

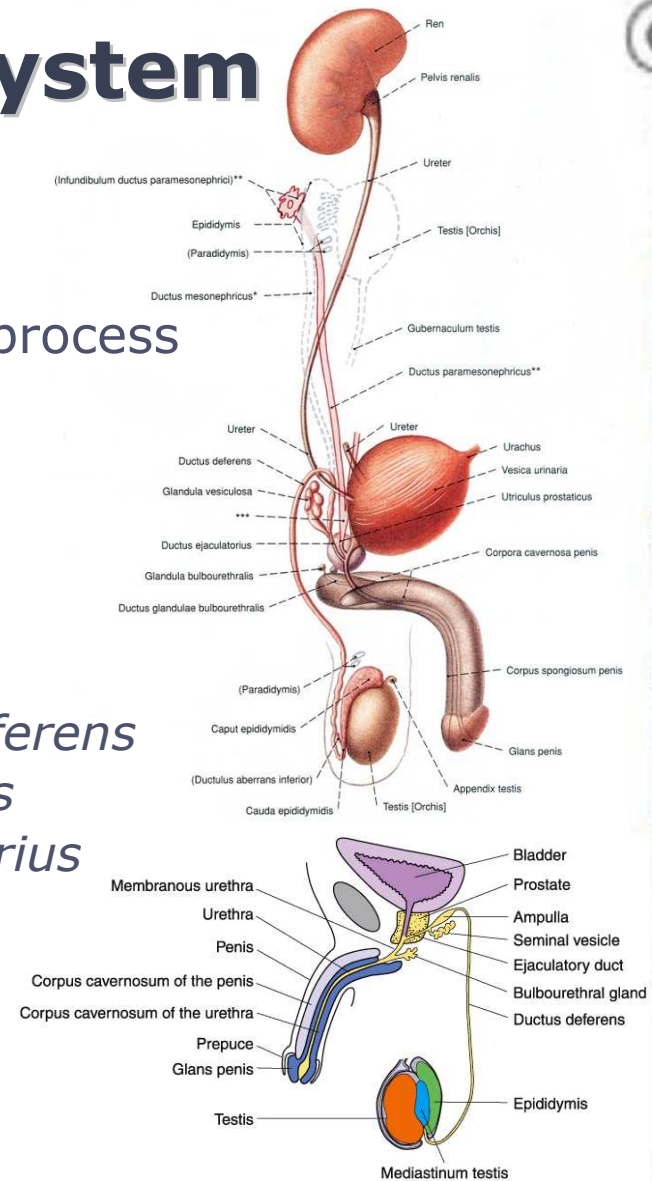
# Male and Female Reproductive System

1. Male and female reproductive organs
2. Testis, scrotum, epididymis, spermatic ducts
3. Penis and accessory glands – seminal vesicles, prostate gland, bulbourethral glands
4. Female internal reproductive organs
5. Female external reproductive organs
6. Mammary gland (breast) and perineum



# Male reproductive system

- Male reproductive system, *systema genitalia masculina*:
  - ✓ a part of the human reproductive process
- Male reproductive organs, *organa genitalia masculina*:
  - ✓ internal genital organs:
    - testicle, *testis*
    - epididymis, *epididymis*
    - ductus deferens, *ductus (vas) deferens*
    - seminal vesicle, *vesicula seminalis*
    - ejaculatory duct, *ductus ejaculatorius*
    - prostate gland, *prostata*
  - ✓ external genital organs:
    - penis, *penis*
    - scrotum, *scrotum*
    - bulbourethral glands, *glandulae bulbourethrales*



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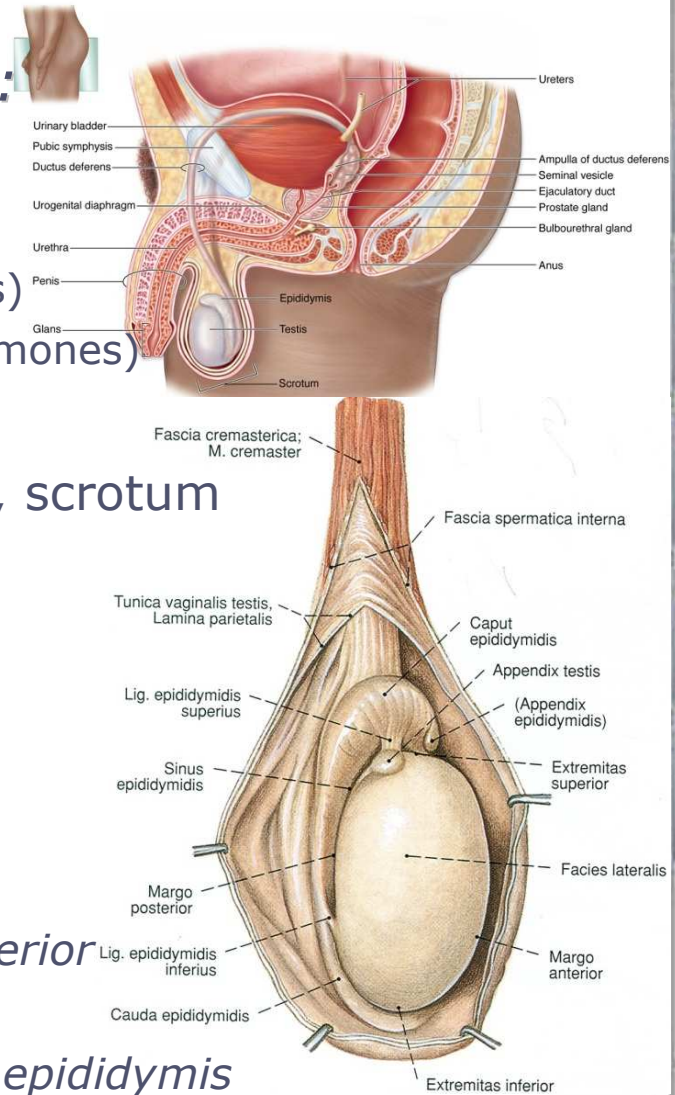
# Testicle, *testis*

■ Testicle, *testis* (*Gr. orchis, didymis*):

- ✓ a pair of oval-shaped organs
- ✓ two basic functions:
  - production of sperm (spermatogenesis)
  - secretion of androgens (male sex hormones)

■ *Testis in situ*:

- ✓ within an extension of the abdomen, scrotum
- ✓ size:
  - 40-45 mm in length
  - 25-35 mm in height
  - 20-30 mm in breadth
- ✓ weight – 10-14 g
- ✓ external appearance:
  - *extremitas superior et extremitas inferior*
  - *facies lateralis et facies medialis*
  - *margo anterior et margo posterior* ⇒ *epididymis*

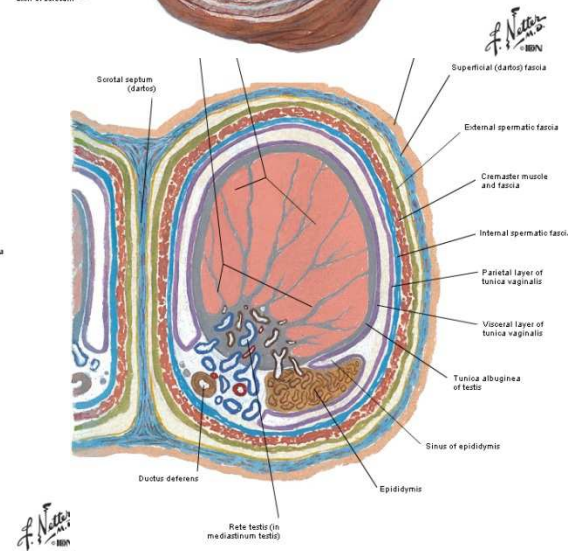
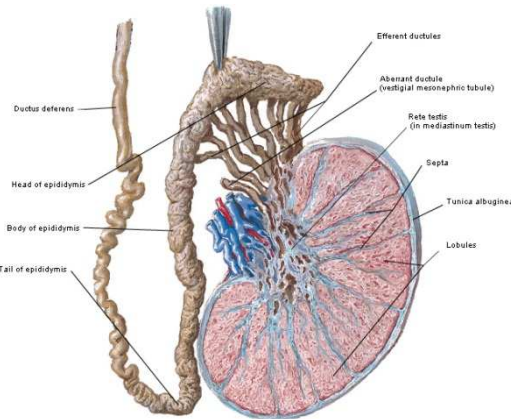
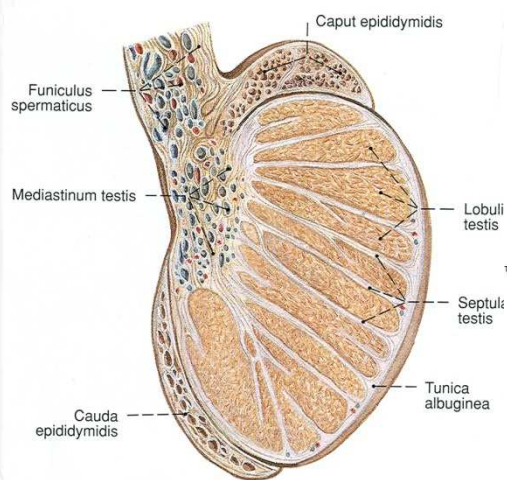
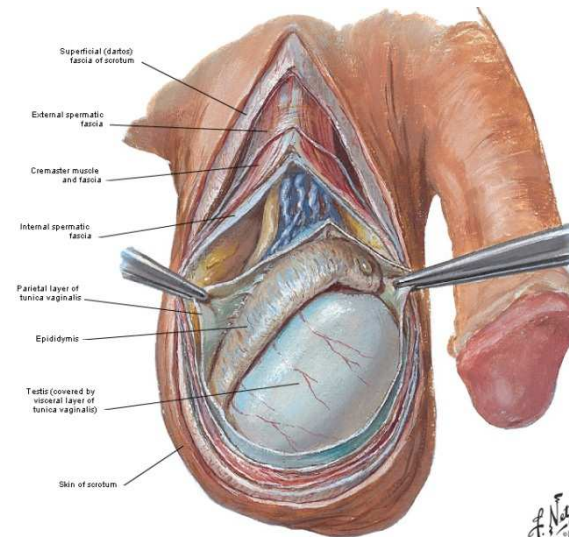






# Macroscopic anatomy

- *tunica vaginalis testis:*
  - ✓ lamina parietalis
  - ✓ lamina visceralis
- *tunica albuginea:*
  - ✓ mediastinum testis
  - ✓ septula testis
  - ✓ lobuli testis - 200-300
- *tunica vasculosa*



F. Netzer  
M.D.

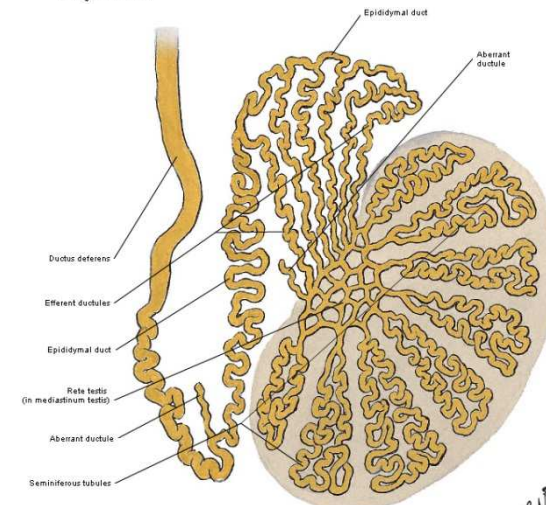
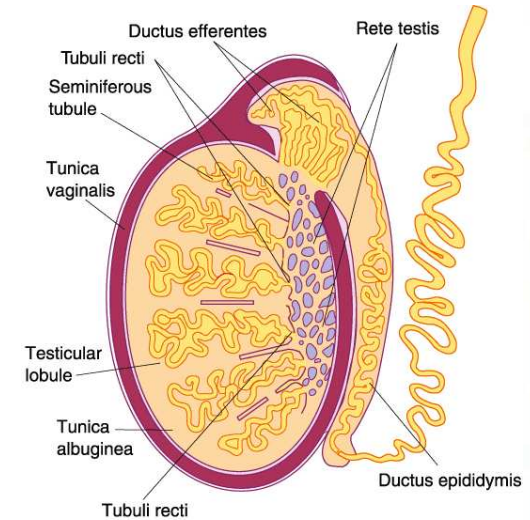
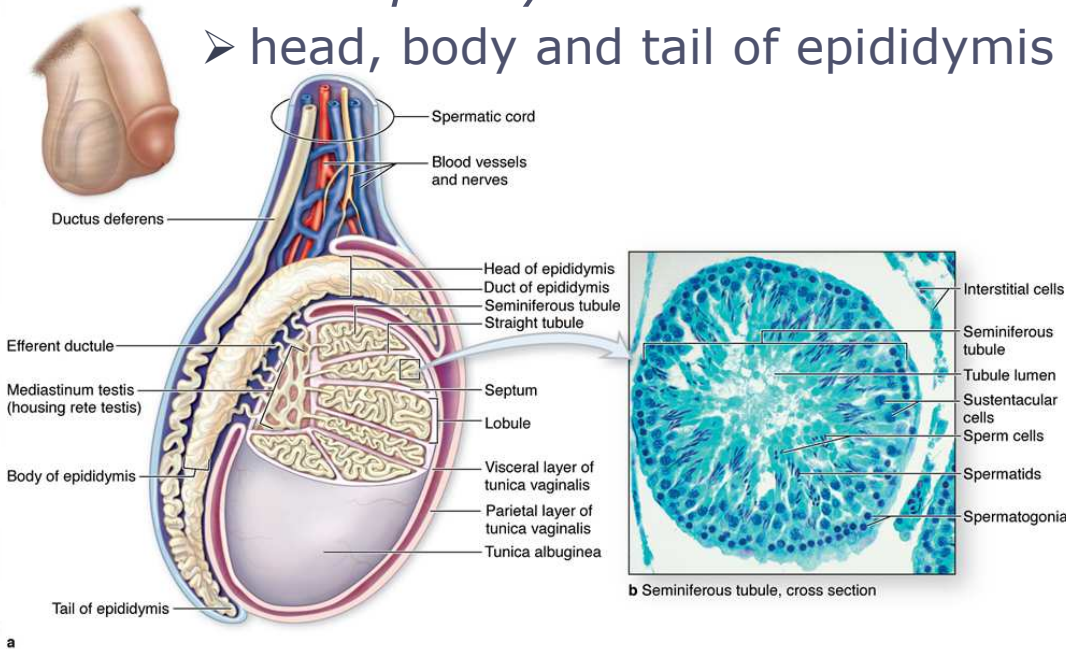
F. Netzer  
M.D.



# Microscopic anatomy

- Testicular lobules, *lobuli testis*:
  - ✓ *tubuli seminiferi contorti* – 400-600
  - ✓ *tubuli seminiferi recti* ⇨ *rete testis*
  - ✓ *ductuli efferentes testis* – 12-20
  - ✓ *lobuli epididymis (coni vasculosi)*
  - ✓ *ductus epididymidis*

➤ head, body and tail of epididymis



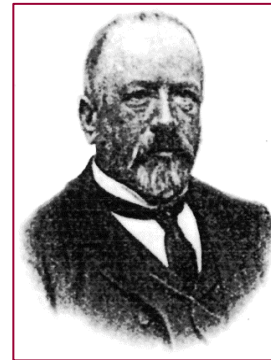
*f. Netter*  
M.D.



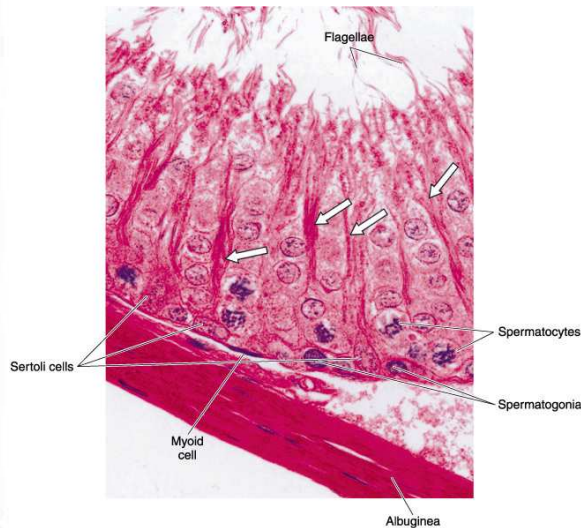
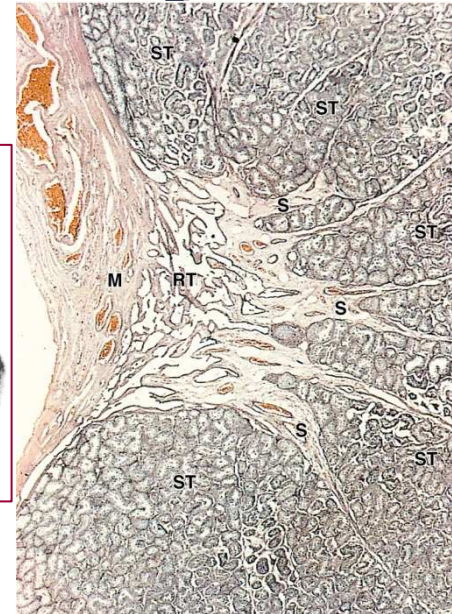


# Microscopic anatomy

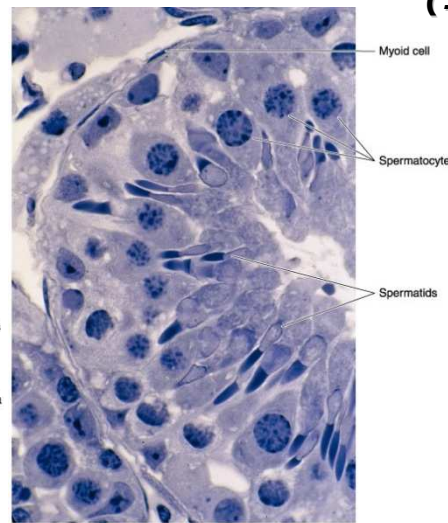
- Convoluted seminiferous tubules, *tubuli seminiferi contorti*:
  - ✓ seminiferous epithelium:
    - cells of spermatogenic lineage
    - supporting (Sertoli) cells – *epitheliocyti sustentantes (Sertoli)*
  - ✓ *stratum myoideum* – myoid cells
  - ✓ *stratum fibrosum*



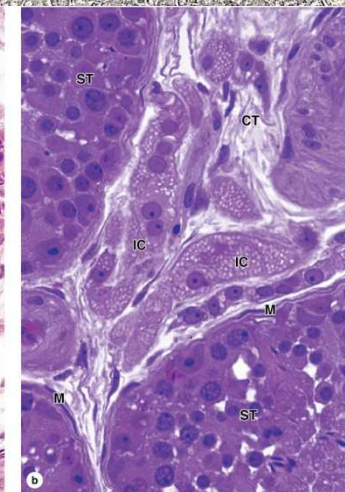
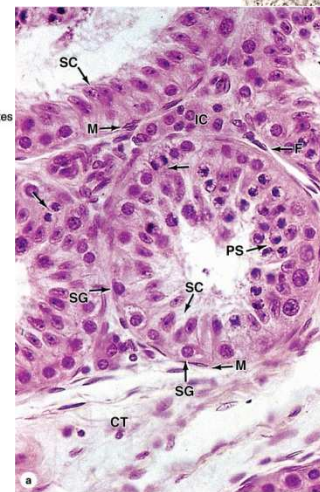
**Enrico Sertoli (1842-1910)**



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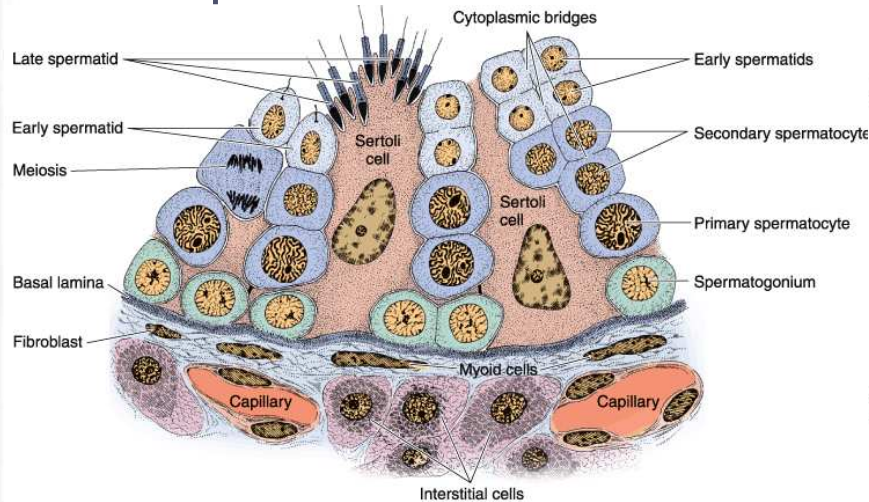






# Microscopic anatomy

- Spermatogenic lineage cells, *cellulae spermatogenicae*:
  - ✓ spermatogonia
  - ✓ primary spermatocytes
  - ✓ secondary spermatocytes (prespermatids)
  - ✓ spermatids – early and late
  - ✓ spermatozoa



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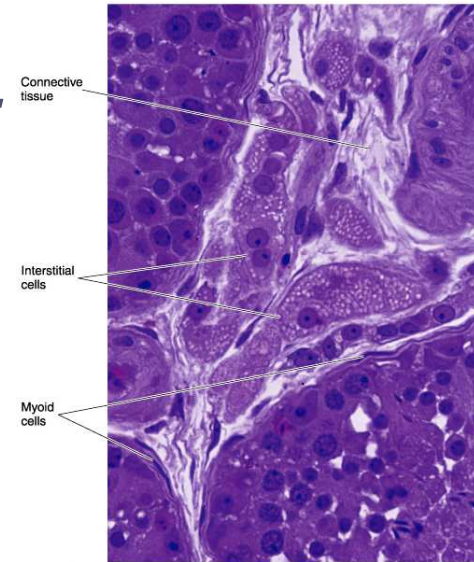


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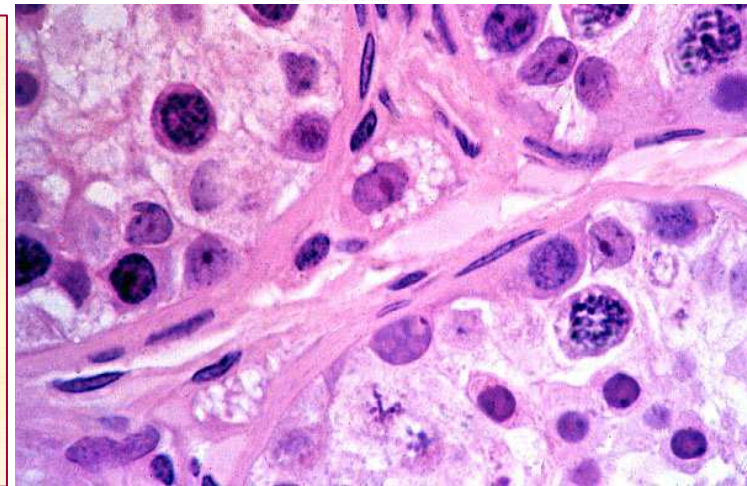
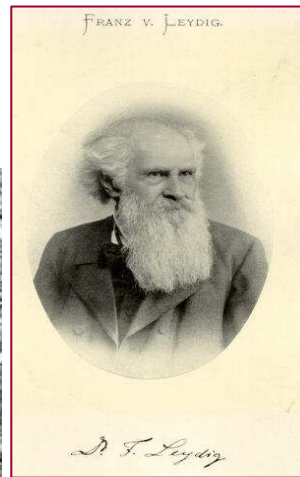
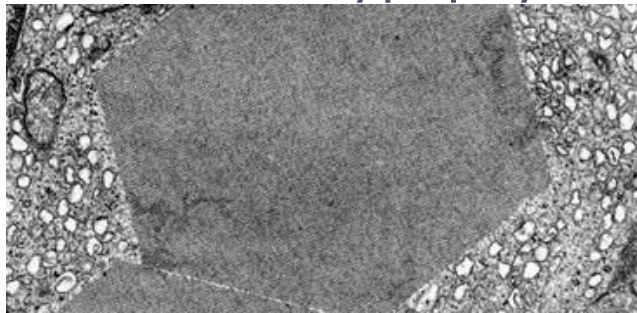


# Interstitial tissue of the testis

- Interstitial (Leydig) cells, *endocrinocytii interstitiales (Leydig)*:
  - ✓ 12 % of the testicular volume
  - ✓ located in the *interstitium testis*:
    - isolated or in small clusters
    - fenestrated capillaries
  - ✓ crystals of *Reinke*
  - ✓ steroid-secreting cells – production of androgens (testosterone)
  - ✓ stimulation by the LH (ICSH) from adenohypophysis



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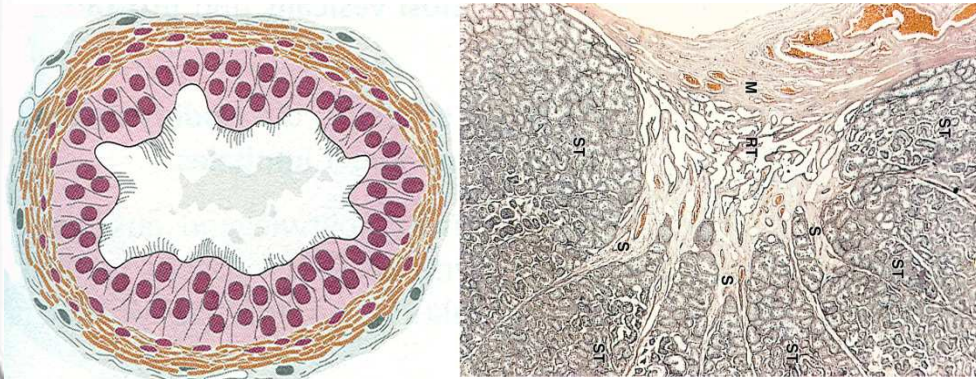
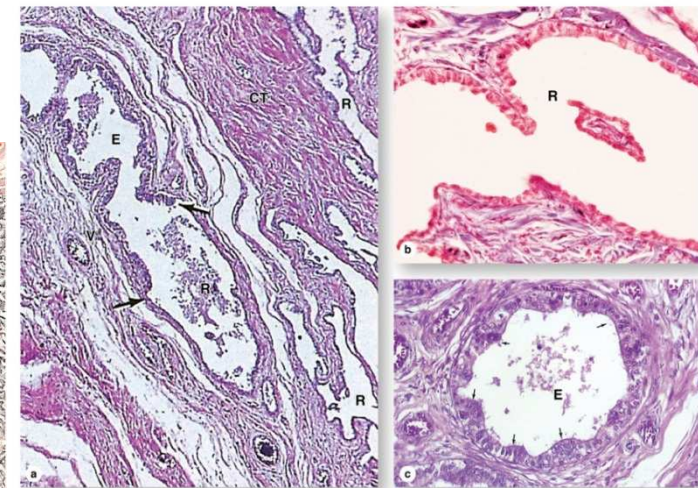
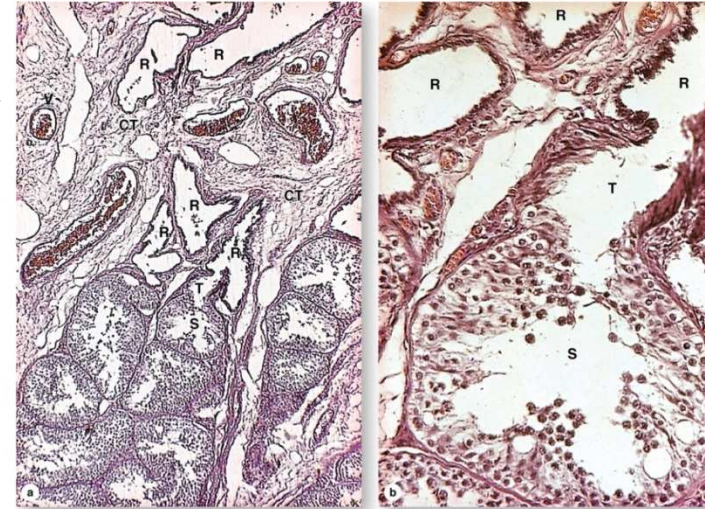
**Franz von Leydig**  
(1821-1908)





# Microscopic anatomy

- *Rete testis*:
  - ✓ straight seminiferous tubules, *tubuli seminiferi recti*:
    - simple cuboidal epithelium
    - transport of sperm
  - ✓ *ductuli efferentes testis*:
    - pseudostratified columnar epithelium – cell types:
      - o ciliated columnar cells
      - o cuboidal secretory cells
    - *stratum fibromusculare*

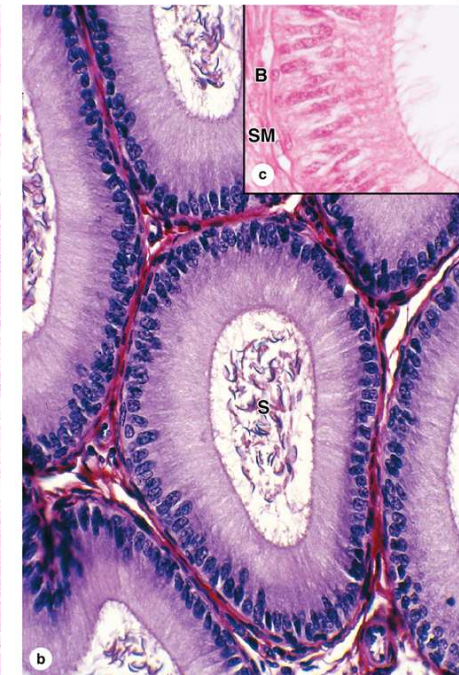
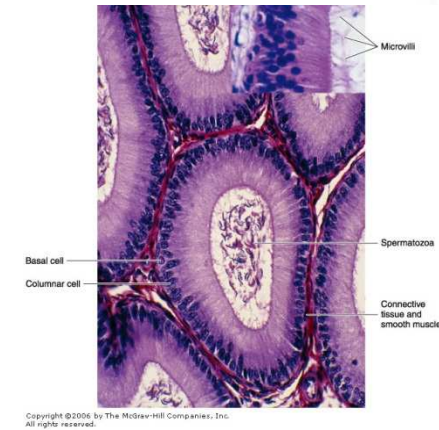
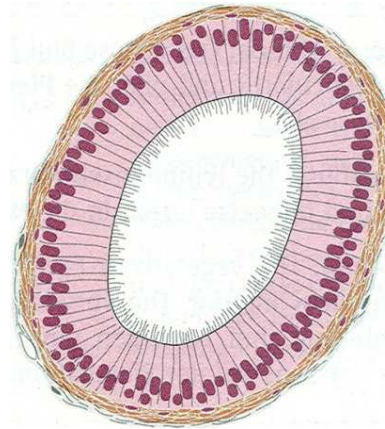






# Microscopic anatomy

- Duct of the epididymis, *ductus epididymidis*:
  - ✓ ~6 m in length
  - ✓ forms the body and tail of the epididymis
  - ✓ structure of the wall:
    - pseudostratified columnar epithelium:
      - *epitheliocytis microvilosi* – stereocilia
      - *epitheliocytis basales*
      - lymphocytes, *halo cells*
    - *tunica fibromuscularia*
      - smooth muscle and elastic fibers
    - *tunica adventitia*

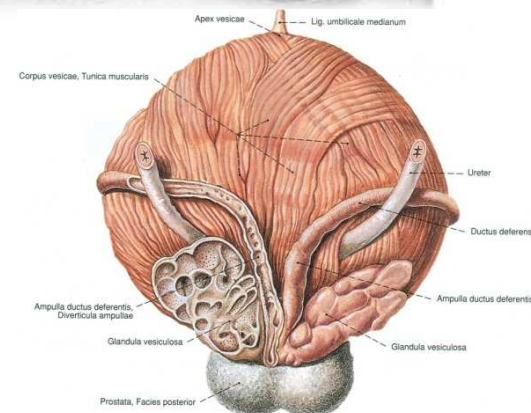
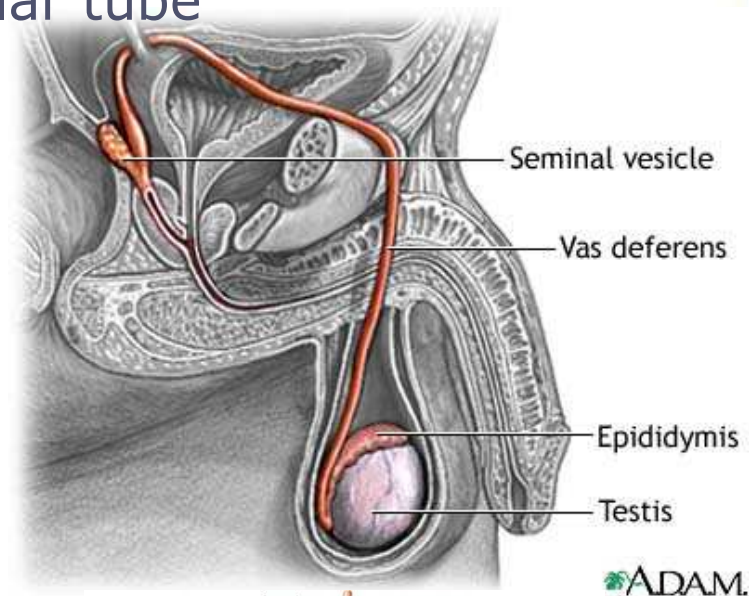






# Ductus (vas) deferens

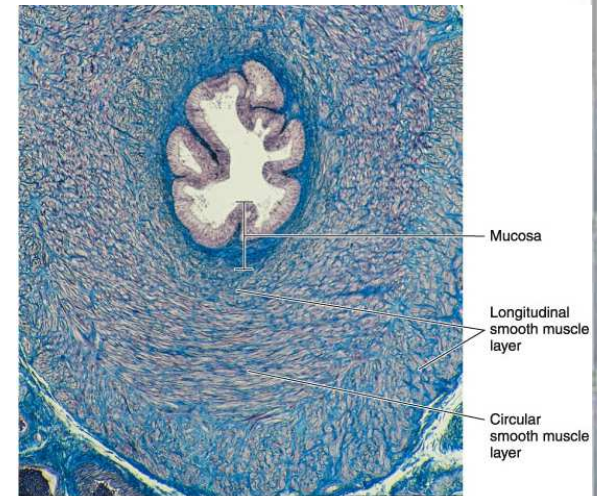
- *Ductus (vas) deferens:*
  - ✓ a straight thick-walled muscular tube
  - ✓ transports sperm cells from the epididymis
  - ✓ length 45-50 cm
  - ✓ diameter 2.5-3 mm
- **Anatomical parts:**
  - ✓ testicular part
  - ✓ funicular part
  - ✓ inguinal part – 4 cm
  - ✓ pelvic part
- *Ampulla ductus deferentis:*
  - ✓ length 3-4 cm; diameter 1 cm
  - ✓ ejaculatory duct, *ductus ejaculatorius*



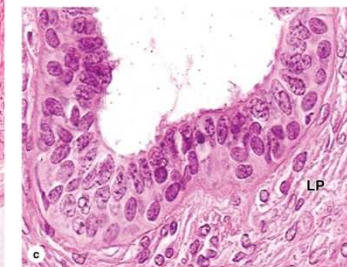
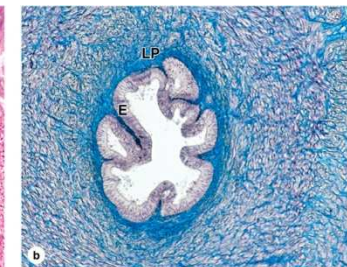
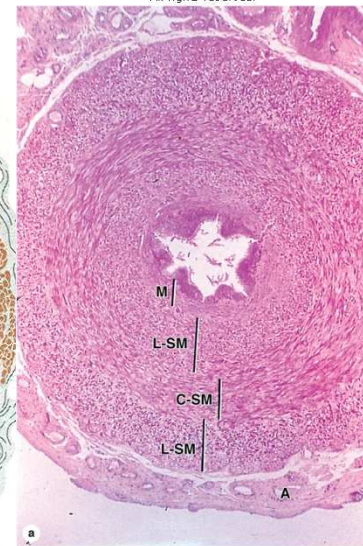
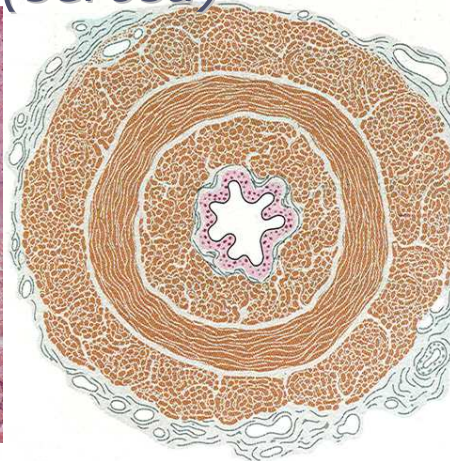


# Microscopic anatomy

- *tunica mucosa* – 5-6 longitudinal folds:
  - ✓ *lamina epithelialis* – bilayered columnar epithelium with stereocilia
  - ✓ *lamina propria*:
    - dense connective tissue
    - elastic fibers
- *tunica muscularis* – thick:
  - ✓ inner longitudinal layer – in the initial portion
  - ✓ circular layer
  - ✓ outer longitudinal layer
- *tunica adventitia (serosa)*



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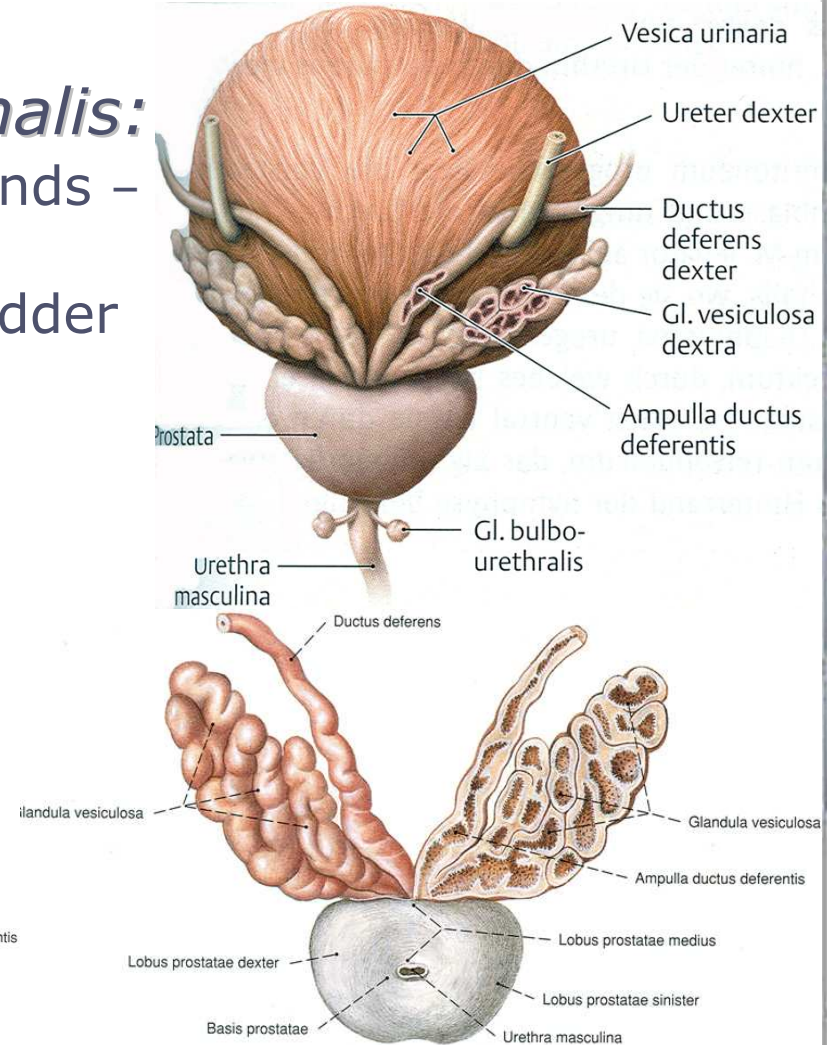
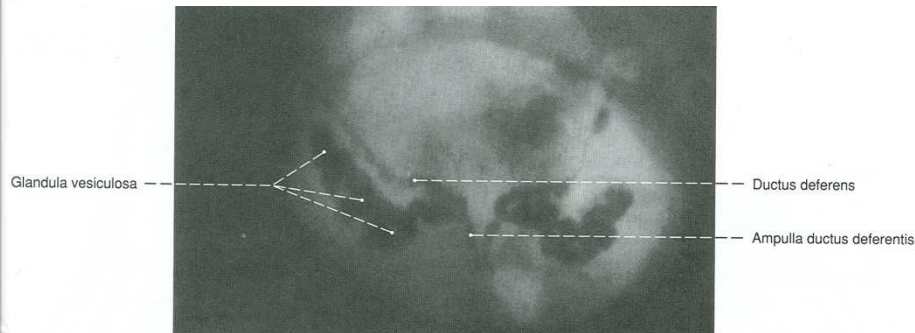






# Seminal vesicle, *vesicula seminalis*

- Seminal vesicle, *vesicula (glandula) seminalis*:
  - ✓ a pair of simple tubular glands – two highly tortuous tubes
  - ✓ posterior to the urinary bladder
  - ✓ length 4-5 (15) cm
  - ✓ diameter 1 cm
- Macroscopic anatomy:
  - ✓ anterior and posterior part
  - ✓ excretory duct

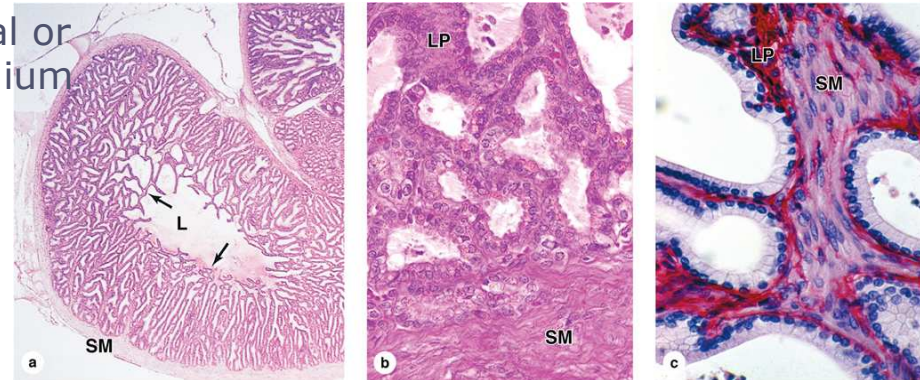




# Microscopic anatomy

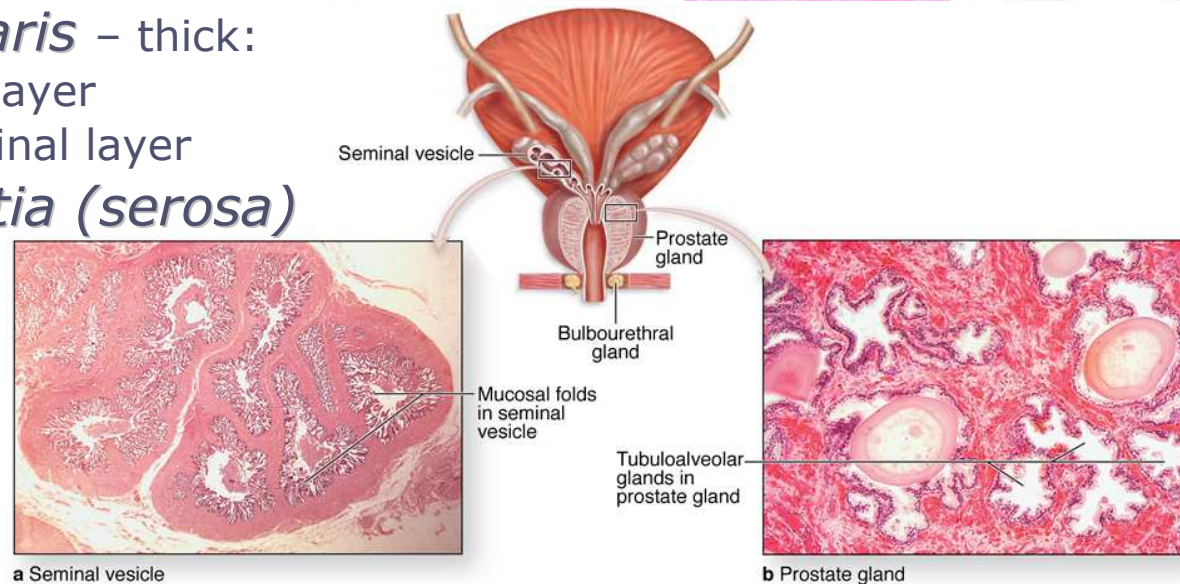
- *tunica mucosa* – highly folded mucosa:

- ✓ *lamina epithelialis* – cuboidal or pseudostratified columnar epithelium with secretory granules
  - viscid, yellowish secretion – 50-80% of the semen
  - fructose, prostaglandins
- ✓ *lamina propria* – very thin
  - rich in elastic fibers



- *tunica muscularis* – thick:
  - ✓ inner circular layer
  - ✓ outer longitudinal layer

- *tunica adventitia (serosa)*

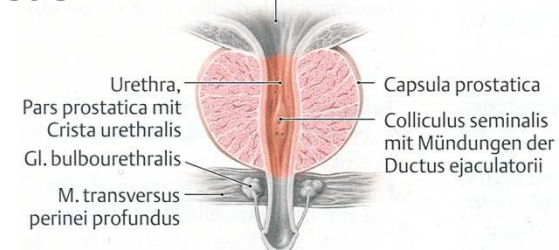
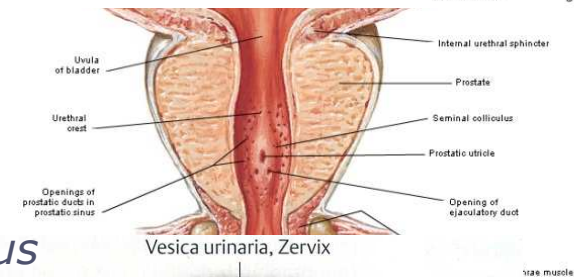
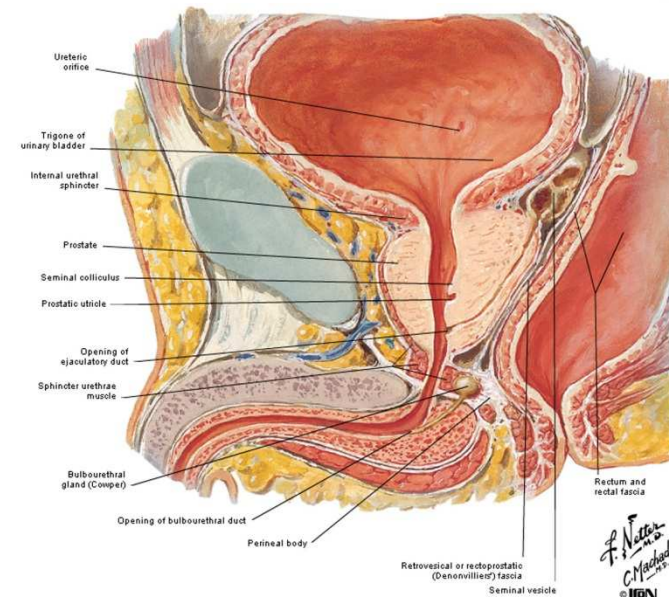






# Prostate gland, *prostata*

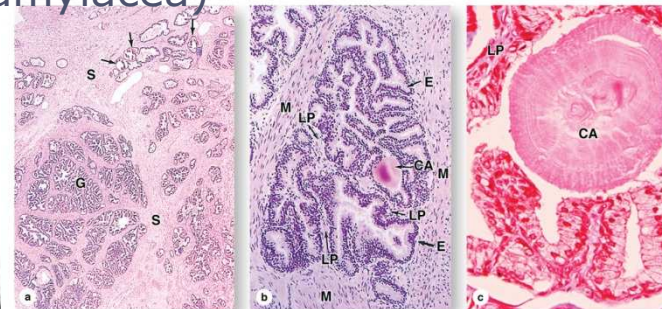
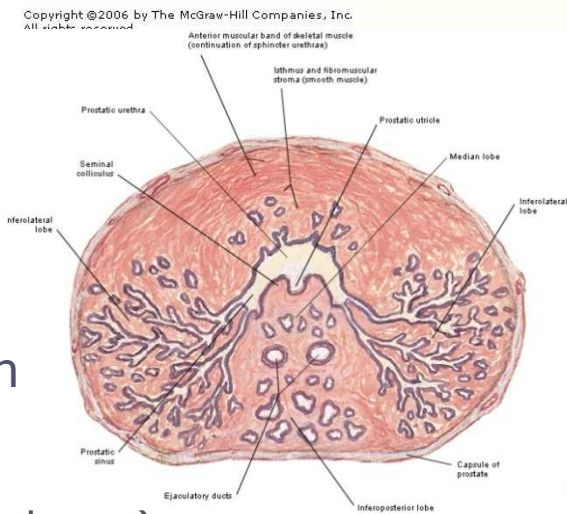
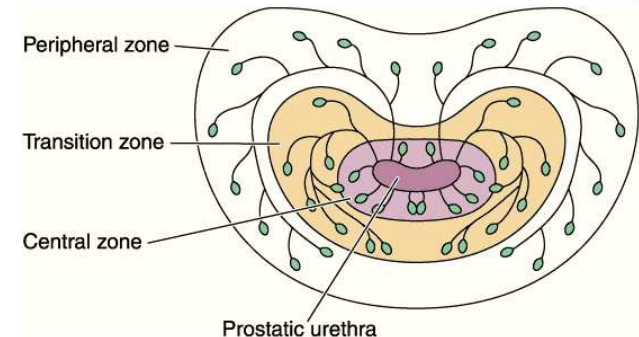
- Prostate gland, *prostata*:
  - ✓ fibromuscular dense organ
  - ✓ tubuloalveolar exocrine gland
  - ✓ endocrine gland
- Macroscopic anatomy:
  - ✓ cone-shaped – chestnut-like
  - ✓ weight ~ 8 g
  - ✓ anterior-posterior size ~2 cm
  - ✓ transverse size ~4 cm
  - ✓ vertical size ~3 cm
  - ✓ tip, *apex prostatae*
  - ✓ base, *basis prostatae*
  - ✓ *facies anterior et facies posterior*
  - ✓ *facies inferolateralis*
  - ✓ two parts – anterior and posterior
    - *colliculus seminalis; utriculus prostaticus*
    - *crista urethralis; ductus ejaculatorii*
  - ✓ three lobes:
    - *lobus prostatae dexter et sinister*
    - *lobus medius*
    - *isthmus prostatae*





# Microscopic anatomy

- fibroelastic capsule – thin:
  - ✓ fibromuscular septa ⇒ 30-40 lobes
- smooth muscle, *stroma myoelasticum*
- glandular tissue, *parenchyma glandulare*:
  - peripheral zone
  - transition zone
  - central zone – 25% of the volume
- ✓ secretory portion:
  - *exocrinocytii mucosi* – milky prostatic fluid – 30% of the semen
    - cuboidal or columnar pseudostratified epithelium
    - prostatic concretions (corpora amyloacea)
- ✓ prostatic tubules
  - two layers of simple columnar epithelium
- ✓ prostatic urethra



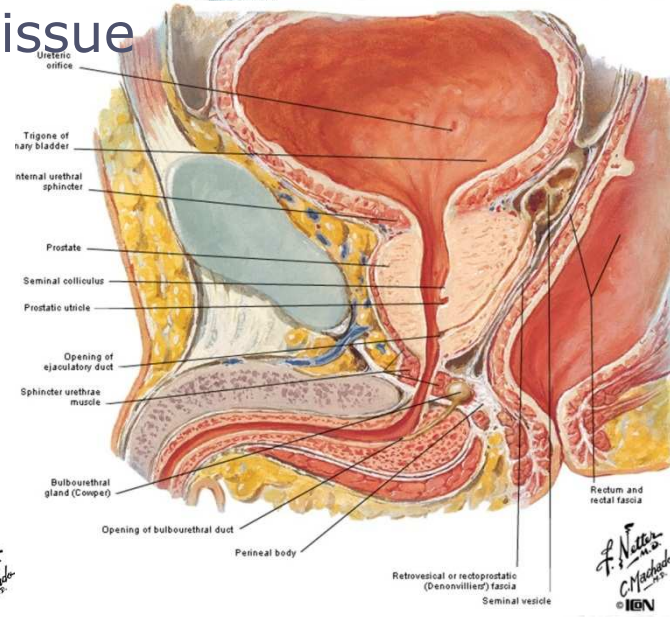
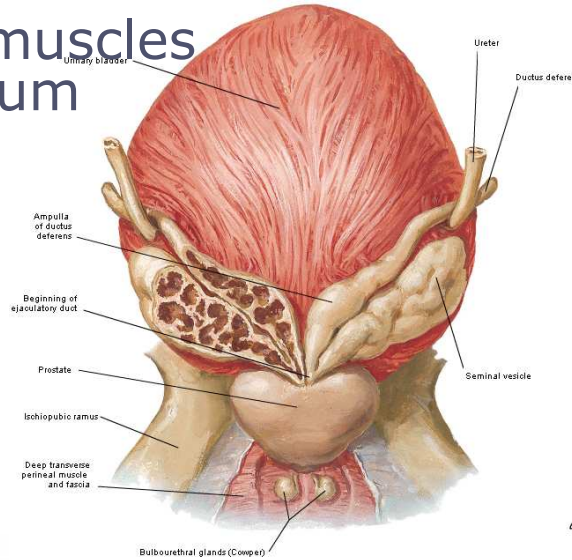
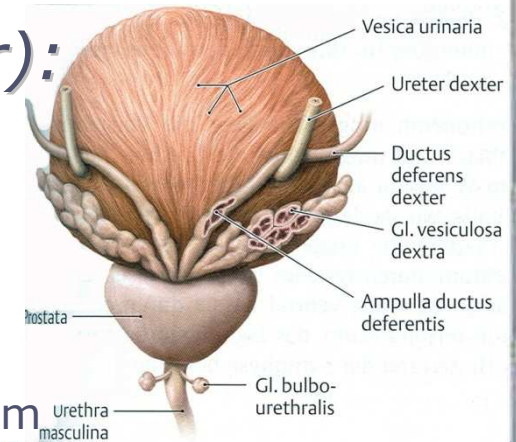




# Bulbourethral glands, *glandulae bulbourethrales*

## ■ *Glandulae bulbourethrales* (Cowper):

- ✓ brownish, spherical glands
- ✓ in the urogenital diaphragm
- ✓ tubuloalveolar glands
  - simple cuboidal to columnar epithelium – clear mucus ⇒ acts as a lubricant
- ✓ *ductus glandulae bulbourethralis* – 3-4 cm
- ✓ fibroelastic and smooth muscle tissue
- ✓ skeletal muscles of perineum



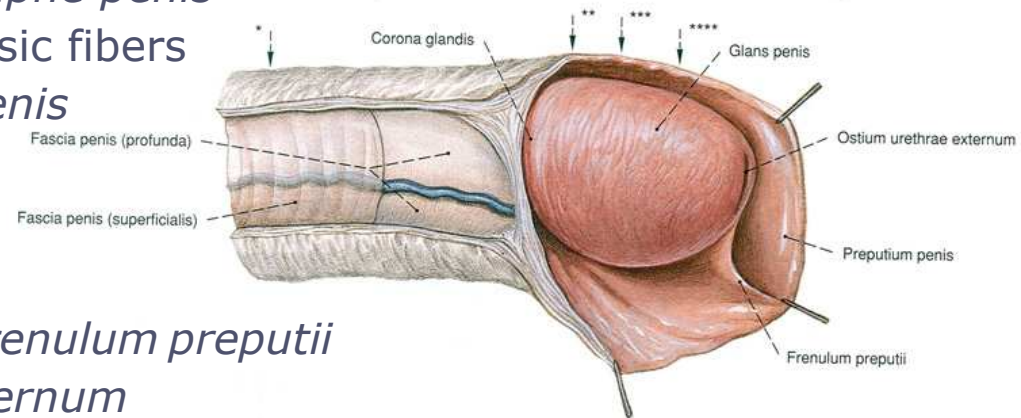
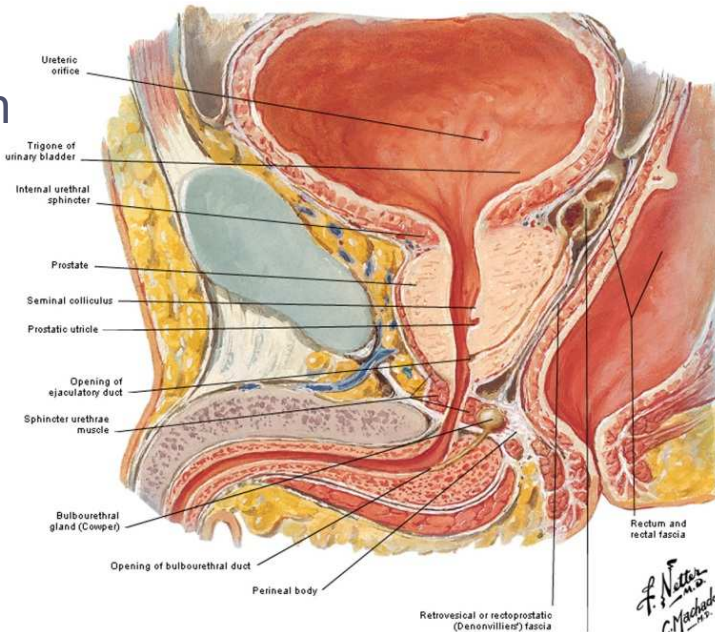
F. Netter M.D. C. Machado M.D. IGM

F. Netter M.D. C. Machado M.D. IGM



# Penis, penis

- **Penis, penis (Gr. phallos):**
  - ✓ a reproductive, intromittent organ
    - to deposit semen in the vagina
  - ✓ urinary duct
- **Anatomical parts:**
  - ✓ root, *radix penis*
    - *crura penis*
    - *bulbus penis*
  - ✓ shaft or body, *corpus penis*
    - *dorsum penis*
    - *facies urethralis* ⇨ *raphe penis*
    - *lig. fundiforme* – elastic fibers
    - *lig. suspensorium penis*
  - ✓ glans, *glans penis*
    - *collum glandis*
    - *corona glandis*
    - *preputium penis et frenulum preputii*
    - *ostium urethrae externum*

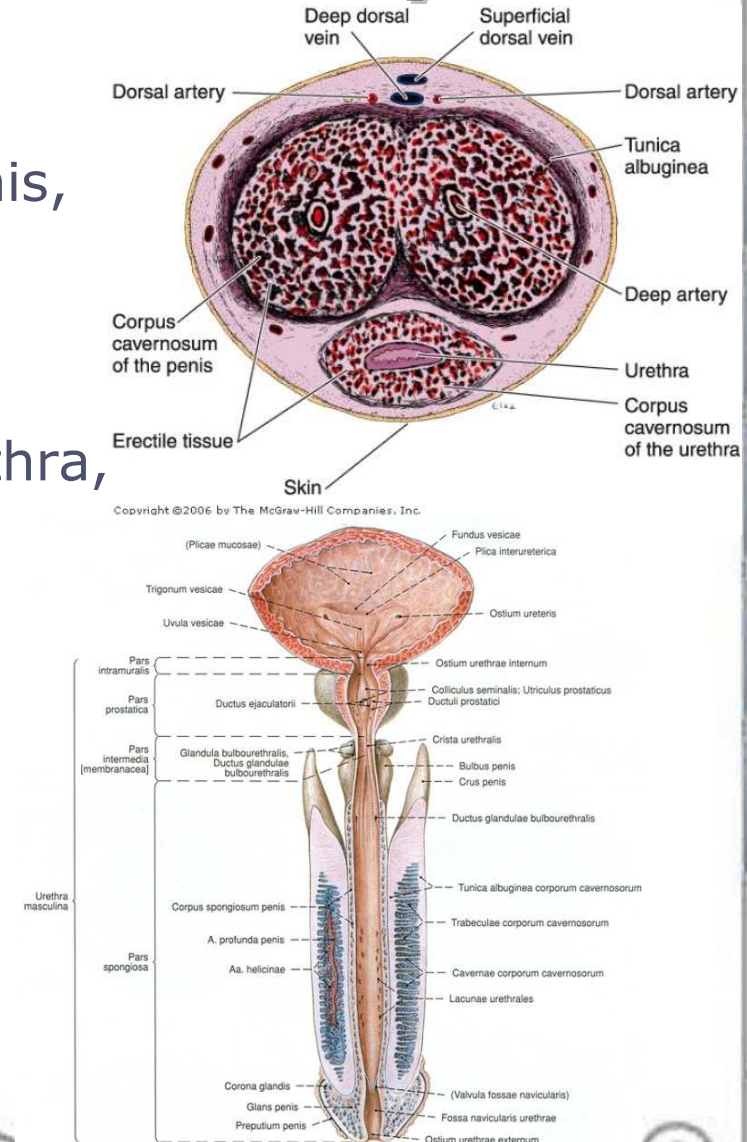






# Macroscopic anatomy

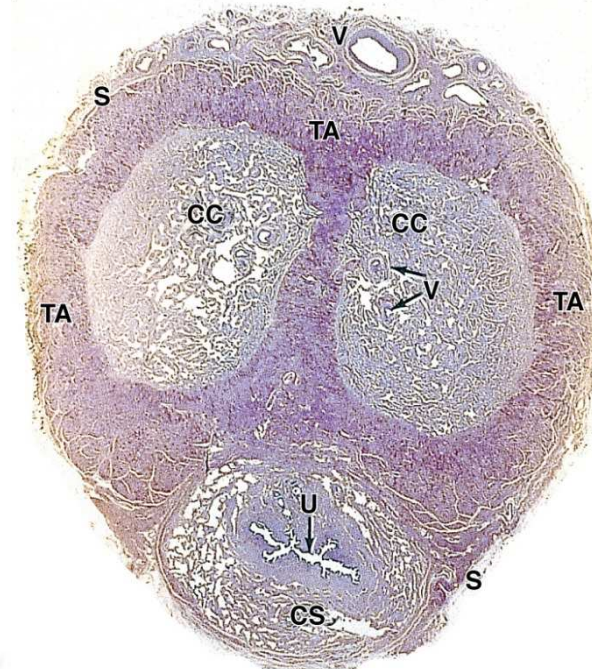
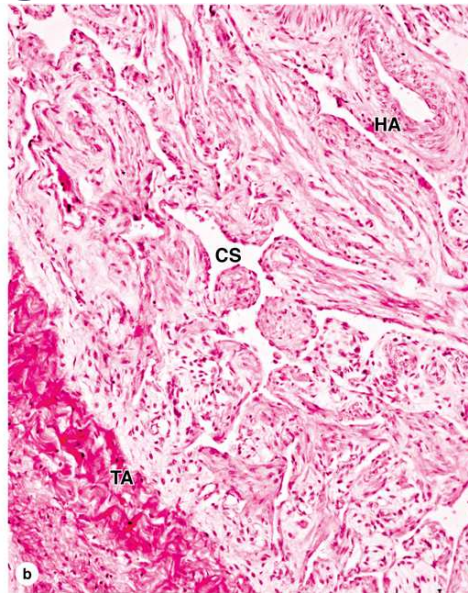
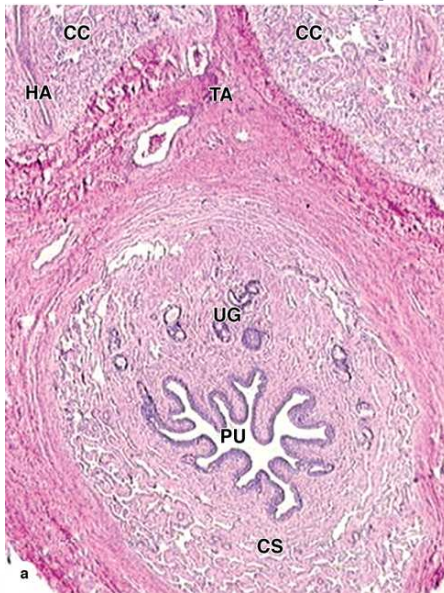
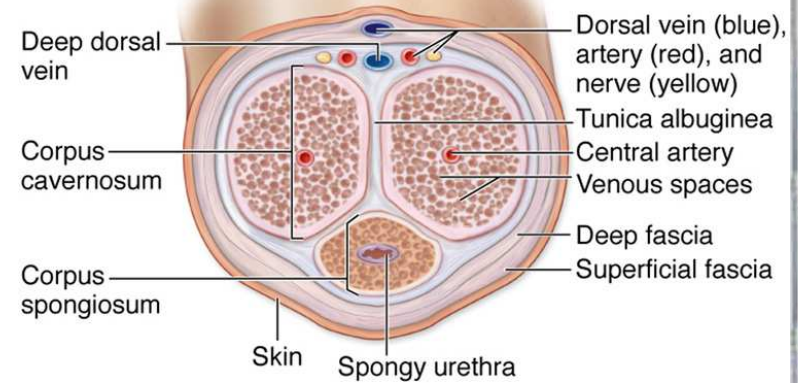
- Structure – erectile tissues:
  - ✓ corpus cavernosum of the penis, *corpora cavernosa penis*
    - *crura penis*
    - *septum penis*
  - ✓ corpus cavernosum of the urethra, *corpus spongiosum penis*
    - *bulbus penis*
    - *glans penis*
    - *urethra masculina*
  - ✓ *tunica albuginea, fascia penis*
  - ✓ subcutis
  - ✓ shaft skin
    - foreskin, *preputium penis*
    - glands of Littre





# Microscopic anatomy

- skin
  - ✓ *raphe penis* ⇔ *raphe scroti*
- *fascia penis*
- *tunica albuginea*
- *erectile tissue*
  - ✓ *a. profunda penis*
  - ✓ *urethra spongiosa*

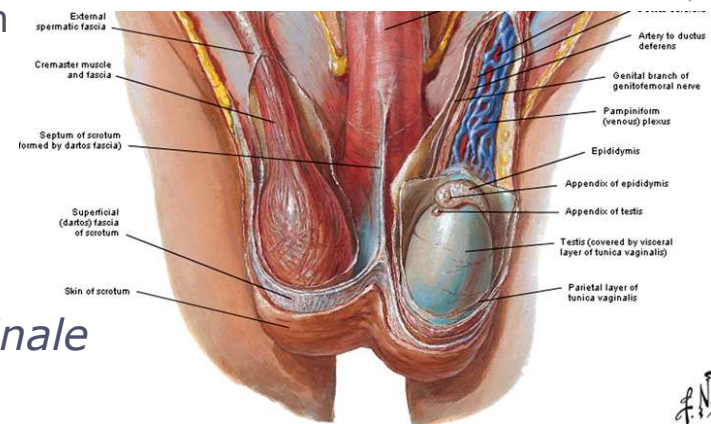
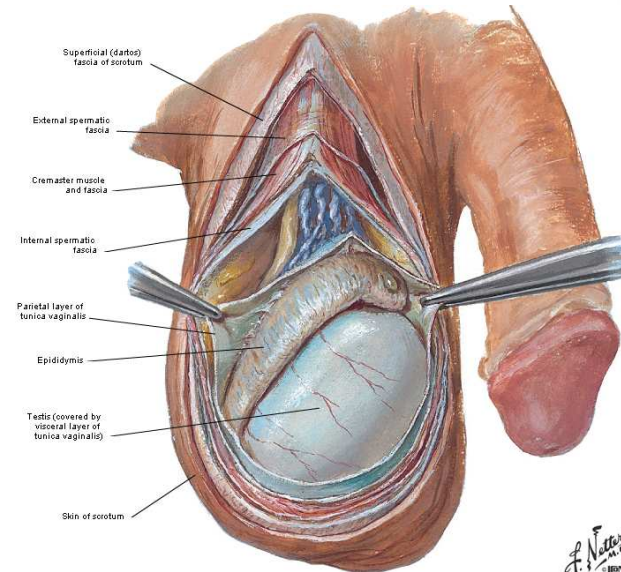






# Scrotum, scrotum

- Scrotal sac:
  - ✓ a dual-chambered pendulous pouch
  - ✓ between the penis and anus
  - ✓ divided by a septum and *raphe scroti*
- Macroscopic anatomy:
  - ✓ skin – hairy and pigmented
    - lightly keratinized epithelium
    - sebaceous and abundance of sweat glands
  - ✓ subcutaneous layer of smooth muscle
    - *tunica s. musculus dartos* – 1-2 mm
  - ✓ *fascia spermatica externa*
  - ✓ *fascia cremasterica*
  - ✓ *m. cremaster*
  - ✓ *fascia spermatica interna*
  - ✓ *tunica vaginalis testis* – *cavum vaginale*
    - *lamina parietalis* (*periorchium*)
    - *lamina visceralis* (*epiorchium*)





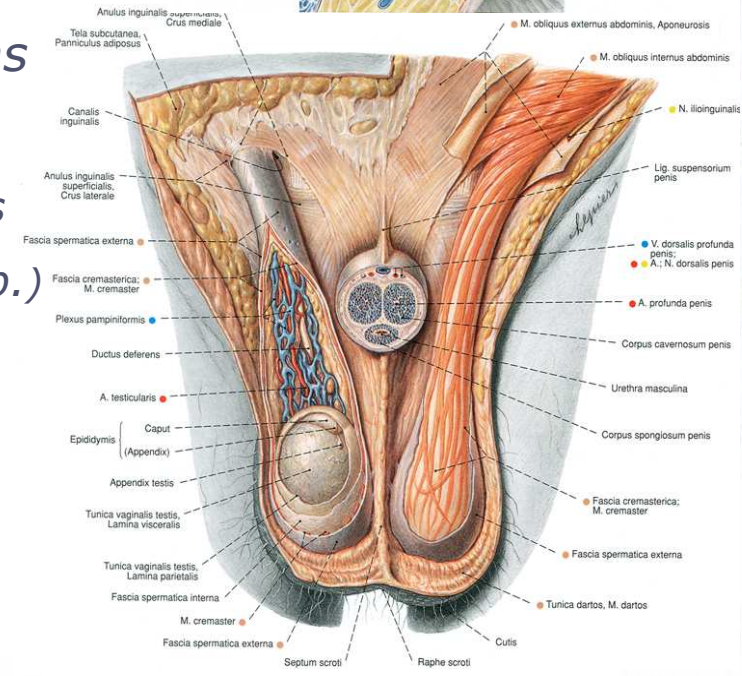
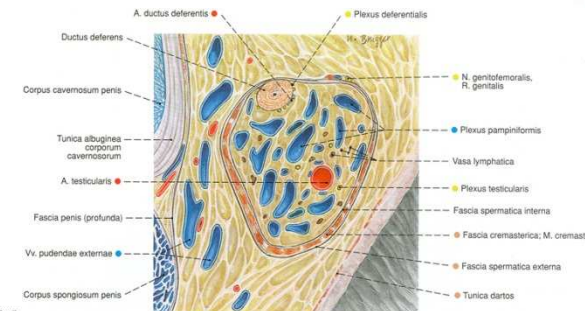
# Spermatic cord, *funiculus spermaticus*

## ■ Spermatic cord, *funiculus spermaticus*:

- ✓ a paired cord of connective tissue
- ✓ length 15-20 cm
- ✓ from *annulus inguinalis profundus*

## ■ Content:

- ✓ sperm duct, *ductus (vas) deferens*
- ✓ *a. testicularis*
- ✓ *vv. testicularis*, pampiniform plexus
- ✓ *a. ductus deferentis (a. vesicalis sup.)*
- ✓ *v. ductus deferentis*
- ✓ *a. cremasterica (a. epigastrica inf.)*
- ✓ lymphatic vessels
- ✓ nerves, *plexus testicularis*
- ✓ *r. genitalis n. genitofemoralis*

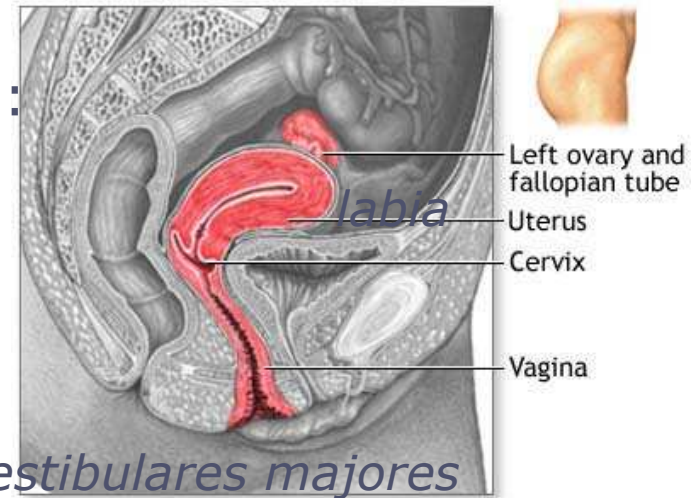
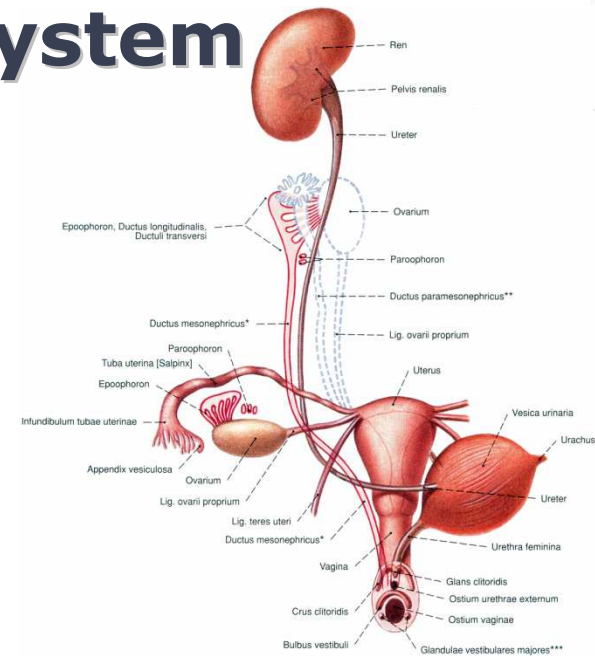






# Female reproductive system

- Female reproductive system, *systema genitalia feminina*:
  - ✓ located in the pelvis
- Female reproductive organs, *organa genitalia feminina*:
  - ✓ internal female genitalia:
    - ovary, *ovarium*
    - uterine tube, *tuba uterina*
    - uterus, *uterus*
    - vagina, *vagina*
  - ✓ external female genitalia (vulva):
    - mons pubis, *mons pubis*
    - fleshy lips, *labia majora et minora pudendi*
    - clitoris, *clitoris*
    - vestibule, *vestibulum vaginae*
    - vestibular bulbs, *bulbi vestibuli*
    - greater vestibular glands, *gll. vestibulares majores*
    - (mammary gland), breast, *mamma*



ADAM.



# Ovary, ovarium

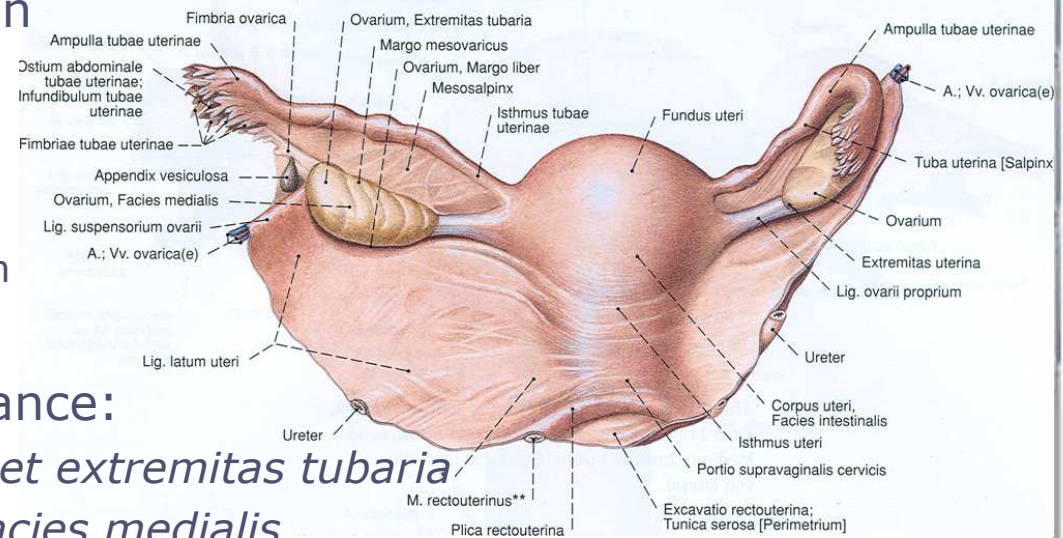
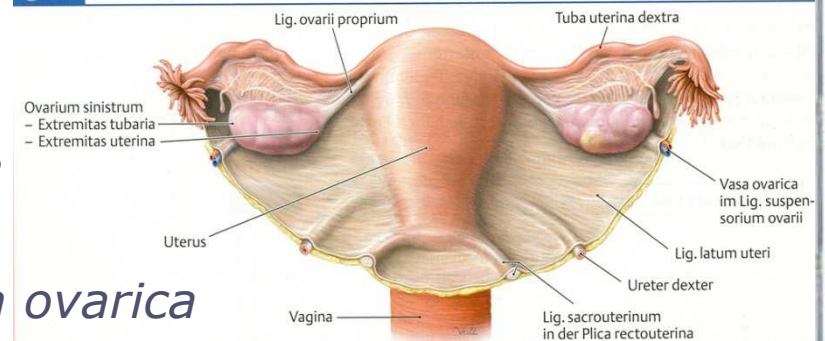
■ Ovary, ovarium (Gr. oophoron):

- ✓ female gonad
- ✓ produces egg cells (ova)
- ✓ secretes female sex hormones

■ Ovary *in situ*:

- ✓ lateral part of the pelvis, *fossa ovarica*
- ✓ almond-shaped organ
- ✓ size:
  - length – 3-4 cm
  - width – 1.5-2 cm
  - thickness – 1-1.5 cm
- ✓ weight – 6-14 g
- ✓ macroscopic appearance:
  - *extremitas uterina et extremitas tubaria*
  - *facies lateralis et facies medialis*
  - *margo liber et margo mesovaricus* ⇒ *lig. latum uteri, mesovarium*

1-3.2 Übersicht über die inneren weiblichen Geschlechtsorgane

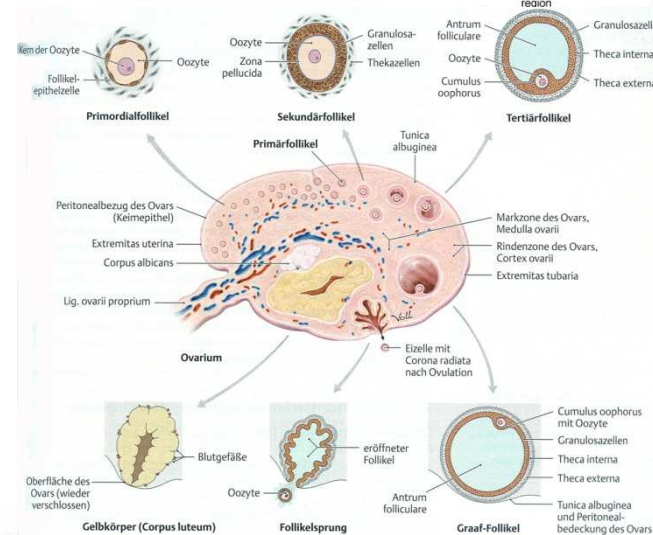
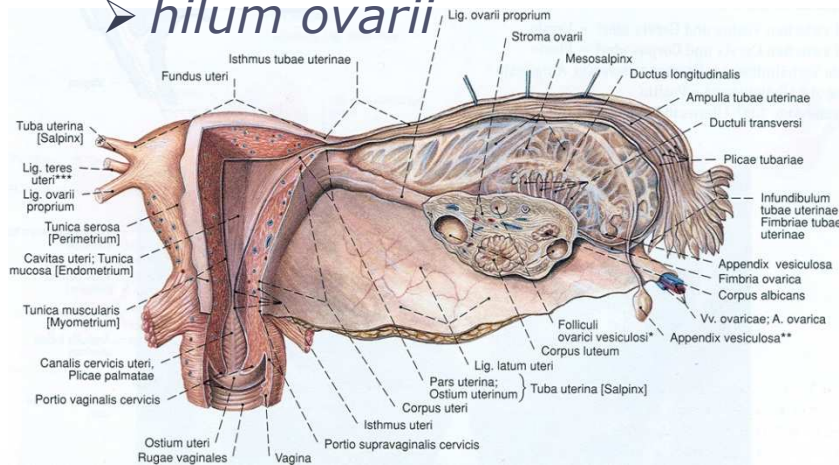
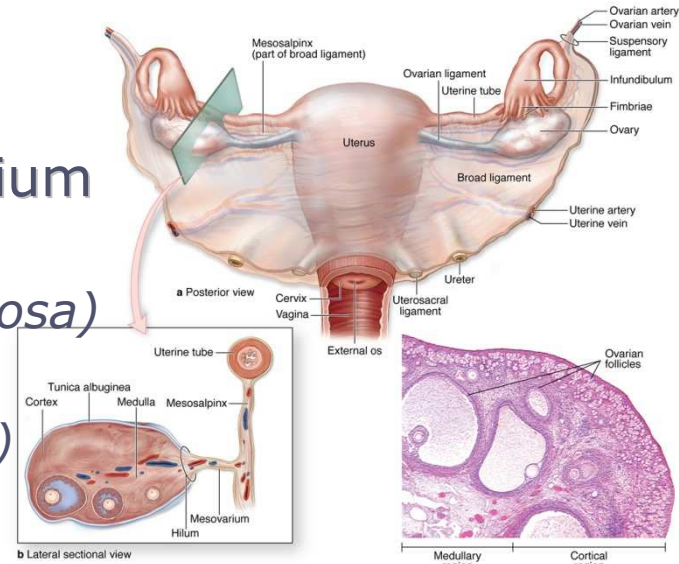






# Microscopic anatomy

- Main components:
  - ✓ simple squamous or cuboidal epithelium, the germinal epithelium
  - ✓ *tunica albuginea* – collagen fibers
  - ✓ cortical region (*zona parenchymatosa*)
    - ovarian follicles
  - ✓ medullary region (*zona vasculosa*)
    - *stroma ovarii*
    - *interstitium ovarii*
    - *hilum ovarii*





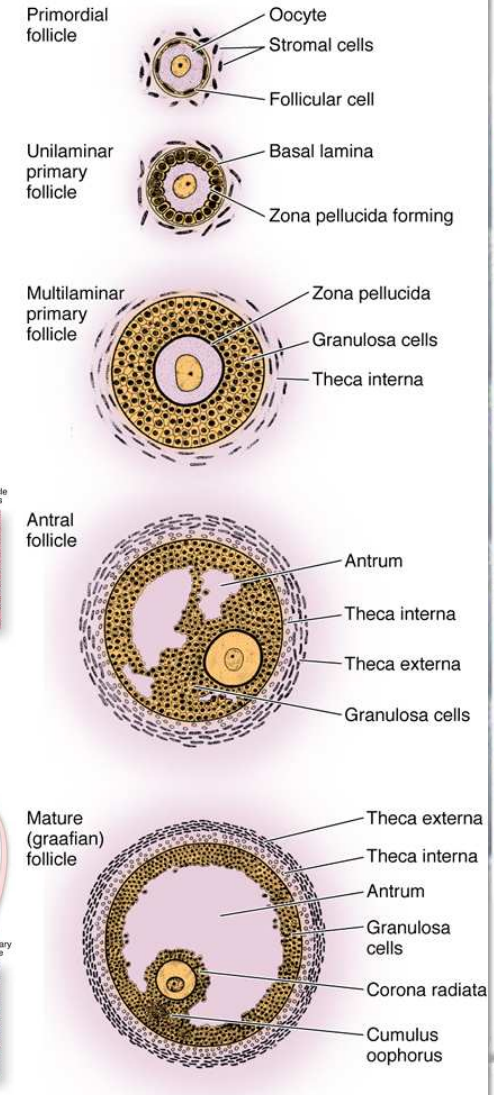
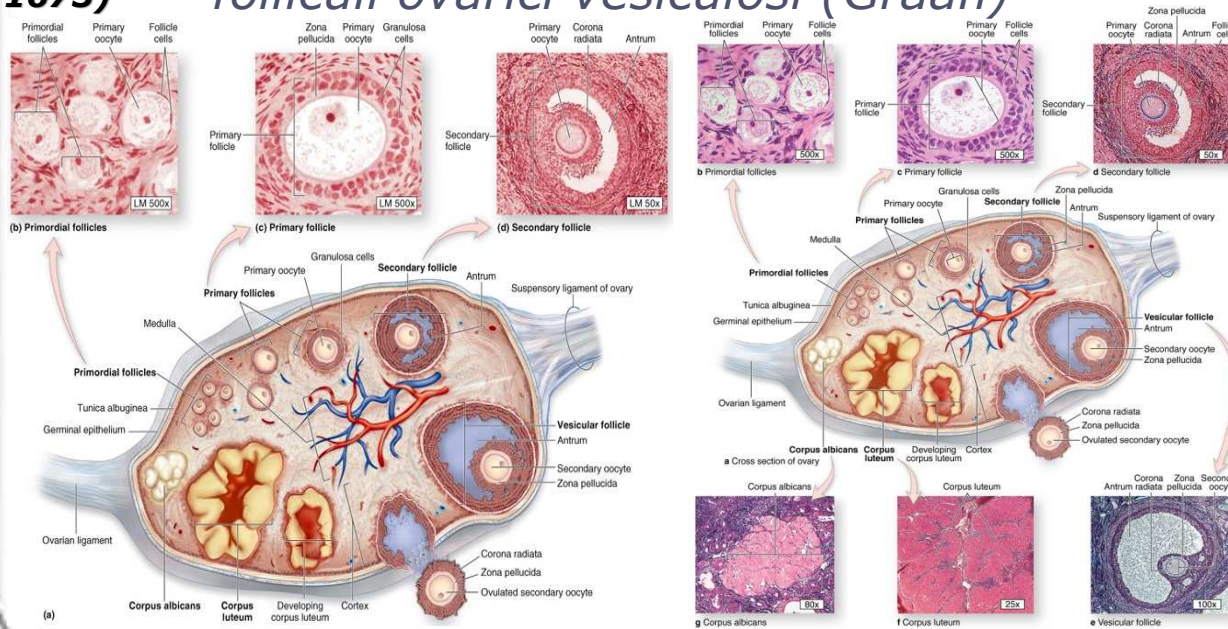
# Cortical region

## ■ Ovarian follicles:

- ✓ primordial follicles, *folliculi ovarici primordiales*
- ✓ primary follicles, *folliculi ovarici primarii*
- ✓ secondary, *folliculi ovarici secundarii*
- ✓ mature (graafian) follicles, *folliculi ovarici vesiculosi (Graafi)*



**Regnier de Graaf (1641-1673)**

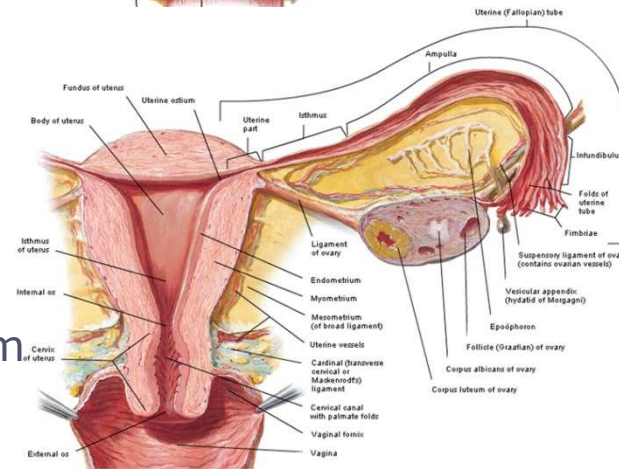
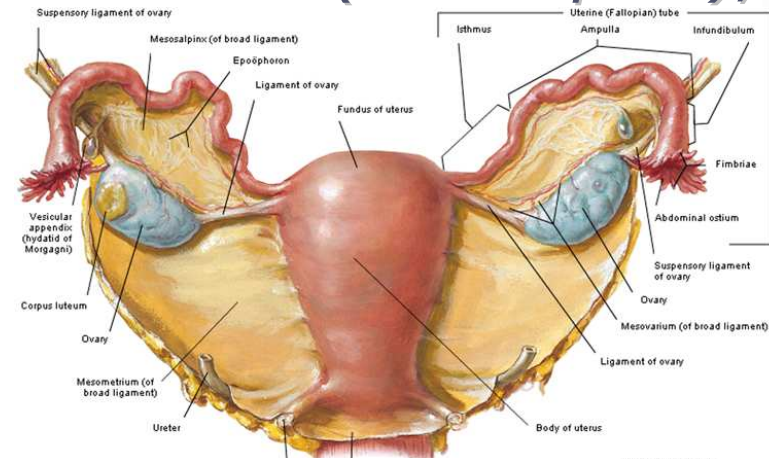






# Uterine tube, *tuba uterina*

- Uterine tube (oviduct), *tuba uterina* (Gr. *salpinx*), fallopian tube (*Falloppio*):
  - ✓ two muscular tubes
  - ✓ length 10-12 (5-20) cm
  - ✓ diameter 3-4 – 8-9 mm
- Anatomical parts:
  - ✓ *pars uterina* – 1 cm
    - *ostium uterinum tubae* – d=1 mm
  - ✓ *isthmus tubae uterinae* – 3-5 cm
  - ✓ *ampulla tubae uterinae* – 6-8 cm
  - ✓ *infundibulum tubae uterinae*
    - *ostium abdominale tubae*, d=2-3 mm
    - *fimbriae tubae; fimbria ovarica*
    - *appendices vesiculosae*



F. Nikolai Lazarov  
2009

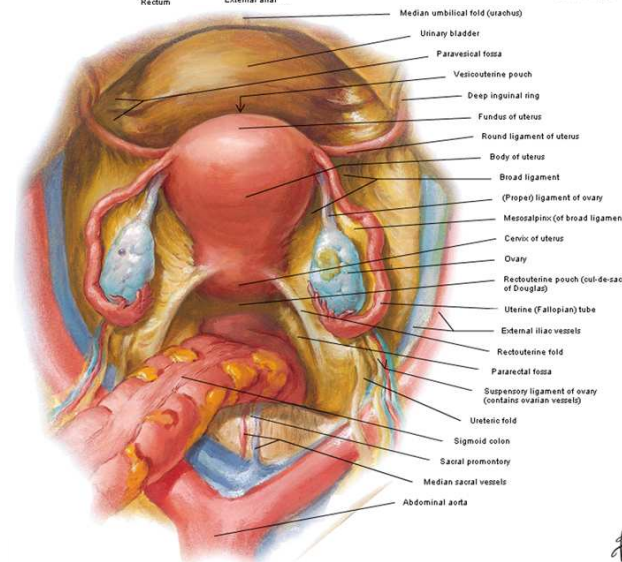
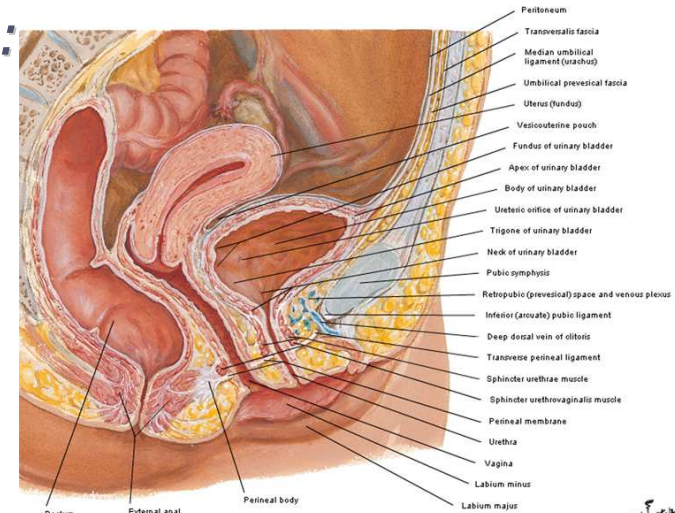






# Uterus, uterus

- Uterus, uterus (*Gr. metra, hystera*):
  - ✓ thick muscular chamber
- Topography and external appearance:
  - ✓ in the pelvis, between the urinary bladder and rectum
    - *excavatio rectouterina*
    - *excavatio vesicouterina (cavum Douglassi)*
  - ✓ pear-shaped organ
  - ✓ weight – 30-45 g
  - ✓ size:
    - length – 7-8 cm
    - width – 5 cm
    - thickness – 2.5 cm
  - ✓ two surfaces:
    - *facies vesicalis*
    - *facies intestinalis*
    - *margo uteri, sinister and dexter*
    - uterine horns



*N. Lazarov*  
MBV

*N. Lazarov*  
MBV



# Uterus, uterus

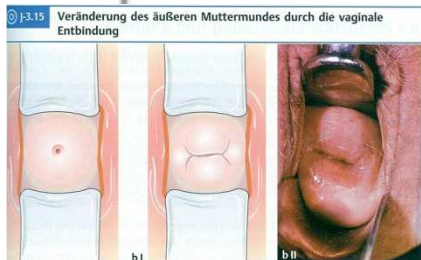
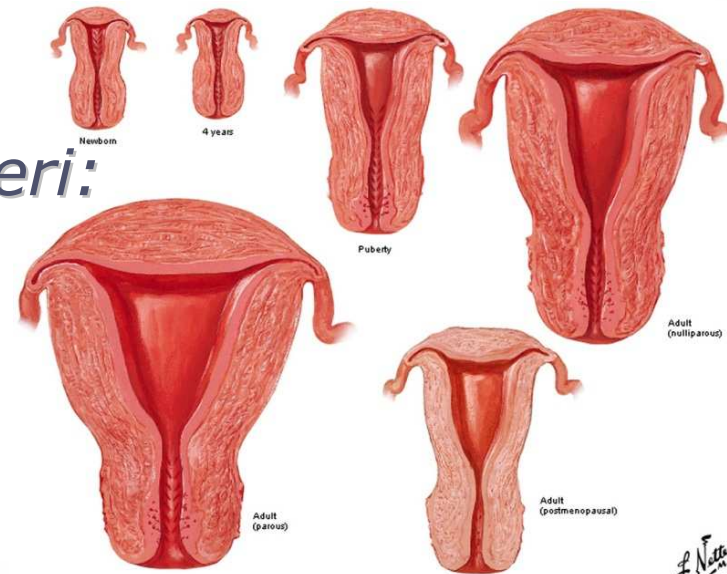
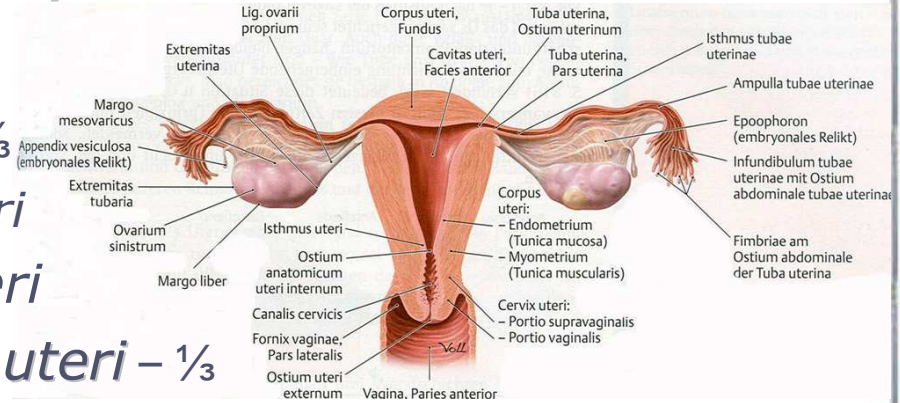
## ■ Macroscopic anatomy:

### ✓ anatomical parts:

- body, *corpus uteri* –  $\frac{2}{3}$ 
  - o fundus, *fundus uteri*
- isthmus, *isthmus uteri*
- neck, *cervix (collum) uteri* –  $\frac{1}{3}$ 
  - o *portio supravaginalis*
  - o *portio vaginalis cervicis*

### ✓ uterine cavity, *cavitas uteri*:

- *canalis cervicis uteri*
- *ostium uteri*
  - o *labium anterius*
  - o *labium posterius*
    - *fornix vaginae*



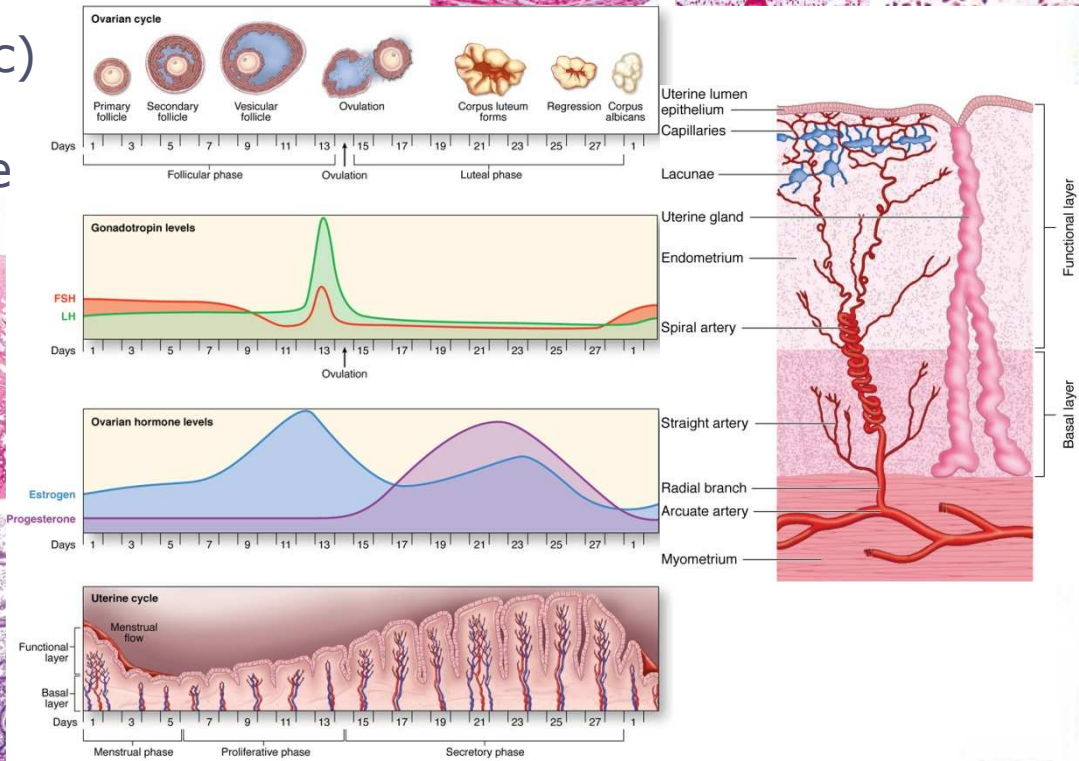
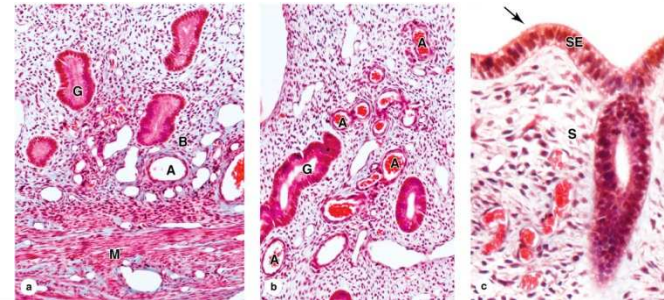
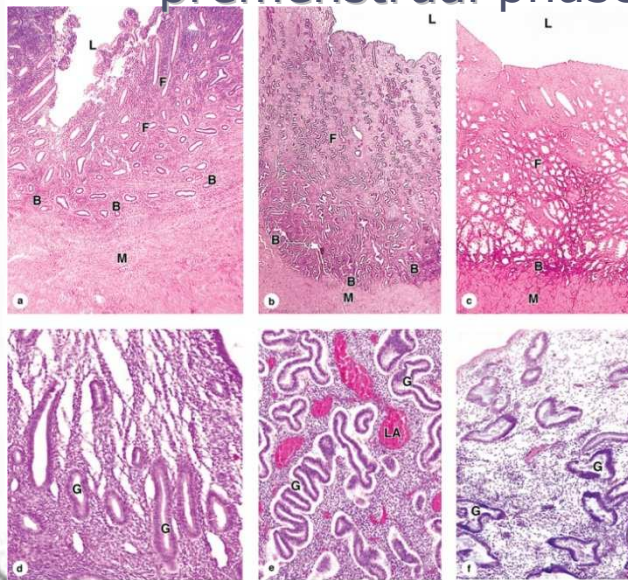






# Microscopic anatomy

- Cyclic changes of the endometrium:
  - ✓ basal layer – 1 mm thick
  - ✓ functional layer
- Phases of the menstrual cycle:
  - ✓ desquamative, menstrual phase
  - ✓ proliferative or follicular (estrogenic)
  - ✓ secretory (luteal)
  - ✓ premenstrual phase

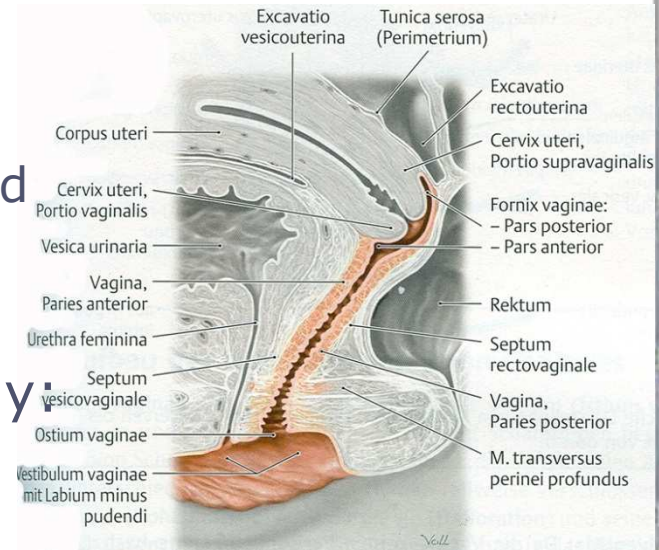






# Vagina, *vagina*

- **Vagina, *vagina* (Gr. colpos):**
  - ✓ muscular tube
  - ✓ allows for discharge of menstrual fluid
  - ✓ receipt of the penis and semen, and birth of a baby
- **Topography and macroscopic anatomy:**
  - ✓ dorsally from the urinary bladder and ventrally of the rectum
  - ✓ between the uterus and vestibule
  - ✓ length – 8-10 cm
  - ✓ external appearance:
    - *paries anterior et paries posterior*
    - *fornix vaginae*,
      - o *pars anterior et pars posterior*
      - o *partes laterales*
    - *ostium vaginae* ⇔ *hymen* – forms
      - o *carunculae hymenales*



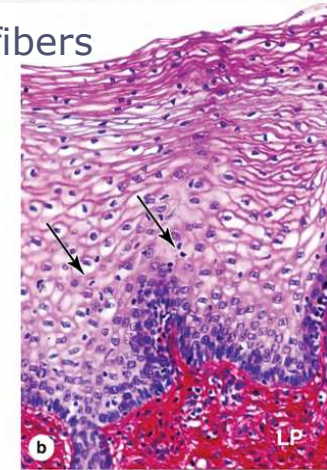
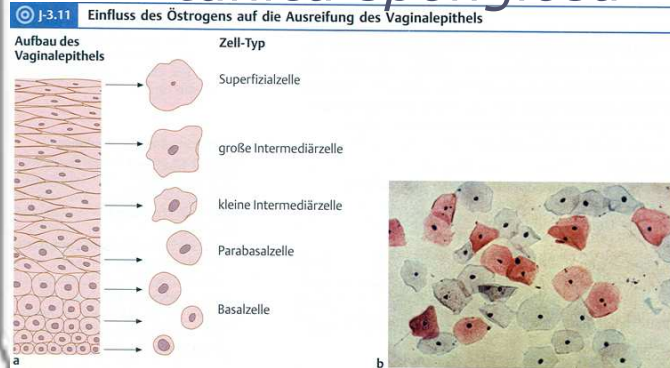
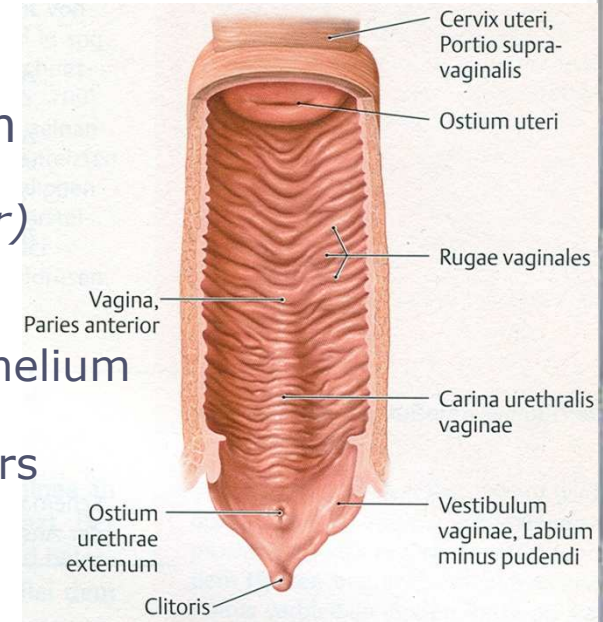
*f. Nator*  
© 2015



# Microscopic anatomy

## ■ Vaginal wall:

- ✓ mucosa, *tunica mucosa* – 150-20  $\mu\text{m}$ 
  - *rugae vaginales*
  - *columnae rugarum (posterior et anterior)*
  - *carina urethralis vaginae*
- ✓ *lamina epithelialis* – estrogen stimulation
  - stratified squamous nonkeratinized epithelium
- ✓ *lamina propria*
  - dense connective tissue with elastic fibers
  - no glands, *folliculi lymphatici solitarii*
- ✓ *lamina (stratum) submucosum*
- ✓ muscular layer, *tunica muscularis*
  - longitudinal (and some circular) bundles of smooth muscle fibers
- ✓ *tunica spongiosa*



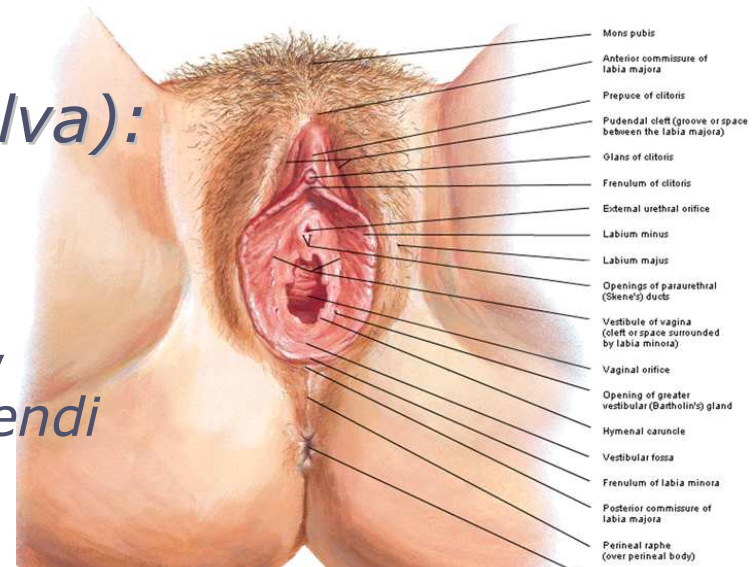




# External female genital organs, *pudendum femininum*

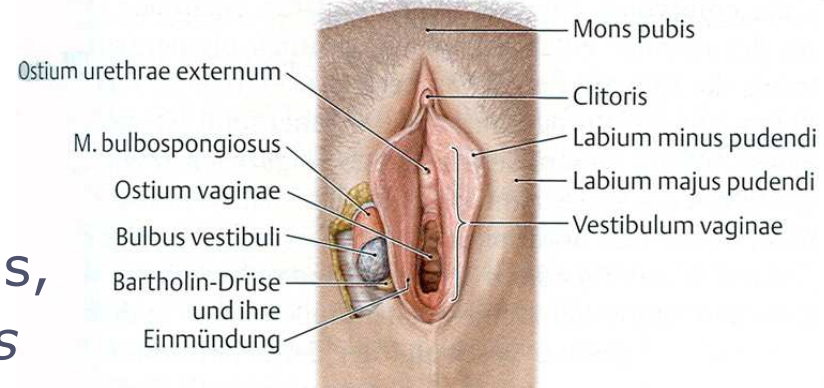
- External female genitalia,  
*pudendum femininum (vulva)*:

- ✓ mons pubis,  
*mons pubis*
- ✓ major and minor fleshy lips,  
*labia majora et minora pudendi*
- ✓ clitoris, *clitoris*
- ✓ vaginal vestibule,  
*vestibulum vaginae*
- ✓ vestibular bulbs,  
*bulbi vestibuli*
- ✓ greater vestibular glands,  
*gll. vestibulares majores*



J-3.9 Äußere weibliche Geschlechtsorgane

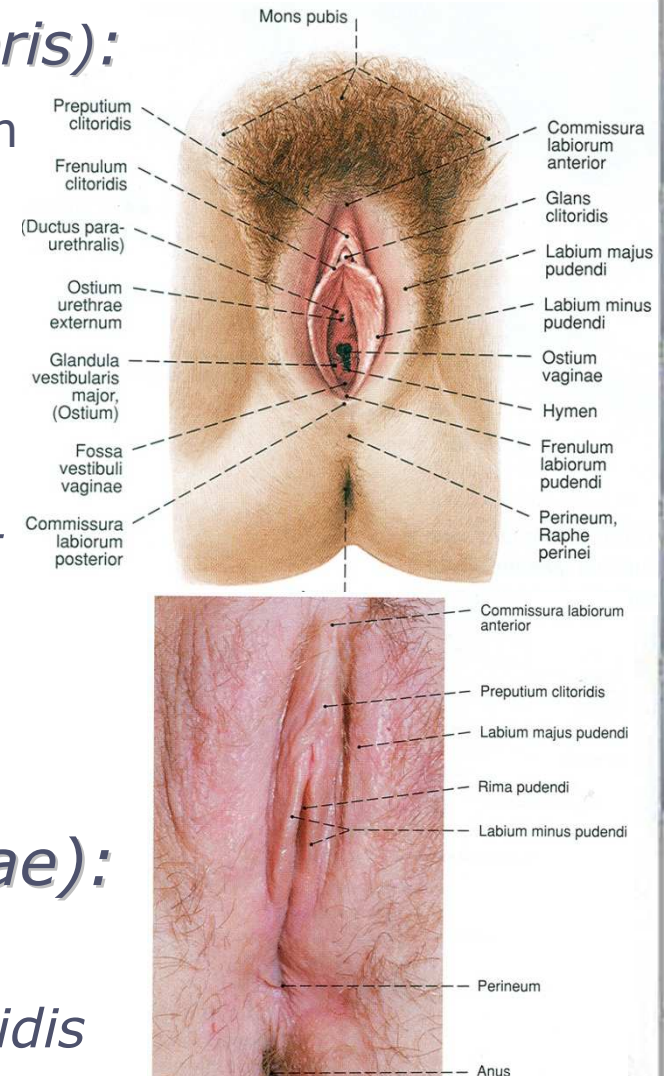
*f. Netter*  
© MDN





## External female genitalia, *pudendum femininum*

- Mons pubis, *mons pubis (Veneris)*:
  - ✓ a mound of adipose tissue – 2-3 cm
  - ✓ overlies the pubic symphysis
- Major fleshy lips, *labia majora pudendi*:
  - ✓ *rima pudendi* ~7 cm
  - ✓ *commissura labiorum anterior et commissura labiorum posterior*
  - ✓ *bulbus vestibuli*
- Minor fleshy lips, *labia minora pudendi (nymphae)*:
  - ✓ *prepuce, preputium clitoridis*
  - ✓ *genital frenulum, frenulum clitoridis*

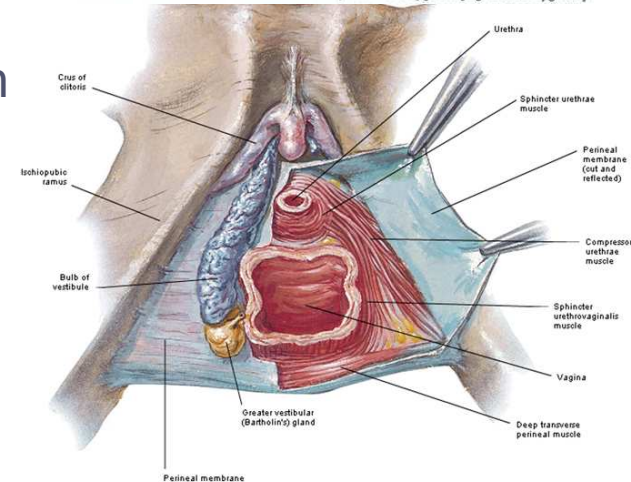
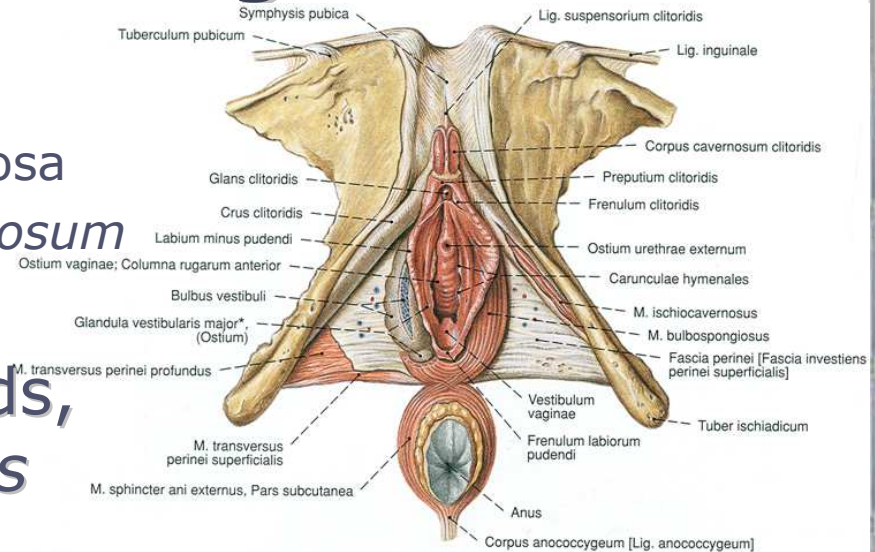






# Vaginal vestibule, vestibulum vaginae

- Clitoris:
  - a pair of corpora cavernosa
  - *septum corporum cavernosum*
  - ✓ *glans clitoridis*
- Greater vestibular glands, *gll. vestibulares majores* (*Bartholini*):
  - ✓ pea-sized structures ~10-12 mm
  - ✓ *ductus glandulae* ~2 cm
- Vestibular bulbs, *bulbi vestibuli*:
  - ✓ *pars (commissura) intermedia*
  - ✓ venous plexuses



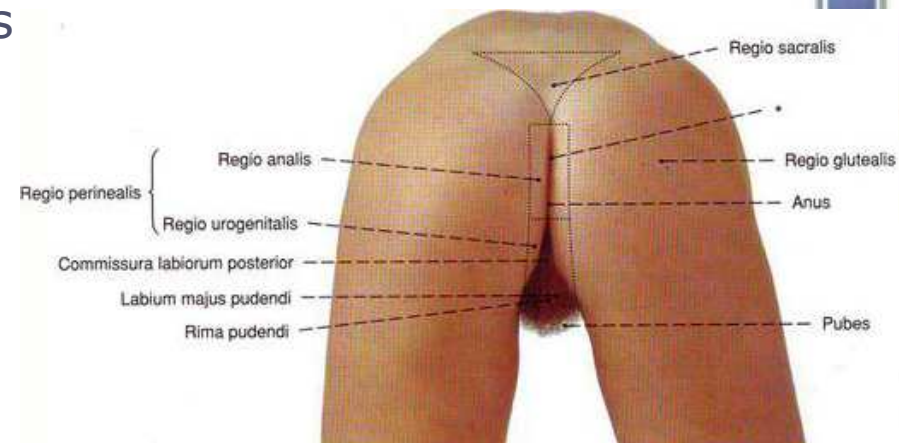
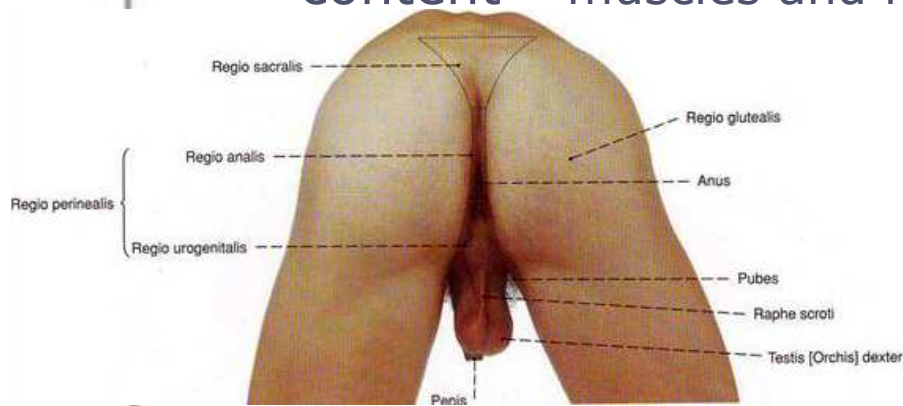
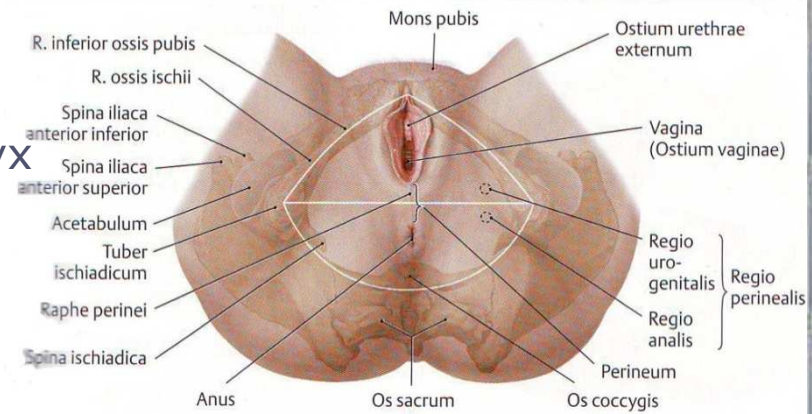
*N. Lazarov*  
C. M. Lazarev  
IGV



# Perineum, *perineum*

- Pelvic floor – boundaries:
  - ✓ a diamond-shaped area between the pubic symphysis and the coccyx
  - ✓ inferior to the pelvic diaphragm
  - ✓ between the legs
- Two triangle parts:
  - ✓ pelvic diaphragm, *diaphragma (trigonum) pelvis*
  - ✓ urogenital diaphragm, *diaphragma urogenitalis*
  - ✓ content – muscles and fascias

C-4.15 Dammregion (Regio perinealis)

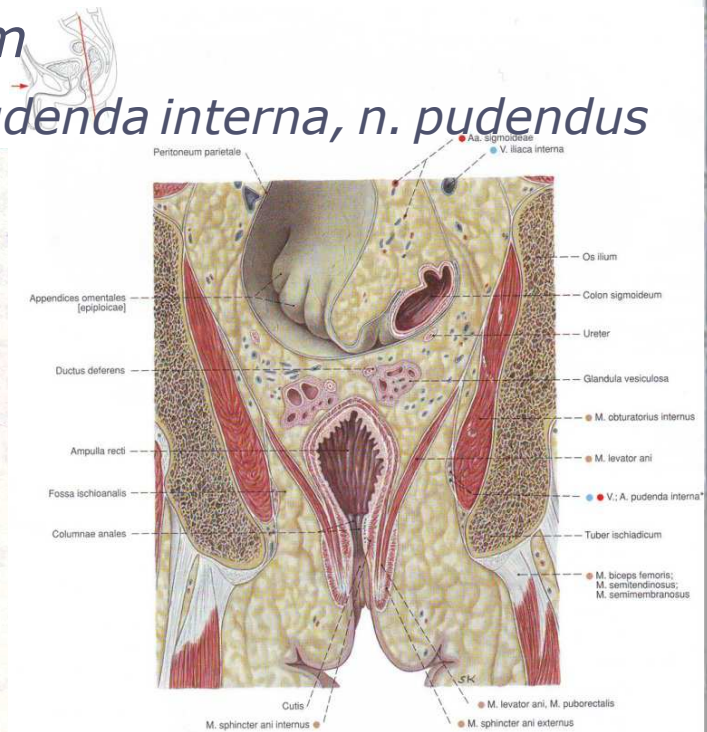
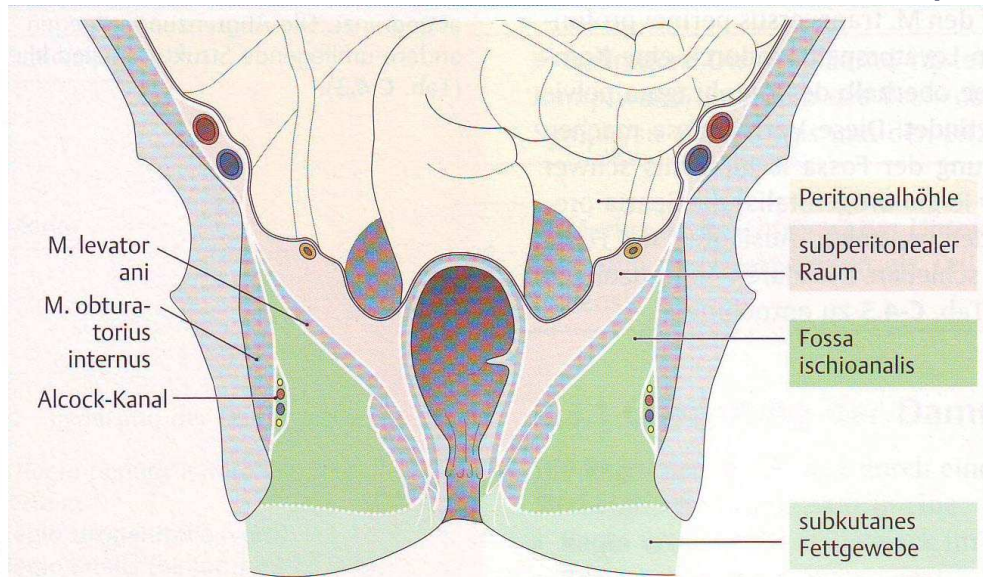






# Ischioanal fossa, fossa ischioanalis (ischioirectalis)

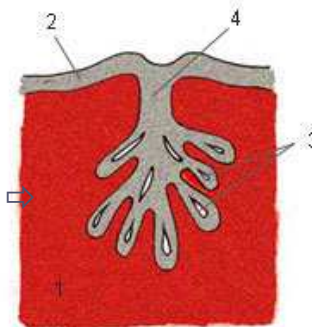
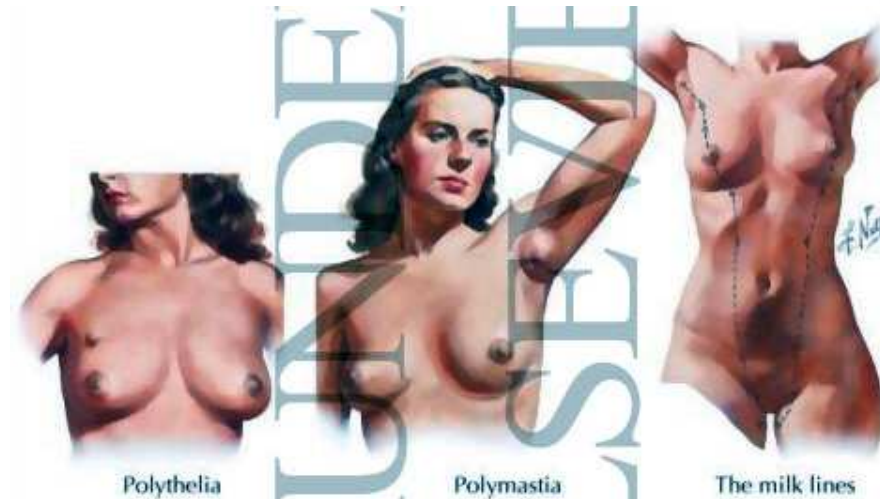
- boundaries:
  - ✓ lateral – *tuber ischiadicum, fascia m. obturatorii interni*
  - ✓ medial and superior – *fascia diaphragmatis pelvis inferior*
- content:
  - ✓ adipose tissue, *corpus adiposum*
  - ✓ neurovascular bundle – *a. et v. pudenda interna, n. pudendus*



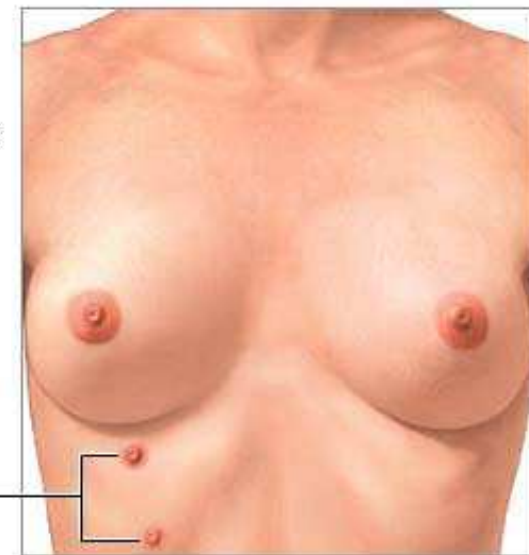


# Embryonic development

- modified sudoriferous glands
- begin - fourth week of gestation, growth of a basic milk streak
- formation of milk lines, "ventral epidermal ridges" - sixth week of the embryo's "life"
- embryonic origin:
  - ✓ ectodermal - parenchyma
    - ⇒ mammary papilla (nipple), alveoli, lactiferous ducts
  - ✓ mesenchymal - stroma  
adipose tissue
- persist of mammary ridges
  - ⇒ *polymastia* (accessory breasts along the milk line from axillae to groin)
  - polythelia* (supernumerary nipple)



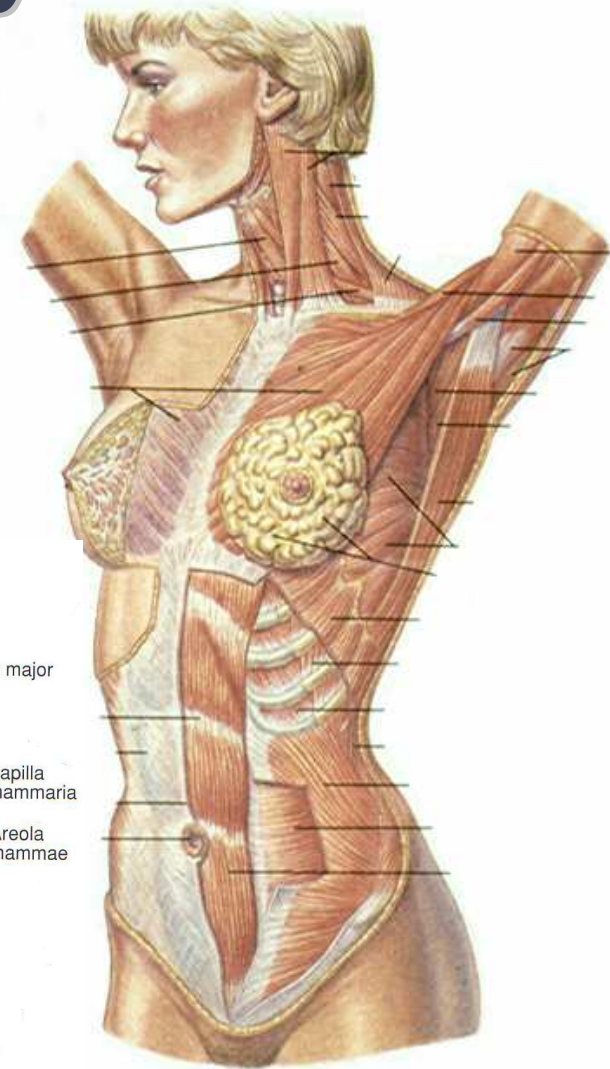
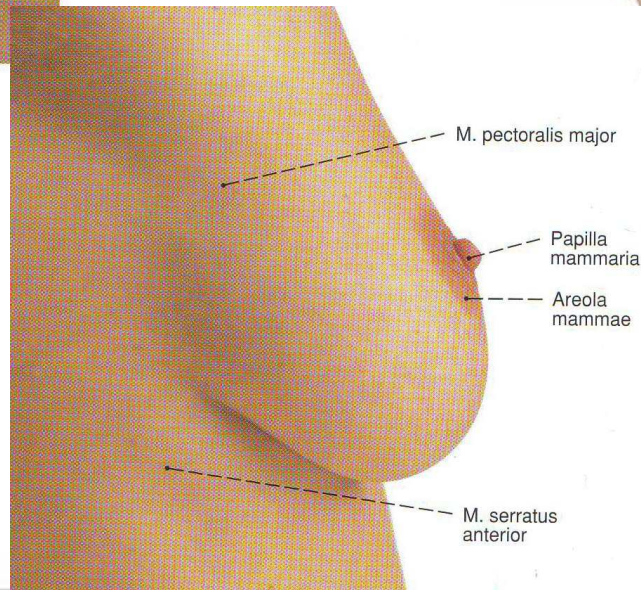
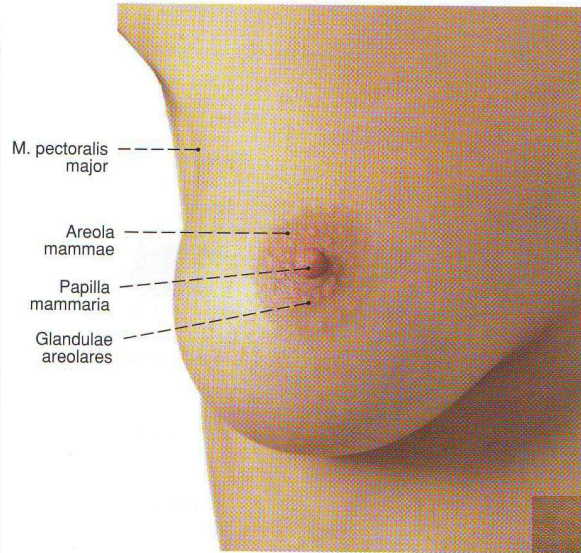
Supernumerary nipples





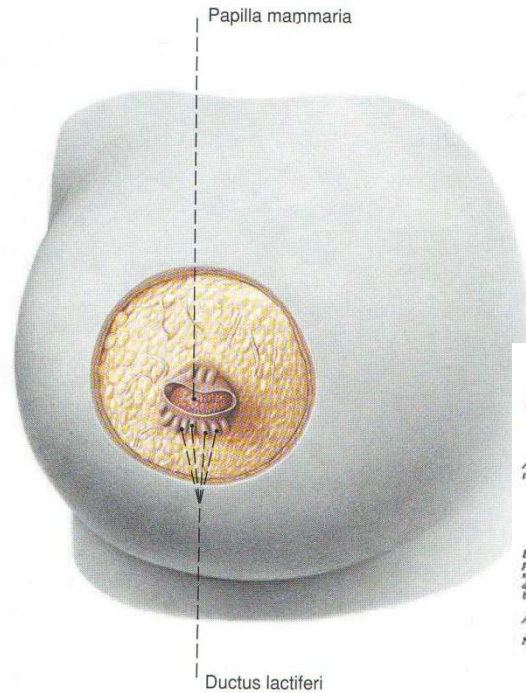


# Breast topography

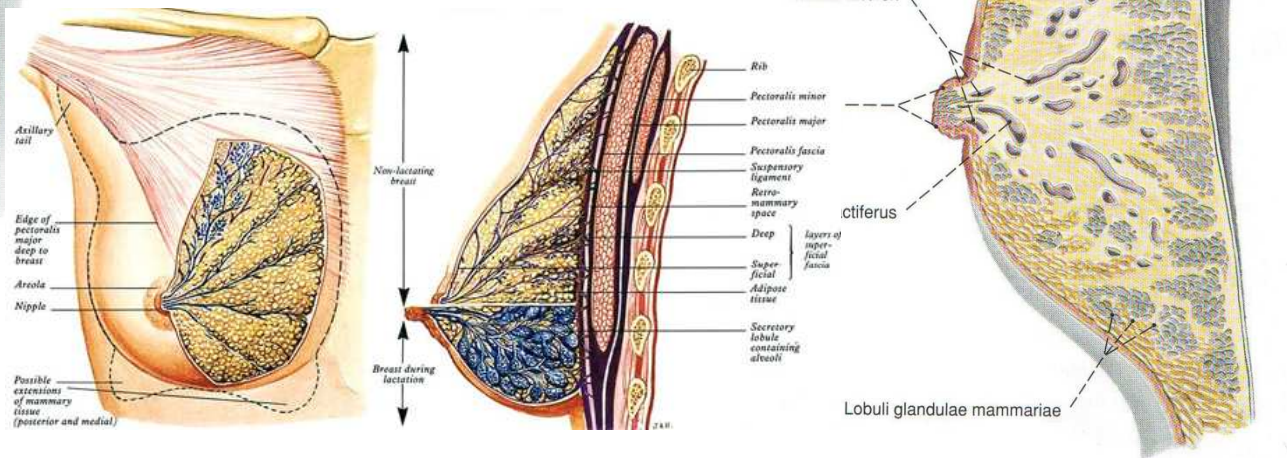




# Adult breast anatomy



- *areola mammae*:
  - ✓ areolar glands (of Montgomery)
  - ✓ *papilla mammaria* (nipple)



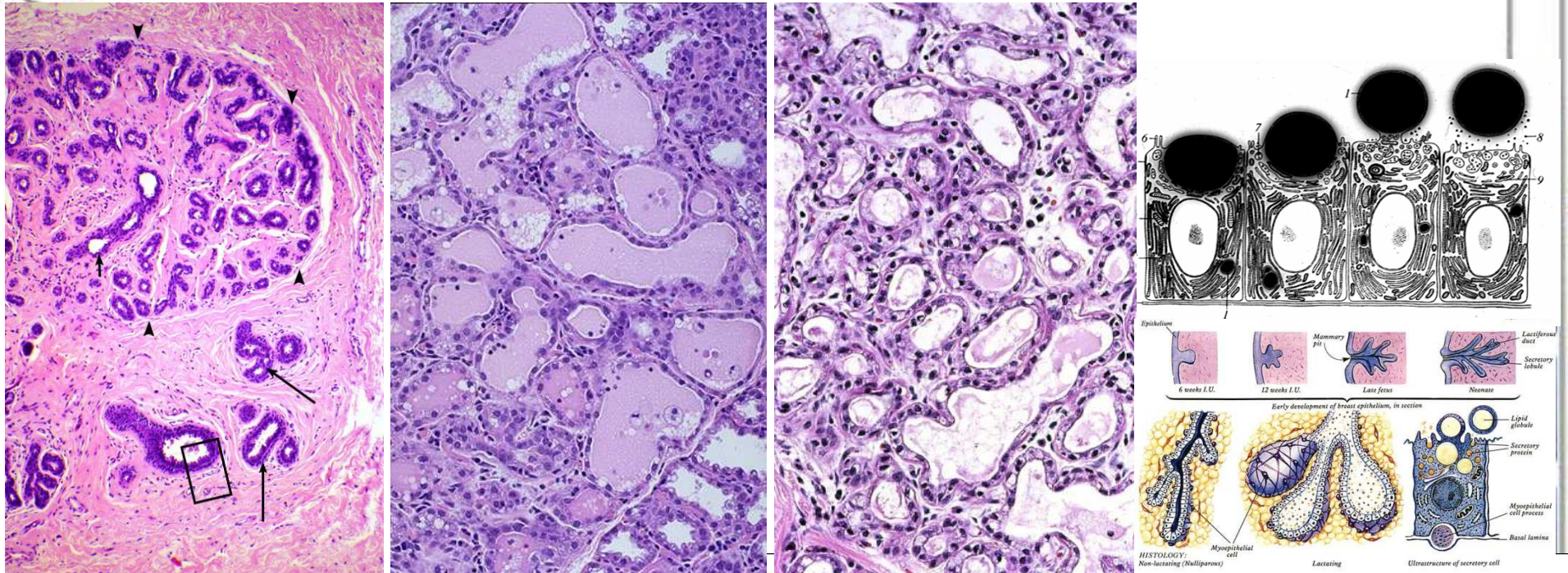
- *parenchyma mammae* – glandular tissue of the tubuloalveolar type
  - ✓ 15-20 lobes, *lobi glandulae mammariae*:
    - cluster of rounded alveoli – alveolar and myoepithelial cells
    - ducts and ductules – *ductus lactiferus*, *sinus lactiferus*, *porus lactiferus*
- *stroma mammae* – fibrous and adipose (fatty) tissue
  - ✓ *suspensory ligaments* (of Cooper)

**NB:** The ratio of glands to adipose tissues rises from 1:1 in nonlactating women to 2:1 in lactating women!



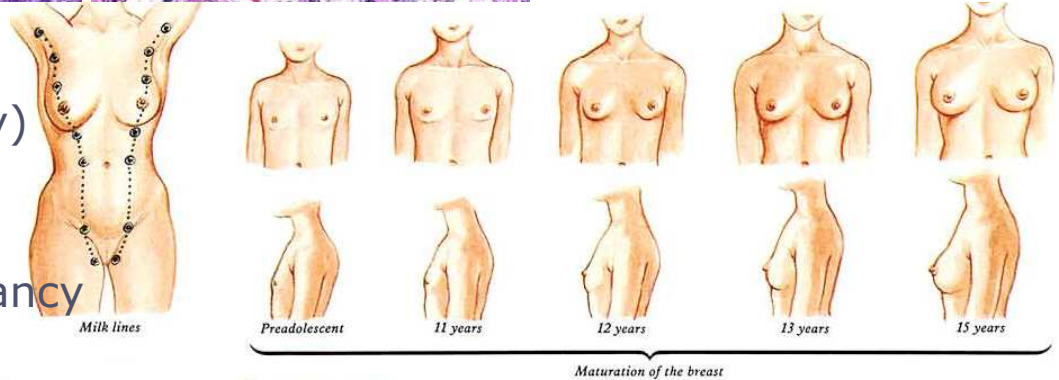


# Microscopic structure



functional stages:

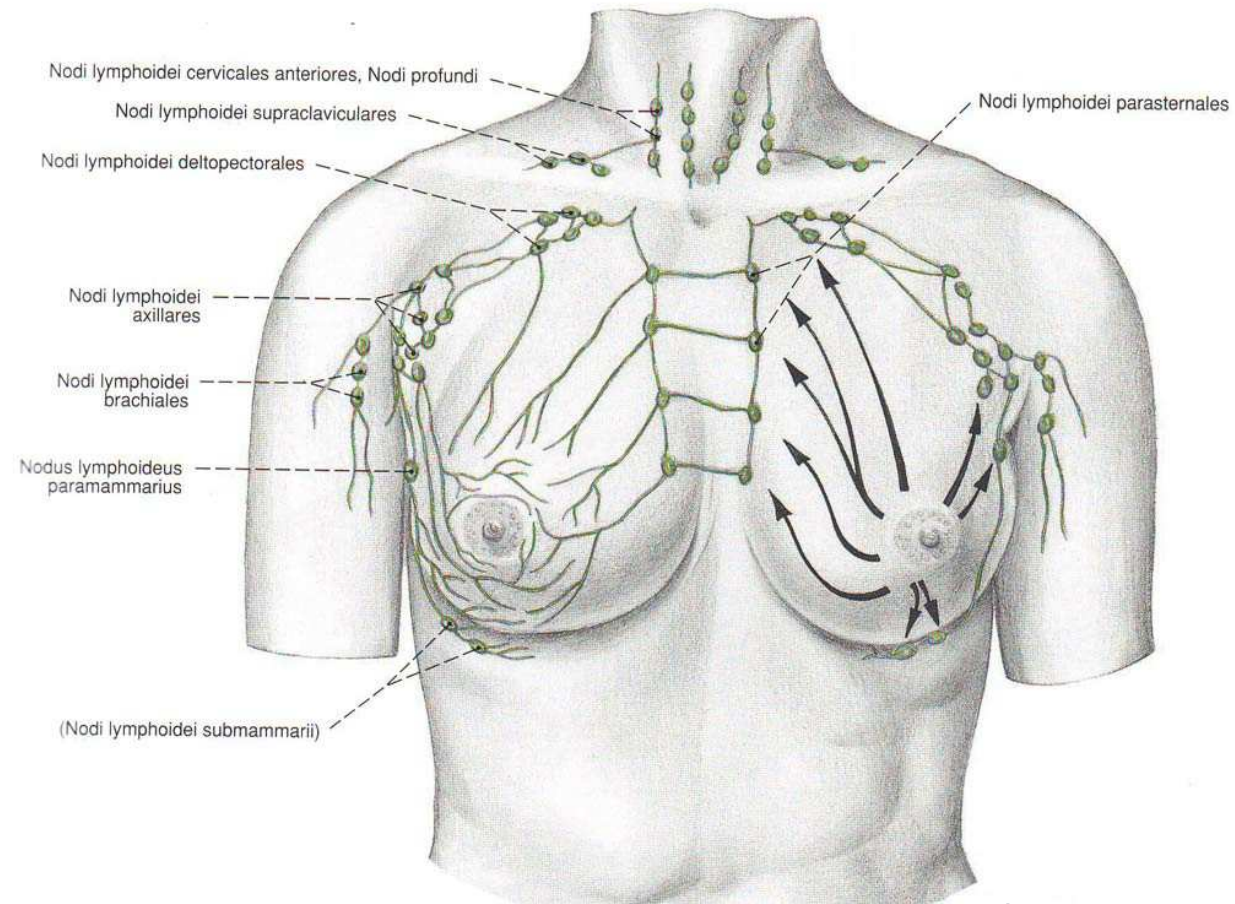
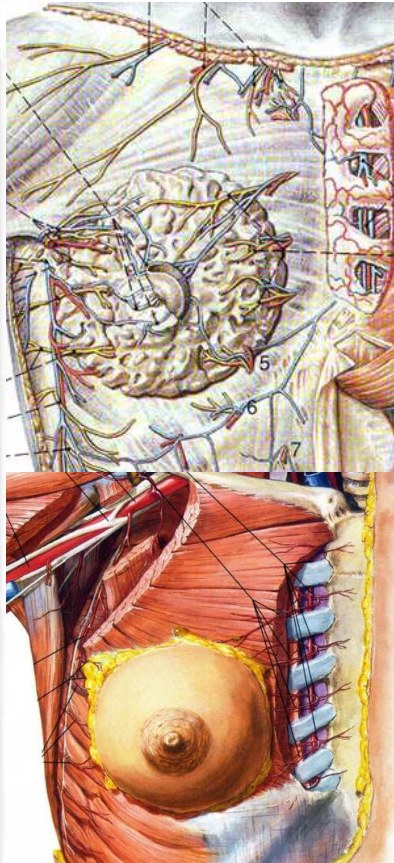
- ✓ childish breast (before puberty)
- ✓ juvenile breast
- ✓ adult resting mammary gland
- ✓ mammary gland during pregnancy
- ✓ lactating mammary gland







# Blood vessels and lymphatic drainage



- superficial plexus ⇒ *nodi lymphoidei axillares* (75% of the lymph)
- deep (fascial) plexus ⇒ *nodi lymphoidei mediastinales*
  - ✓ lymphatic pathway of *Grossman* ⇒ *nodi lymphoidei apicales (infraclaviculares)*
  - ✓ lymphatic pathway of *Gerota* ⇒ *nodi lymphoidei hepatici et subdiaphragmatici*

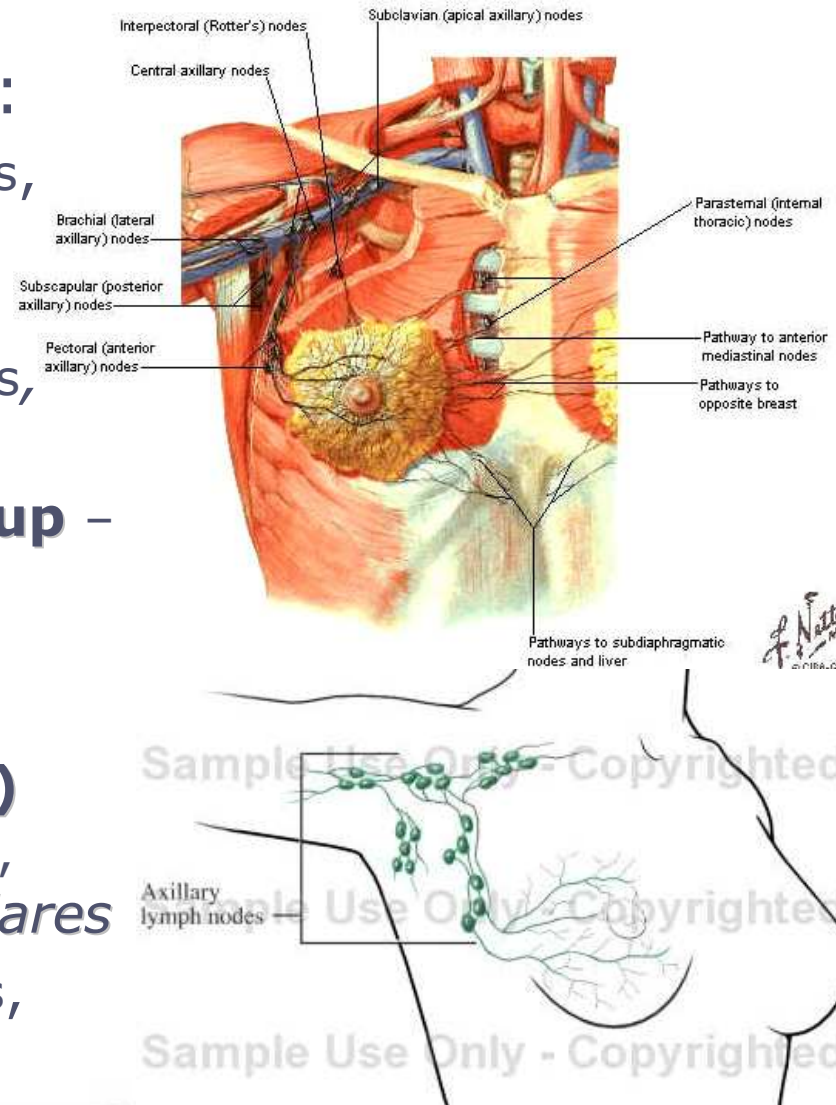






# Axillary lymph nodes

- 5 groups (20-40 nodes):
  - ✓ **apical group** – 6-12 nodes, *nodi lymphatici apicales (infraclaviculares)*
  - ✓ **central group** – 4-6 nodes, *nodi lymphatici centrales*
  - ✓ **anterior (pectoral) group** – 4-5 nodes, *nodi lymphatici mediales (pectorales)*
  - ✓ **posterior (subscapular) group** – 6-7 nodes, *nodi lymphatici subscapulares*
  - ✓ **lateral group** – 3-8 nodes, *nodi lymphatici laterales*







*Thank you ...*

