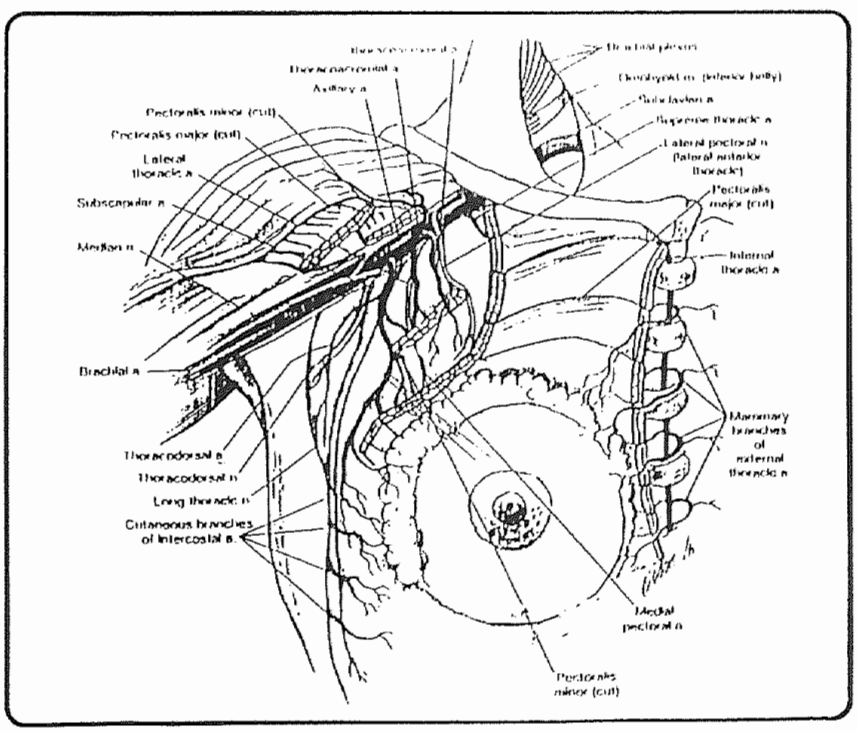


Figure (3) : Nerves and Arteries of the breast (From Skandalakis. J.E. Atlas of Surgical Anatomy for Genral Surgeons, 1985).

In lateral plane its base extends vertically from the second to sixth rib, at the level of the fourth costal cartilage it extends transversly from the parasternal region to the mid axillary line. The supero-lateral quadrant is prolonged superolaterally towards the axilla as the axillary tail along the lower border of pectoralis major, sometimes passing through the deep fascia nearly as far as the prectoral group of axillary lymph node. The deep aspect of the breast is slightly concave and is anterior to pectoralis major, serratus anterior, obliqus externus abdominis and rectus sheath. It is separated from these by the deep pectoral fascia, with superficially intervening loose connective tissue, the retromammary space, which allows the breast some degree of movement on the deep pectoral fascia. Advanced mammary carcinoma may, by invasion, fix the breast to pectoralis major (*Williams, 1989*).

Nipple and Areola

The skin over the center of the breast is modified to form the areola and nipple.

The circular areola, a cutaneous zone about 5 cm. in diameter, has many minute rounded elevations, indicating the presence of underlying cutaneous glands which are isolated sebaceous glands for lubrication of nipple during lactation (Montgomery glands) (*McVay, 1984*).

The nipple which is a conical or wart like elevation is located in the middle of the areola on the approximate summit of each breast.