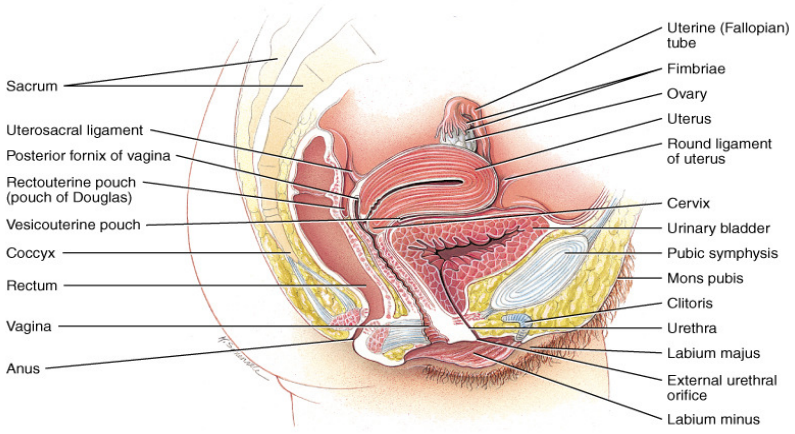
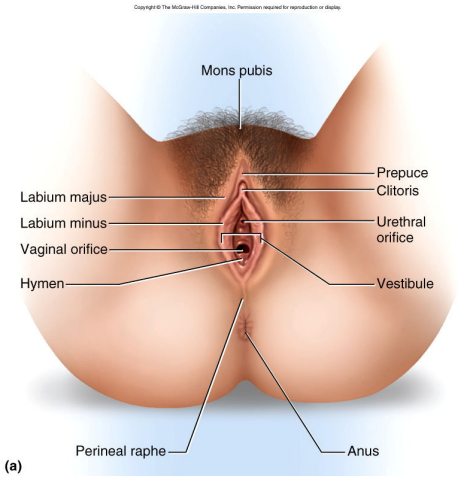
Bio& 242 A&P
Unit 4 / Lecture 4

Anatomy of the Female Reproductive System



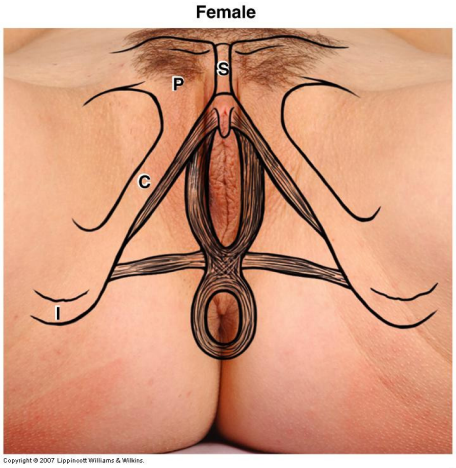
(a) Sagittal section showing female reproductive organs

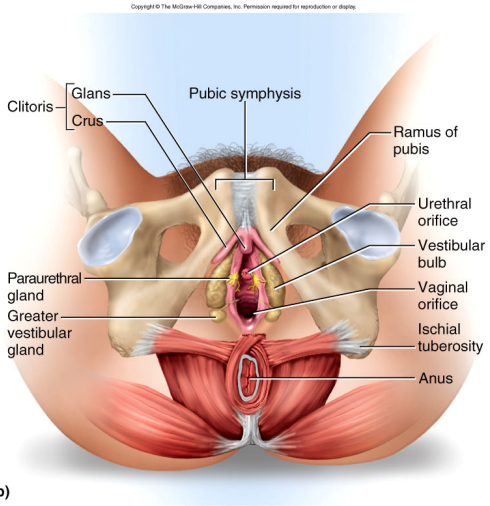
Female Vulva



(a)

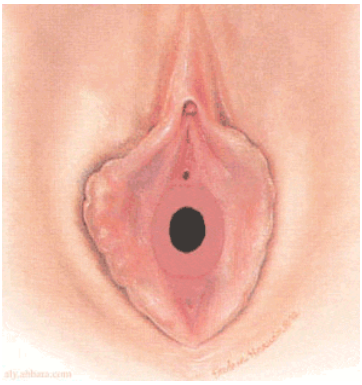
Female Vulva



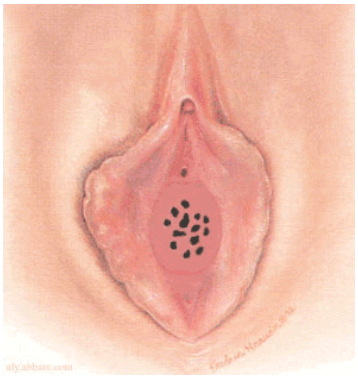


(b)

Female Hymen

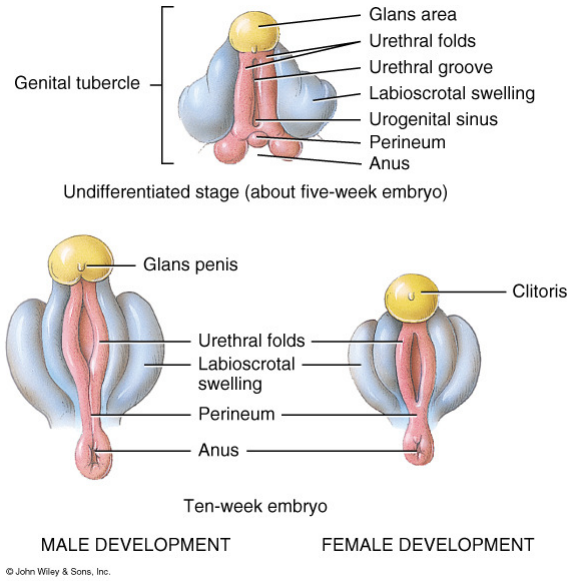


annular hymen



rare **cribriform** hymen

Development of Genitalia and related structures



Development of Genitalia and related structures

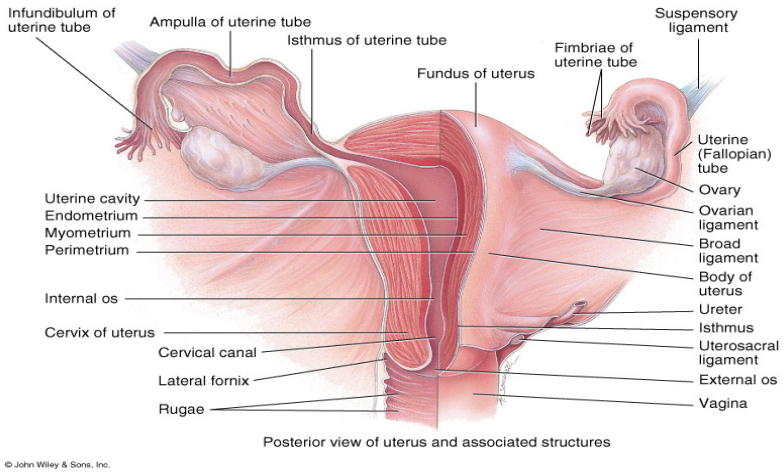
Urogenital Sinus

Male	Female
Prostate Gland	Urethral/paraurethral gland
Bulbourethal glands	Greater Vestibular Glands

Phallus

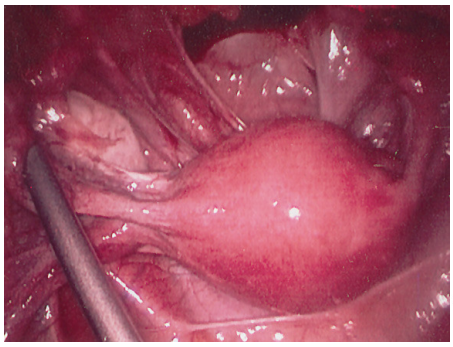
Glans Penis	Glans Clitoris
Corpora Cavernosa penis	Corpora Cavernosa clitoris
Corpus Spongiosum	Bulb of the vestibule
Ventral aspect of Penis	Labia Minora
Scrotum	Labia Majora

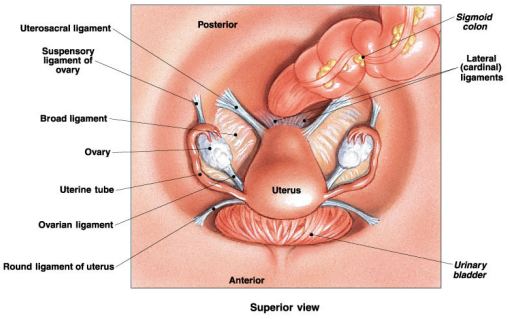
Internal Anatomy of the Female Reproductive System



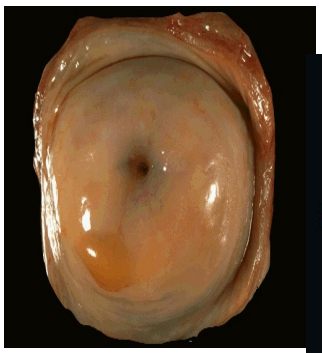
Posterior view of uterus and associated structures

Internal Anatomy of the Female Reproductive System



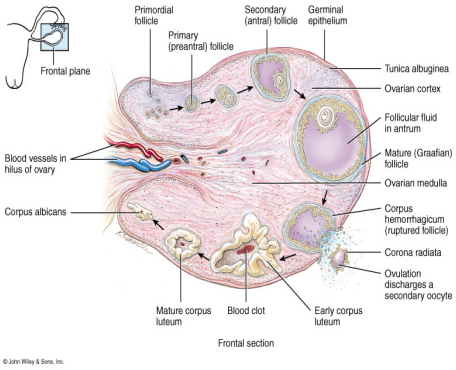


Internal Anatomy of the Female Reproductive System, gross view



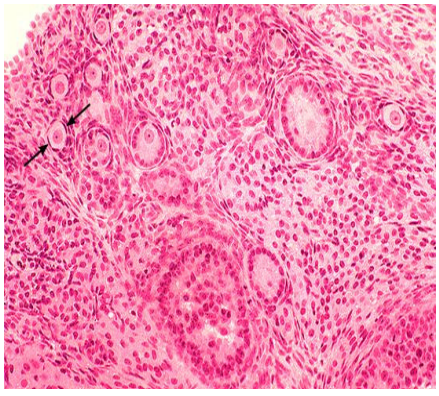
Steps of Oogenesis

- **Primordial Follicles:**
  during fetal development, oogonia develop from mitosis of stem cells. These cells start through meiosis, however, meiosis is stopped at prophase meiosis I.
  In adult ovaries, primordial follicles contain a primary oocyte.



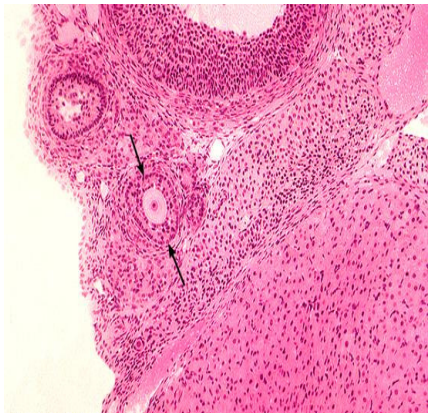
Steps of Oogenesis

- **Primordial Follicles:**
  Arrows indicate a primordial follicle



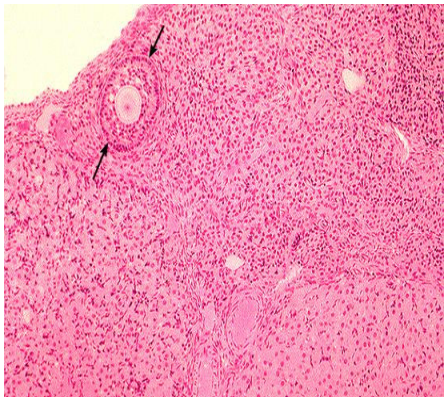
Steps of Oogenesis

- **Primary follicle: After puberty, due to increasing levels of FSH, primary follicular cells enlarge and begin secreting estrogen. In humans, the estrogen inhibits other follicles and their primary oocyte from developing.**



Steps of Oogenesis

- **Secondary Follicle: The diploid primary oocyte undergoes meiosis I and gives rise to one haploid secondary oocyte and one polar body. Several primary oocytes within several secondary follicles may start this process but usually only one completes the process.**

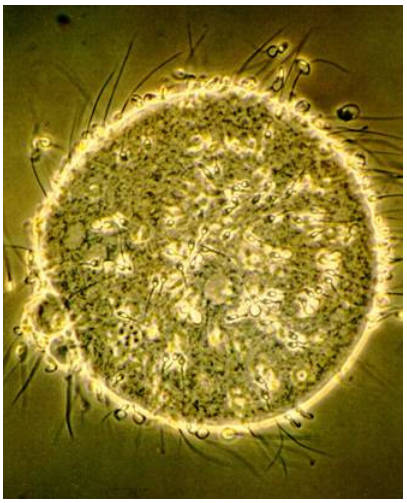


Steps of Oogenesis

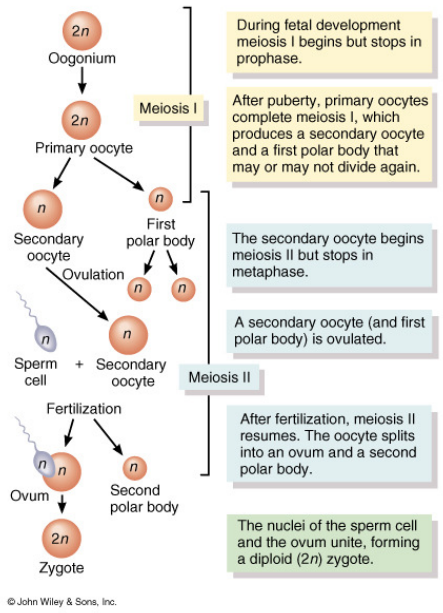
- **Graafian follicle: contains a haploid secondary oocyte and the first polar body. Due a surge of LH, the secondary oocyte is ovulated before meiosis II occurs.**

Steps of Oogenesis

- **The Ovum forms from meiosis II after a sperm cell has contacted the secondary oocyte.**
- **In the picture, you can see sperm cells surrounding the oocyte and both polar bodies indicating meiosis II has occurred.**

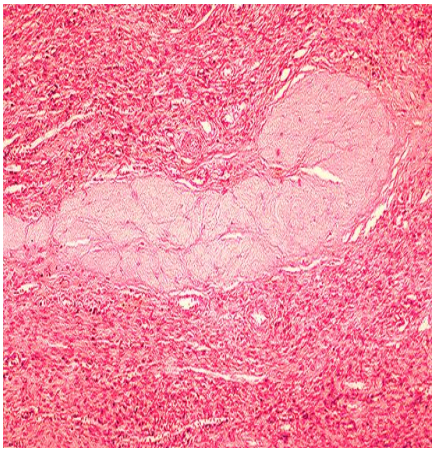


Review of Oogenesis

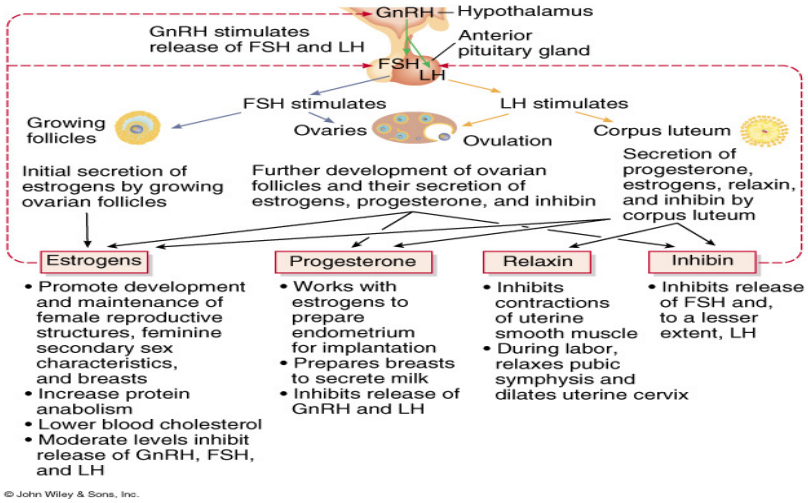


Formation of the Corpus Luteum

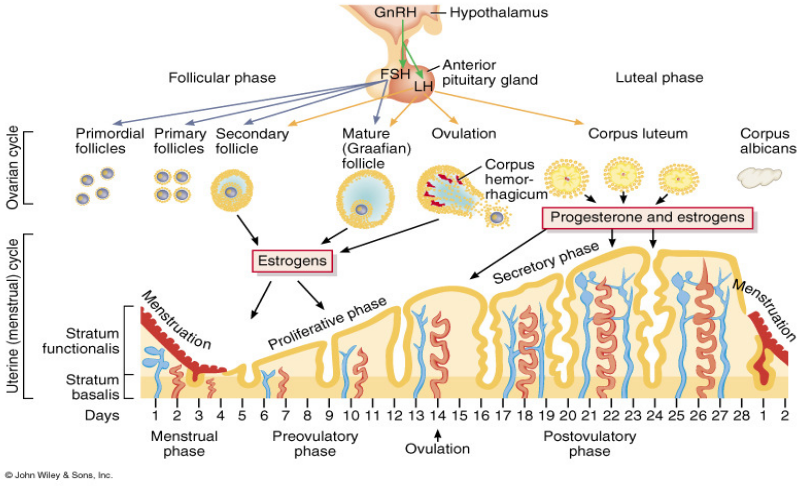
- **After ovulation, the follicular cells implode forming the Corpus Luteum.**
- **The Corpus Luteum produces high amount of progesterone and smaller amounts of estrogen, relaxin and inhibin.**



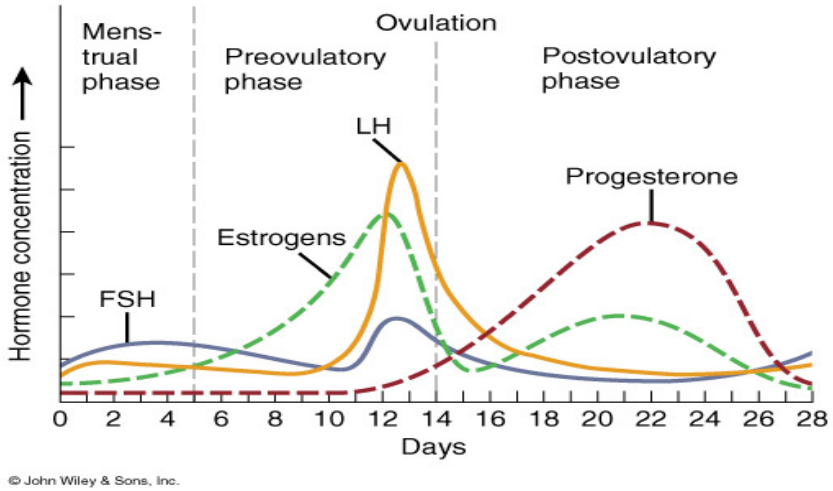
Hormones Involved in an Ovarian Cycle



Action of Hormones on the Ovaries and Uterus



Cyclic Patterns of Hormone Production during the Ovarain Cycle



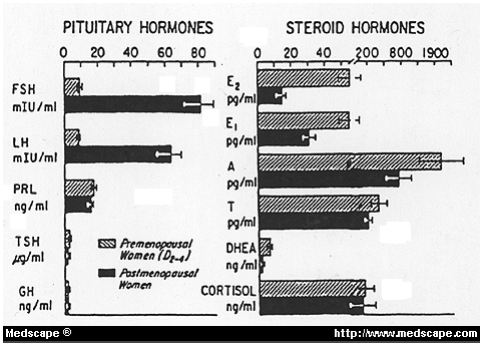
Terms associated with the Ovarian Cycle

- Menses: Monthly Blood Flow
- Amenorrhea: Without periods
- Dysmenorrhea: Painful periods
- Menarche: First period
- Menopause: Cessation of periods, usually between 40 to 55.

Menopause

Hormonal Changes during Menopause

1. Blood levels of FSH increase
2. Blood levels of Inhibin decrease
3. Blood levels of estradiol decrease
4. Blood levels of progesterone decrease
5. Blood levels of DHEA decrease



Menopause

The degree to which each woman's body responds to these normal hormonal changes varies.

25% of women do not have any problems with menopause and manage the transition without assistance

50% of women experience some menopausal symptoms, varying from mild to moderate

25% of women have more severe problems

Common Menopausal Symptoms:;

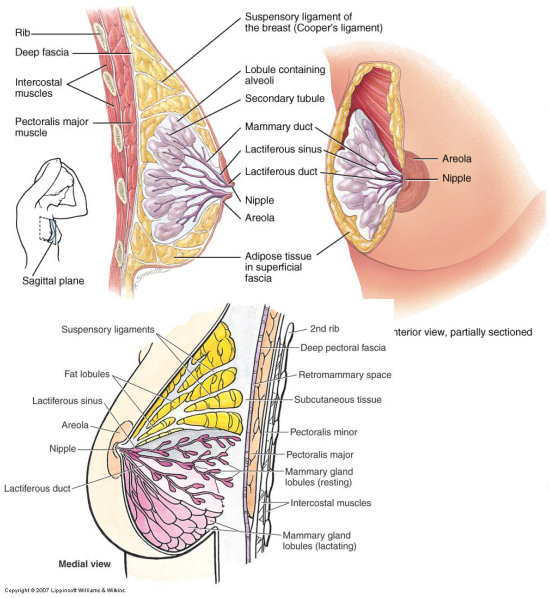
1. Hot flushes (last 30sec to 5min)
2. Menstrual irregularities
3. Sleep disturbances
4. Genital changes
5. Urinary problems
6. Joint/muscle aches and pain
7. Skin /hair changes
8. Neurological Brain function changes

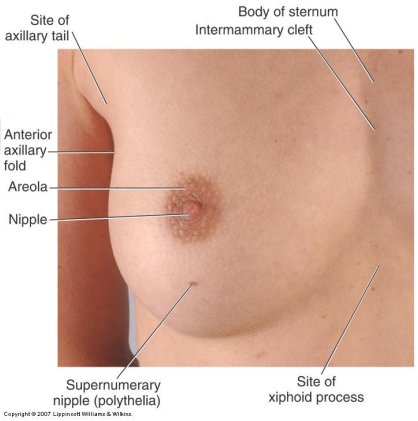
Menopause

Positive action to decrease symptoms

1. Eat a well balanced diet
2. Exercise regularly
3. Stress management (Tai chi, yoga, meditation, relaxation)
4. Making sex comfortable (water based lubricants, vaginal hormone therapy)
5. Pelvic floor exercises
6. Trial hormone replacement therapy
7. Quit smoking

Anatomy of the Breast



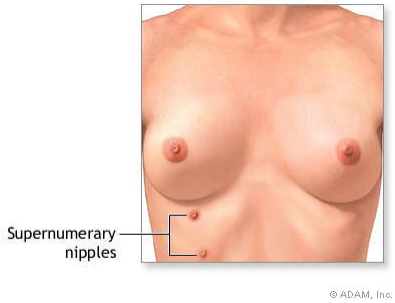


Inverted Nipples

A nipple that, instead of pointing outward, is retracted into the breast. In some cases, the nipple will be temporarily protruded if stimulated, but in others, the inversion remains regardless of stimulus. Women and men can have inverted nipples.

Asymmetric Breast Develop

Polytheia: Extra nipples
Polymastia: Extra breast tissue usually in the axillary area. May or May not have nipples and areola.



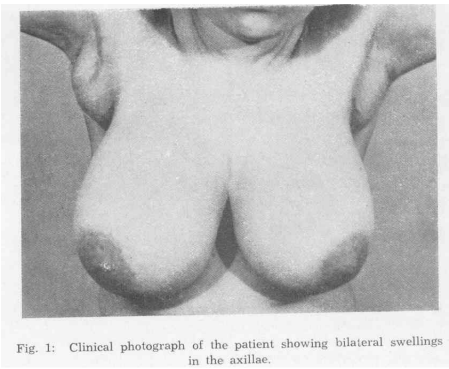


Fig. 1: Clinical photograph of the patient showing bilateral swellings in the axillae.

Breast Cancer

Ductal carcinoma: The most common kind of breast cancer. It begins in the cells that line the m ilk ducts in the breast**.**

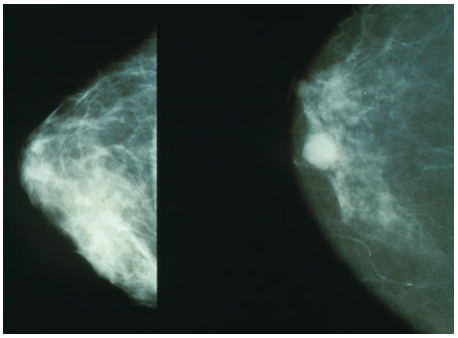
in situ (DCIS): The abnormal cancer cells are only in the lining of the milk ducts, and have not spread to other tissues in the breast.

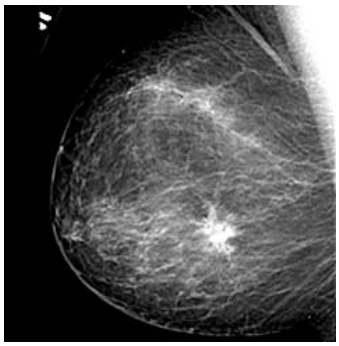
Invasive ductal carcinoma: The abnormal cancer cells break through the ducts and spread into other parts of the breast tissue. Invasive cancer cells can also spread to other parts of the body.

Lobular carcinoma: In this kind of breast cancer, the cancer cells begin in the lobes, or lobules, of the breast.

in situ (LCIS). The cancer cells are found only in the breast lobules.

Invasive lobular carcinoma. Cancer cells spread from the lobules to the breast tissues that are close by

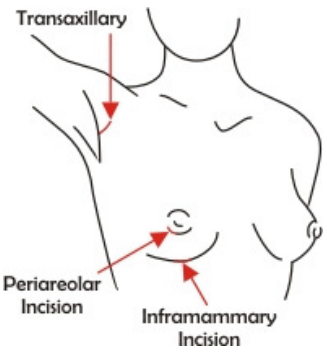


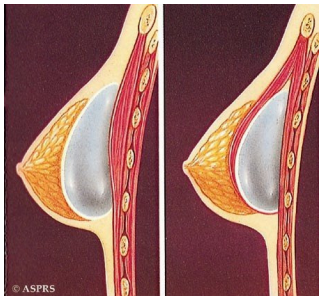


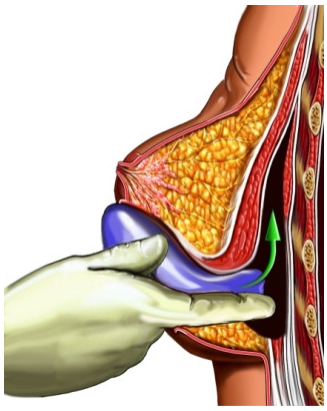
Mammogram of a normal breasts and breast cancer

An example of obvious signs of Inflammatory breast cancer displaying the swollen breast, redness, inverted nipple and peau d'orange (orange-peel texture).

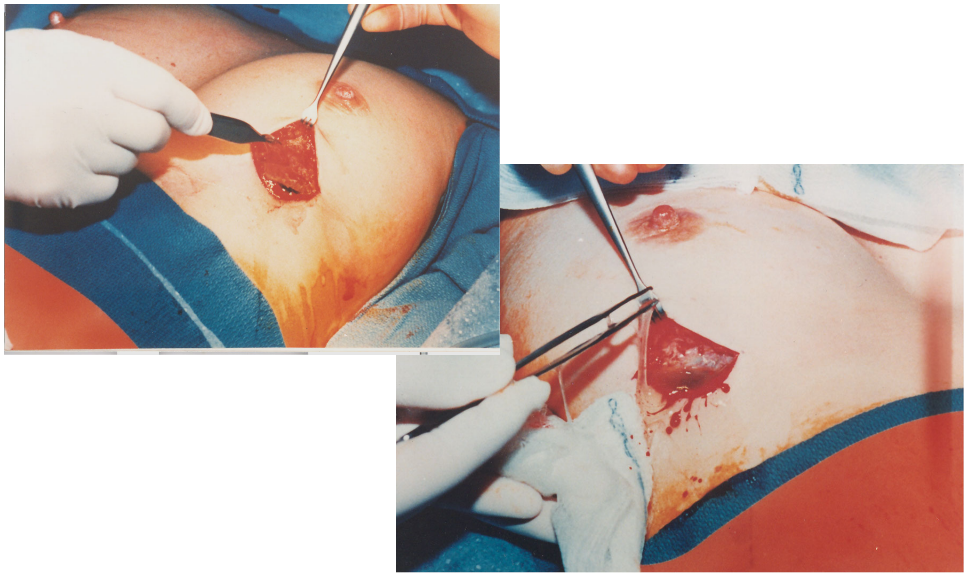
Breast Implant







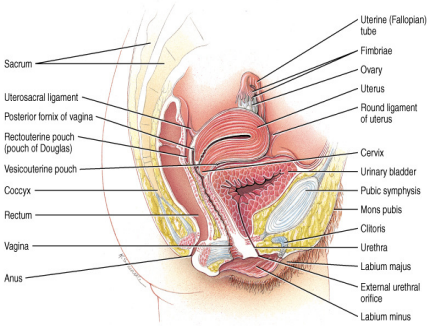
Breast Implant Removal



The Female Sexual Response

- **<u>Arousal:</u> various erotic thoughts and physical stimulation triggers parasympathetic reflexes that cause an erection and lubrication.**
- **<u>Erection:</u> occurs when neurons release Nitric Oxide at their synaptic endings.**

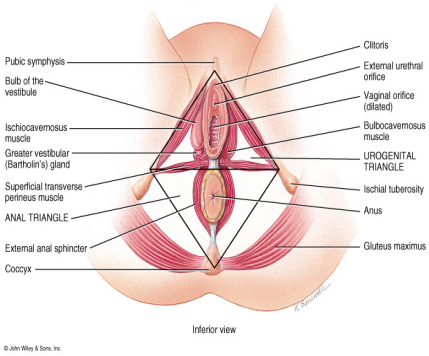
  NO causes smooth muscles of the clitoral arteries to relax, vessels dilate, blood flow to the erectile tissue increases . The vascular channels engorge with blood, resulting pressure causes the clitoris to become stiff.



(a) Sagittal section showing female reproductive organs

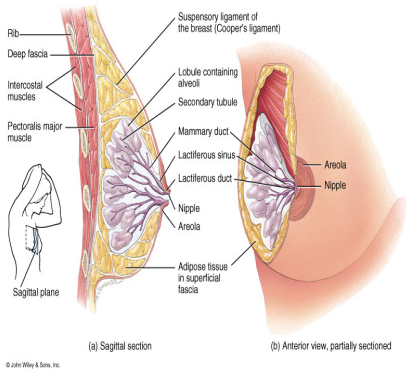
The Female Sexual Response

- **Blood engorgement of the labia and bulb of the vestibule cause swelling in the perineum.**
- **<u>Lubrication</u>: Blood engorgement of the connective tissue of the vagina causes lubricating fluid to seep through the vaginal epithelial to cover the lumen surface. A process called "transudation."**
- **Greater vestibular "Bartholin's glands also release mucus.**
- **During arousal, increases in heart rate, blood pressure, skeletal muscle tone, and hyperventilation occur**



The Female Sexual Response

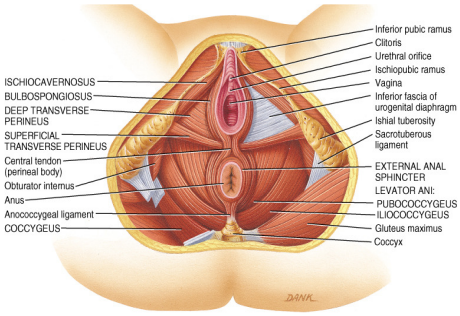
- **<u>Plateau stage</u>: Changes that begin during arousal are sustained at an intense level, vasocongestion in the breast may cause breast to swell some and erection of the nipples.**
- **Late in the plateau stage, pronounced vasocongestion of the distal third of the vagina causes it to swell and narrows the vaginal opening, thus increasing friction on the penis**



The Female Sexual Response

<u>Orgasm;</u> intensely pleasurable sensations associated with rhythmic contractions of smooth muscles of the vaginal wall and the uterus. Rhythmic contractions also occur with ischiocavernosus and bulbospongiosus muscles and other peritoneal muscles. Also a great increase in total body muscle tone occurs.

Other physiological changes include pronounced increase in heart rate and blood pressure.

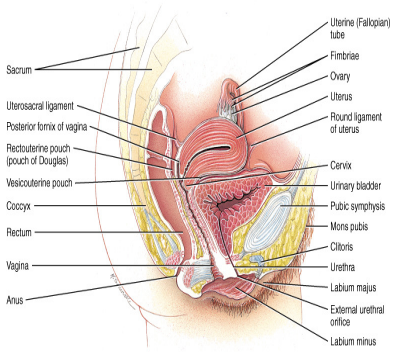


Inferior superficial view

The Female Sexual Response

<u>Resolution</u>: Sense of profound relaxation- genital tissues, heart rate, blood pressure, breathing, and muscle tone return to normal.

During early period of resolution, females lack or have a much shorter a refractory period than males. Therefore, some women can have multiple orgasms.



(a) Sagittal section showing female reproductive organs