



## **The breast: basic structure and function**

What exactly makes up breast tissue? Breasts are composed of the following structures: mammary glands, connective tissue, blood vessels, nerves, and lymph vessels.

- Mammary glands contain the milk-producing cells. These glands are hormone dependent, and enlarge monthly with the menstrual cycle and during pregnancy.
- Connective tissue of the breast includes fatty tissue and suspensory ligaments, which support the breast and give it shape. Sometimes a breast mass will pull on these ligaments, causing pitting of the skin of the breast – a sign that may indicate breast cancer.
- The breast has arteries and veins that allow circulation through the tissues, as well as nerves that provide information about touch and pain.
- The breast also contains lymph vessels, which drain into lymph nodes. About 75% of the breast lymph goes to the axillary nodes, which are located in the axilla (armpit area), and the rest goes to the parasternal nodes, which are located near the middle of the chest. Because breast cancer has a tendency to spread to local lymph nodes, examination of the lymph nodes in the armpit are a crucial component of the breast exam.

Breast tissue can extend from the border of the breastbone near the center of the chest all the way to the armpit, and overlies the second to sixth ribs. The breast has an axillary tail, which is a tail of tissue that extends up into the armpit region. About 60% of breast cancer actually originates in this axillary tail, which is why it is an important part of the breast exam. The breast lies on top of a muscle called the pectoralis major, or the “pec”.

From birth until puberty, breast tissue is the same in both men and women. The breast tissue is made up of the components described above – mostly basic mammary glands and connective tissue. Since most breast cancer originates in the cells related to the mammary glands, men can also develop breast cancer (although it is fairly rare). The breast undergoes changes with puberty, each menstrual cycle, pregnancy, and menopause.

- During puberty, increased hormones stimulate the secondary sex characteristics, one of which is the development of breasts. The breasts grow – both in the amount and size of the mammary glands and the amount of fatty and connective tissue deposited in the breast region.
- With each menstrual cycle come hormone fluctuations. After ovulation (the mid-point of the menstrual cycle), the body prepares for pregnancy. Part of this preparation is to stimulate growth of the mammary glands in the breast in order to be ready for milk production if pregnancy occurs. The increase in size may cause some women to feel breast tenderness or even pain during

this part of their menstrual cycle. During menstruation, the hormone levels drop and the breast glands decrease to their normal size.

- In pregnancy, increased estrogen stimulates breast growth, both increasing the number and size of the glands and the amount of fatty tissue in the breasts as part of the body's preparation for lactation (milk production). Prolactin and hormones from the placenta stimulate milk production during pregnancy, but milk release is prevented by the high levels of estrogen and progesterone. At birth, the estrogen and progesterone levels drop drastically, and milk release can occur.
- After menopause, the levels of estrogen in the body decrease and the mammary glands are no longer stimulated. Thus the breast changes from being composed mostly of glands and dense connective tissue to mostly fatty tissue. The dense breast tissue of younger women is more difficult to see through on mammogram, which is why screening mammograms are not usually effective in women under 40, as masses may be missed. As the breast becomes more fatty with age, it becomes easier to detect masses and changes consistent with cancer on mammogram.

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