# "NEW THERAPEUTIC TRENDS FOR BREAST CANCER"

*ESSAY*

**Submitted For Partial Fulfilment**
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**BY**



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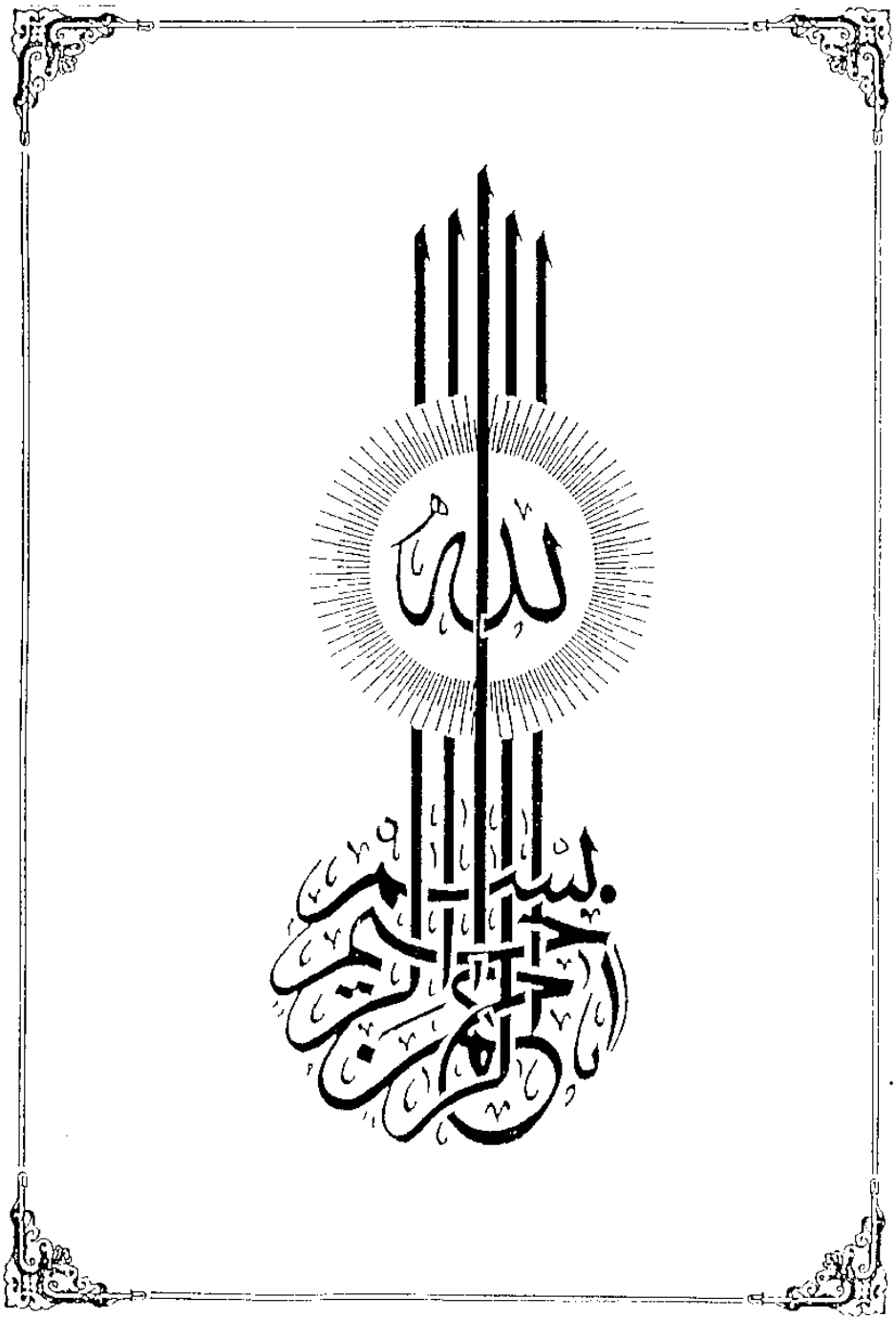

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## EMBRYOLYG

In the young embryo a pair of band like thickenings of ectodermal origin appear on the venteral body wall extending from the axilla to the groin. They are called the milk line or ridges. The lower part of the milk line disappears while its upper part develops into the mammary gland.

The gland appears as a lenticular mass of epithelial cells. During the 4th month, it grows further and in the 5th month the epithelial thickening on each side gives rise to about 16 to 24 cellular cords then branchs to form secondary cellular cords. By the eighth and nineth months, cords become canalized and the original epithelial down growth now appears as a pit in which the rudimentary duct system opens. About full term, the connective tissue elements underlying the pit proliferate, causing its lining to be elevated above the surrounding surface to form the nipple. If this does not occur the ducts open into a pit instead of a nipple, a defect known as inverted or crater nipple. At birth the rudimentary mammary glands are similar in both sexes with signs of hypertrophy and secretary activity (witchis milk) (Hamilton, 1976).

## GENERAL DESCRIPTION

Using the nipple as a reference point, each breast is divided into four quadrants upper-inner, lower-inner, upper-outer and lower-outer quadrants. Also, there is a retro areolar area and axillary tail. (Gartell, 1989).

Projection of fibrous tissue (Cooper's ligments) extends from the deep muscular fascia to the fibrous tissue of the dermis. These bands of fibrous tissue which serve to support the breast are important pathologically because of the communication that they establish between the breast and the skin. This communication leads to skin retraction overlying some infiltrating carcinomas of the breast (Gartell, 1989).

These glands together with their fibrous and fatty tissues occupy the interval between the 2nd and 6th ribs, and stretch from the parasternal to the midaxillary line about the 4th rib. Their medial half rest above on the pectoralis major and below on the aponeurosis of the external oblique where they cover the upper part of the rectus abdominus. The lateral half of the breast lies upon the pectoralis major above and on the serratus anterior plus digitation of the external oblique origin below (Grobler, 1977).

The size and shape of the mature mammary glands vary generally in different races and individuals. They also vary according to their state of functional activity. In nulliparous young adults they are usually hemispherical but somewhat flattened above the nipple. They become enlarged in pregnant and lactating women and usually undergo atrophy after the menopause (Hamilton, 1976).

The nipple is a conical projection from just below the center of the anterior surface of the breast at the level of the 4th intercostal space in nulliparous females. It is traversed by about 16-24 milk ducts which open on its wrinkled tip. It contains numerous non striated muscle fibres arranged mostly in circular fashion and cause erection of the nipple upon its stimulation. Arround the nipple is the areola (Peter L. Williams, et al., 1973).

The skin covering of the breast is smoother, translucent and more thinner than the skin covering most of the rest of the body. (Hamilton, 1976).

Thickening of this skin as revealed by mammography may be a sign of malignancy. The two breasts are frequently of unequal size. Much of the mammary tissue is in the upper outer quadrant, accounting for the observation that more benign and malignant processes affect this sector than any other (Gartell, 1989).

The basic subunit of the glandular tissue is the alveolus. Clusters of alveoli form lobules, which in turn aggregate to form lobes. The alveoli empty into the lactiferous ducts, these ducts unite to form larger ducts, which correspond to one of the chief subdivisions of the breast. There may also be accessory breasts or nipples in one to two percent of subjects. (Gartell, 1989).

## BLOOD SUPPLY

### ARTERIES:

Arteries supplying the breast are;

**I- Lateral thoracic artery:**

It is a branch from the 2nd part of axillary artery. It gives rise to the external mammary arteries which cause down along the lateral border of the pectoralis minor muscle (Last. R. J., 1986).

**II- Perforating branches of the internal mammary artery:**

The 1st, 2nd and 3rd are the most frequant sources; the common number supplied to a gland is two. The perforating rami, after piercing the intercostal musculature, supply the pectoralis major muscle and send branches to the overlying skin. ( Mc Vay, 1984 ).

**III- Acromio-Throacic branch of the axillary artery:**

It gives rise to the pectoral branch at the medial edge of the pectoralis minor muscle, this vessel courses

between pectoralis minor and major, then gives branches to the posterior surface of the breast. (Rush, 1989).

In addition to the above mentioned major vessels, there are other vessels, namely, the superior branch of the axillary artery, the lateral perforating branches of the intercostal arteries and the branches of the subscapular artery (Benjamin F. Rush, Jr., 1989).

**VENOUS DRAINGE**

**I- THE SUPERFICIAL SUBCUTANEOUS VEINS:**

They form a rich anastomosing network before they drain into the internal mammary vein or occasionally into the superficial vein of the lower neck. Veins become markedly dilated during pregnancy and may become prominent over an area of underlying neoplasm. (Benjamin F. Rush, Jr., 1989).

**II- THE DEEP VEINS:**

(a) The intercostal veins:

One of the most important routes passes posteriorly to the vertebral veins and then to the azygos veins and the superior vena cava. The vertebral veins are a separate system paralleling the caval system. They drain not only the vertebrae but also the bones of the pelvis, upper ends of the femur, the shoulder girdle, the upper ends of the humeri and the skull. (Mcvay,1984).

(b) Tributaries of the axillary vein.

(c) Perforating branches of the internal mammary vein: They are the largest veins draining the breast, passing through intercostal spaces to empty finally into innominate veins, then to the pulmonary capillary network and so they are easy routes for metastatic carcinomatous emboli to the lung. (Mcvay, 1984).

The anastomosis of the intercostal veins with the vertebral veins is the explanation for the often great metastasis of breast cancer to the vertebral bodies or even the sacrum or pelvis without presence of metastatic deposition in the lung. (Benjamin F. Rush, Jr., 1989).

**LYMPHATIC DRAINAGE:**

THE BREAST HAS A RICH LYMPATIC NETWORK :

**( A ) LYMPH VESSELS**

A dense areolar and nipple lymphatic network is continuous with the surrounding cutaneous lymphatics and also communicate with the deeper part of the central portion of the breast. From the subareolar plexus there are usually two major trunks, one from the superior and one from the inferior portion which drain into the axillary lymph nodes. The deep lymphatics, which originate in the interlobular and perilobular regions, may either converge into the sub-

areolar plexus or may drain peripherally into one or more lymph-node bearing regions. The latter include the axillary lymph-nodes, and the interpectoral lymph-nodes. Vessels from the lateral portion of the breast usually drain into the axillary lymphatics and vessels from the medial portion of the breast drain into the internal mammary lymph-nodes located sub-along the internal mammary vessels. ( Lippman M. E., 1988).

Some lymphs may pass directly to the subscapuler nodes from the upper part of the breast. A few lymphatics pass to the apical nodes. This pathway may be interrupted in the infraclavicular nodes or in small and incostant interpectoral nodes. Most of the remainder of breast lymph enters the parasternal nodes. (Roger Warwick, et al., 1973).

Occasionally lymphatic vessels from the breast pass to the intercostal lymph nodes accompanying the lateral cutaneous branches of the posterior intercostal arteries. (Roger Warwick, et al., 1973).

Lymphatic spread to the opposite breast also occurs and the infero-medial quadrant approximates closely to the xiphi-sternum and lymphatics of the subjacent fascia plexus communicate through the upper thin part of the linea alba with the peritoneal cavity.

In this way, secondary deposits may appear on the surface of the liver or malignant cells may give rise to metastasis in the pelvis by traversing in the peritoneal cavity (N. J. Grobler, 1977).

## ( B ) LYMPH GLANDS

### (A) The Internal Mammary Lymph Nodes :

They are small nodes about 5 mm. in diameter and they are situated in the interspace between the costal cartilages within 3 cm. of the sternal edge, in close proximity to the internal mammary vessels and lie on the endothoracic fascia.

Efferent lymphatics of these nodes empty into the thoracic duct on the left side, and the right lymphatic duct on the right side. (Mcvay, 1984).

### (B) Posterior Intercostal Lymph Nodes :

These nodes receive tributaried from parietal pleura, the vertebrae and the spinal muscles, and provide a retrograde route where by carcinomatous emboli from the breast may reach the pleura or the vertebrae, they are one to three nodes in each interspace lying upon the inner aspect of thoracic wall, close to the head of these ribs. Efferent lymphatics from these nodes empty into the thoracic duct. (Mcvay, 1984).

(C) The Axillary Lymph Nodes :

They lie-beneath the coracoid fascia along with axillary blood vessels, nerves, connective tissue and fat and are held within a delicate strong fascial network which makes dissection in one mass relatively easy. ( Chester. B. Mcvay, 1984 ).

They vary from twenty to thirty in number and may be divided into five groups which are not however sharply demarcated (Roger Warwick, et al., 1973).

They are divided into :

(1) Apical group:

Six to twelve lymph nodes are situated partly posterior to the upper portion of the pectoralis minor and partly above its upper border, and extend upward into the apex of the axilla along the medial side of axillary vein.

The only direct afferents of this group are those which accompany the cephalic vein and one or two which drain the upper and peripheral part of the mammary gland, but it recives the efferent of all of the axillary lymph nodes. The efferent vessels of this group unite to form the subclavian trunk, which open either directly into the function of the internal Jugular and subclavian veins or into the Jugular lymphatic trunk, on the left side it may end in the thoracic duct (Roger Warwick, et al., 1973).

(2) Central group :

Three or four large lymph nodes are embedded in the fat of the axilla. It has no special area of drainage, but it receives afferent from all groups of axillary nodes. Its efferent passes to the apical group.

(3) The Lateral Group :

It is composed of four to six lymph - nodes which lie medial to-and behind, the axillary vein. Efferent vessels pass partly to the centeral and apical groups of axillary nodes and partly to the lower deep cervical nodes.

(4) Anterior or pectoral group :

Four to five lymph nodes along the lower border of pectoralis minor in relation to the lateral thoracic vessels. Its afferent passes partly to the centeral and partly to the apical groups of axillary lymph nodes.

(5) A posterior or subscapular group :

Six to seven lymph nodes along the lower margin of the posterior wall of the axilla in the course of the subscapular vessels.

Their efferent passes to apical and centeral group of axillary lymph nodes. (Roger Warwick, et al., 1973).

# PATHOLOGY