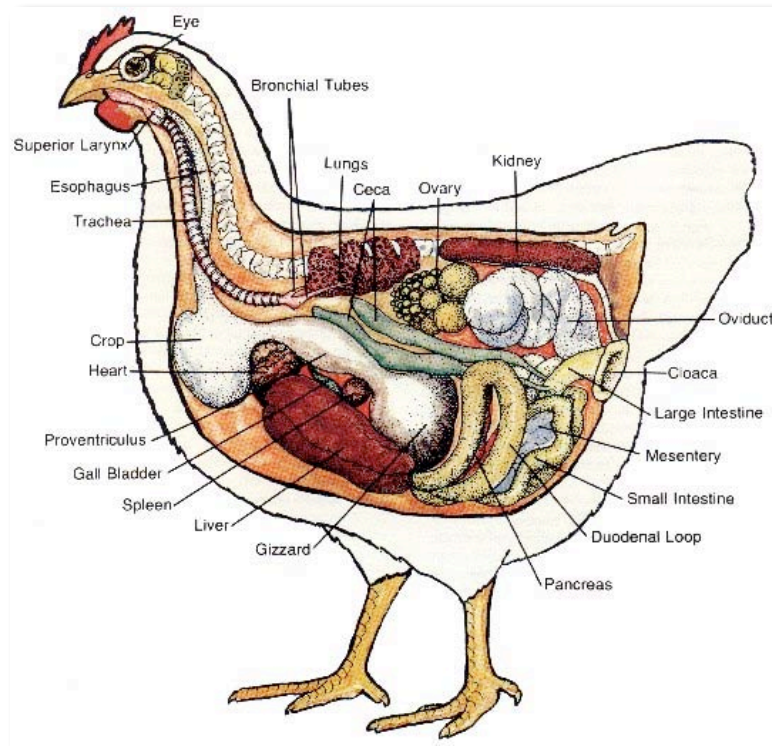
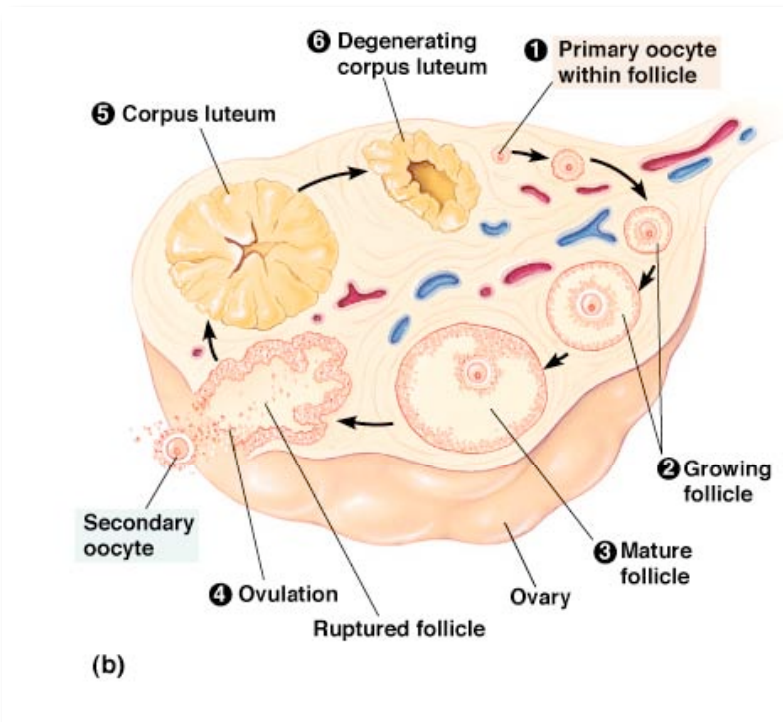
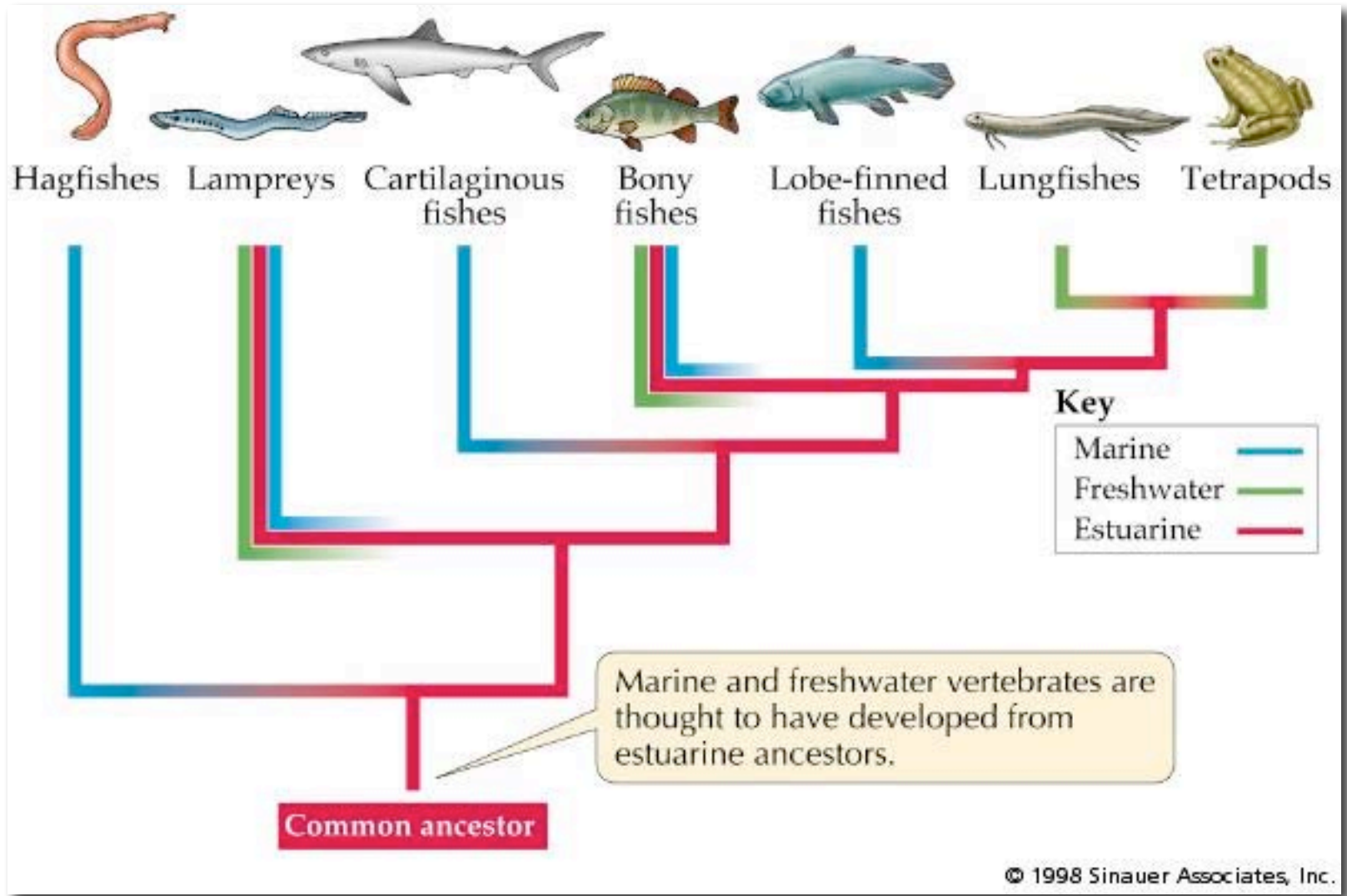


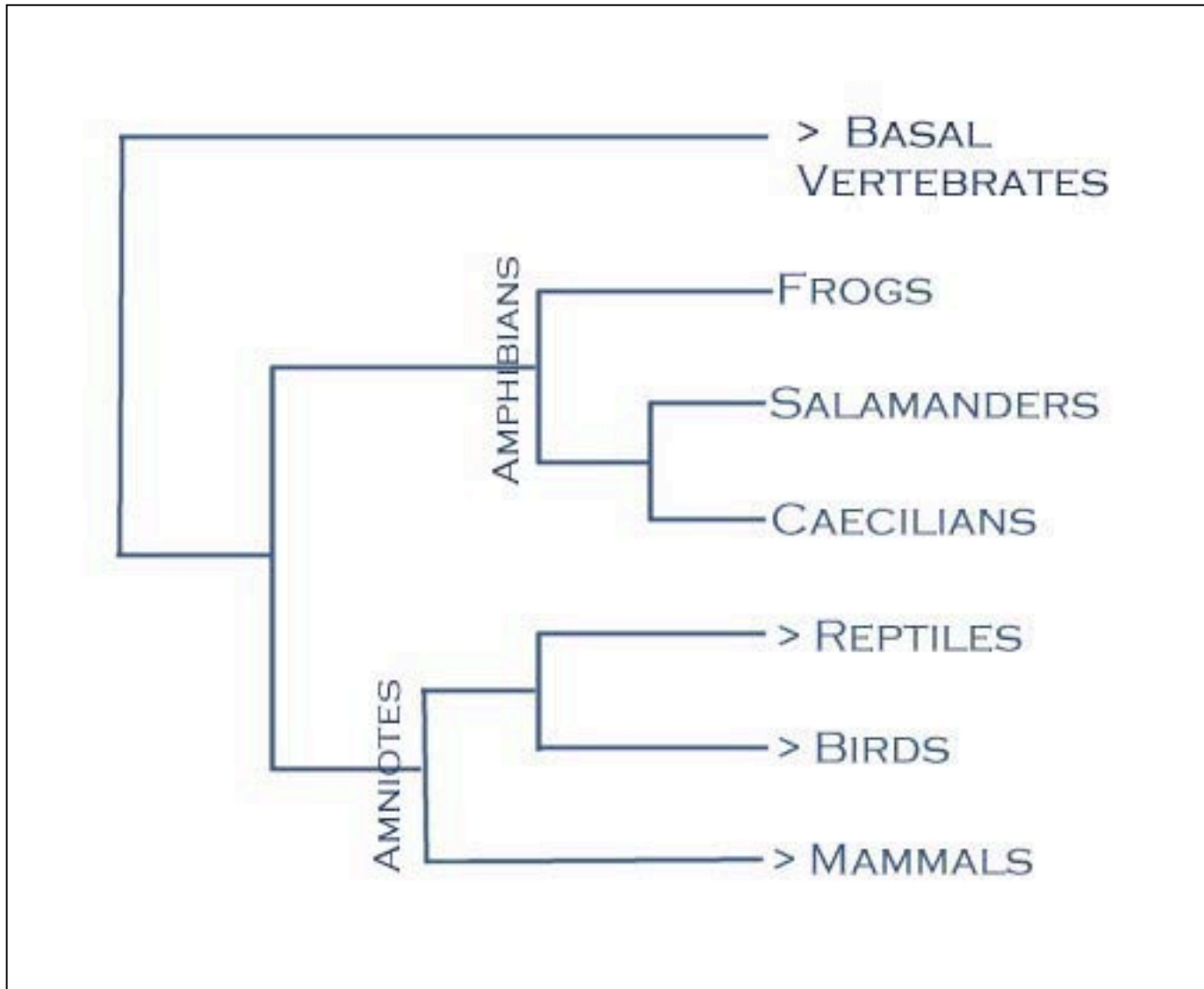
Female Reproductive Anatomy



Vertebrate Tree



Tetrapod Tree



Ovary - Primary Organ

◆ Ovary - Gross anatomy

- usually paired
- may be solid or hollow
- size can vary greatly depending on species and stage of reproductive activity

Gross Anatomy - Mammal



Human

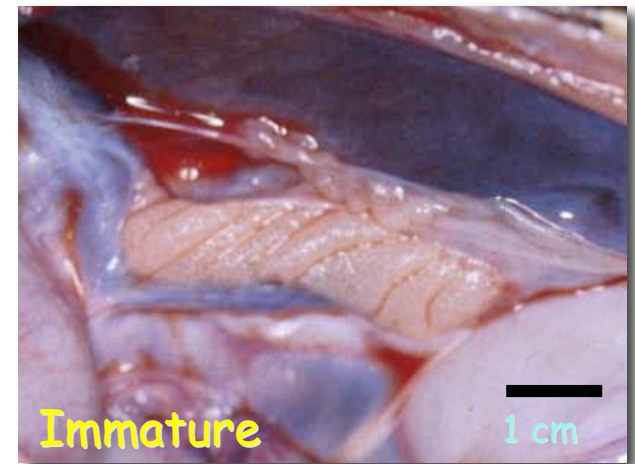
- ◆ Paired, solid
- ◆ Size changes little with reproductive activity
 - 'Blisters on the surface'



Cow

Gross Anatomy - Reptile

- ◆ Paired, solid ovary
- ◆ Enlarged dramatically with reproductive activity



Alligator

Gross Anatomy - Fish



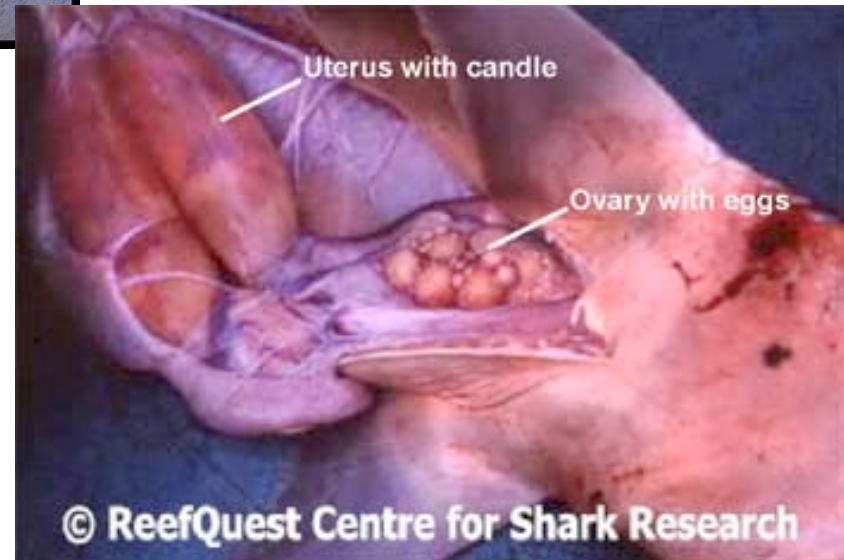
Perch

◆ Teleosts

- Paired - can be fused completely or in part

◆ Elasmobranchs

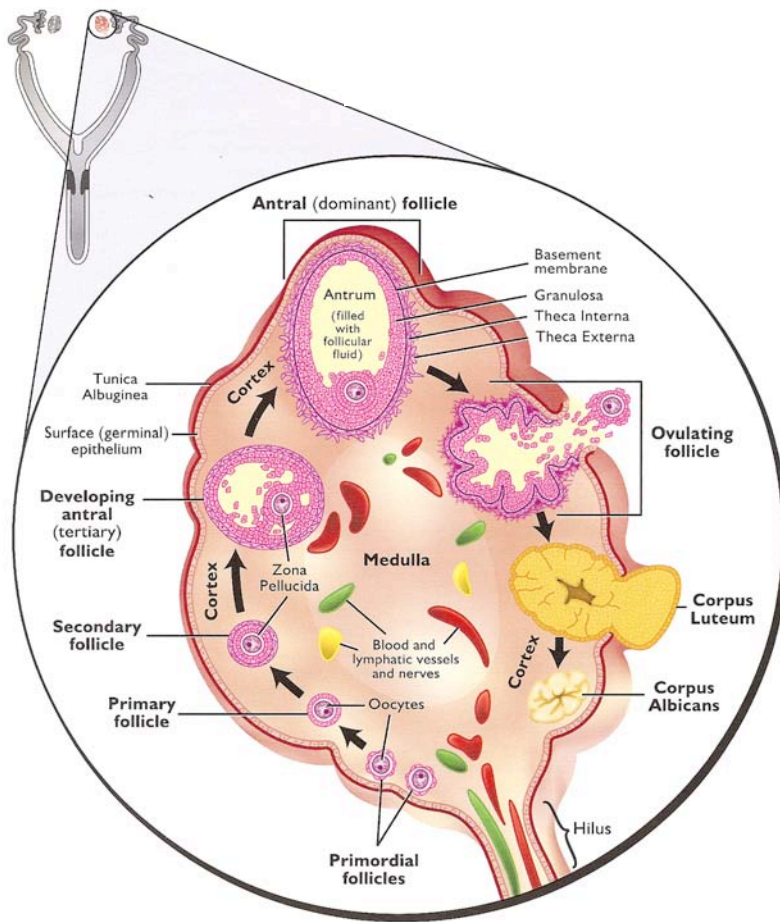
- Paired but fused midline



Shark

Eutherian Mammals

Ovarian Histology



◆ Serosa

- outer covering of tough connective tissue

◆ germinal epithelium

- single layer of cells once thought to produce the germ cells - thus its name

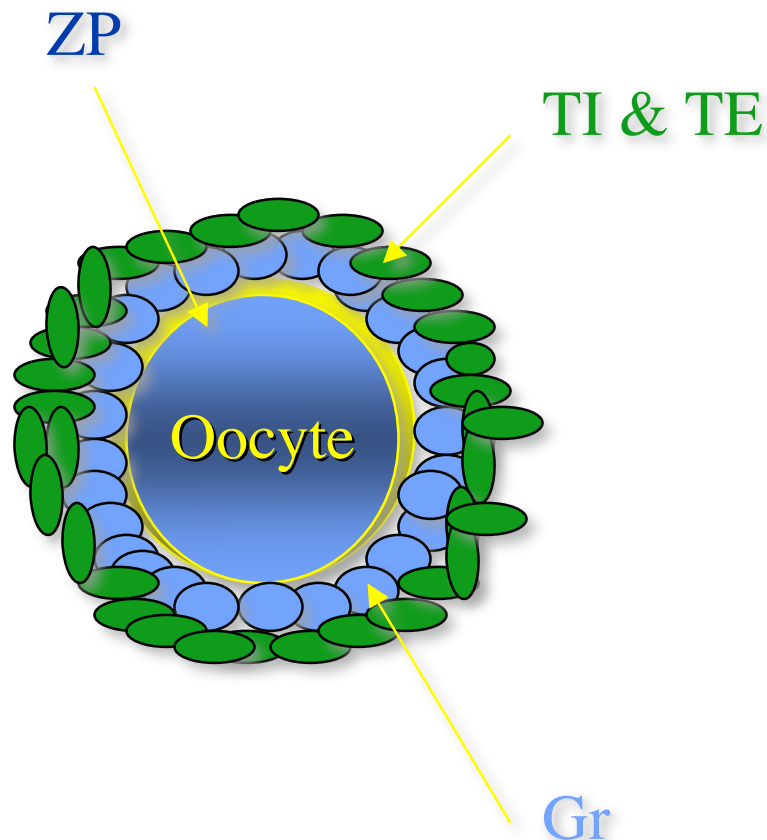
◆ ovarian stroma or cortex

- contains follicles and scar tissue, some blood vessels

◆ ovarian hylus or medulla

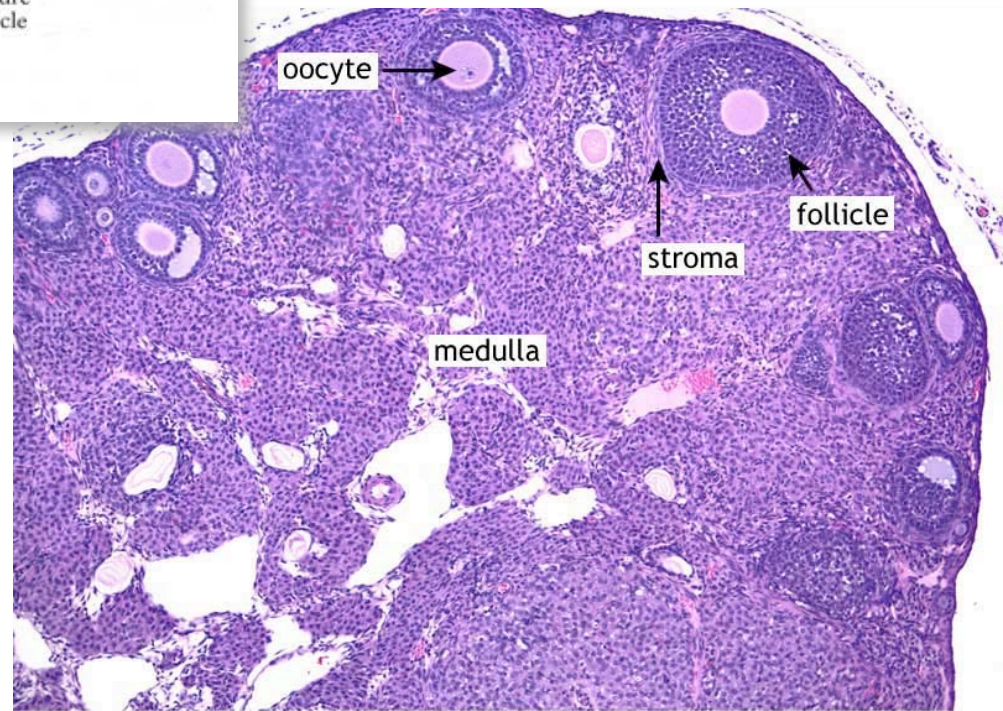
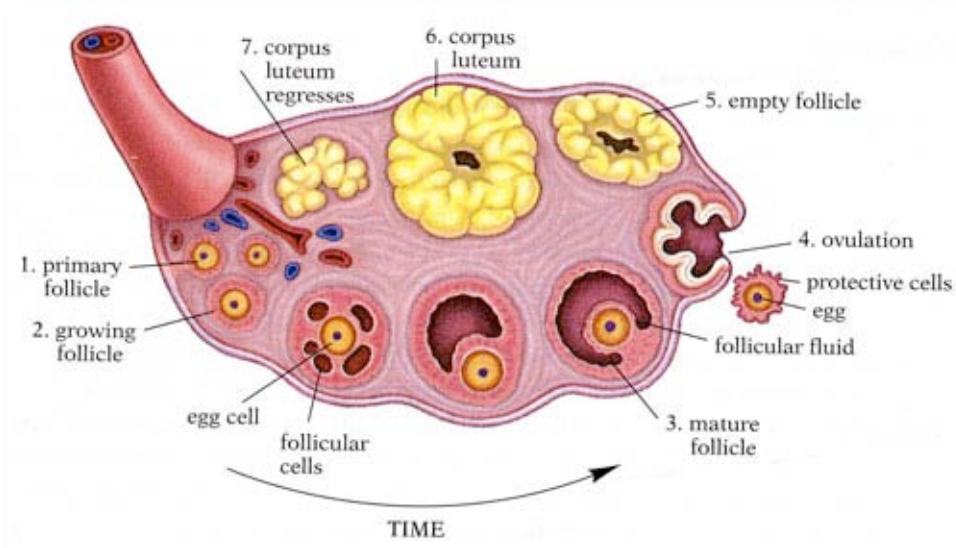
- contains blood vessels, nerves, lymph

Ovarian Follicle



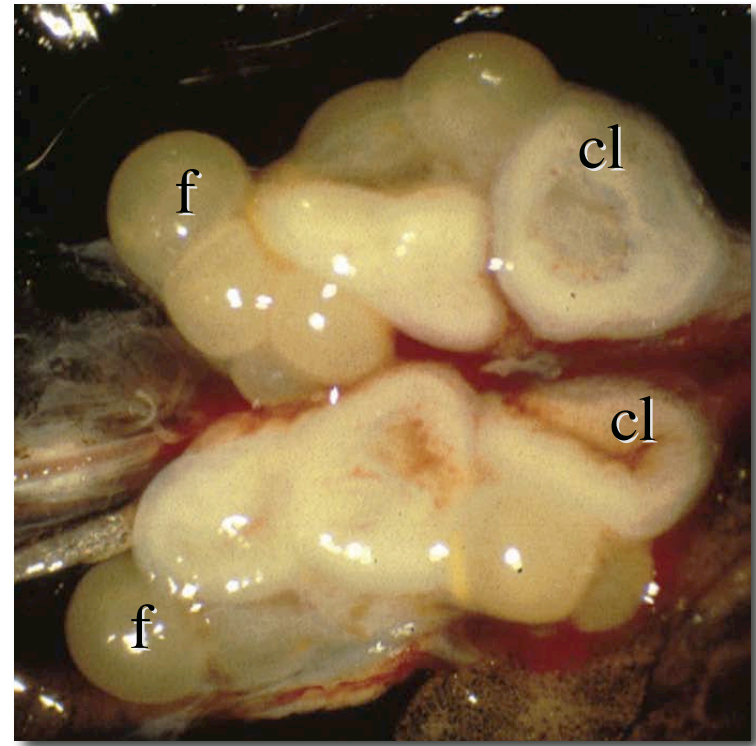
- ◆ **follicle** - composite structure that will produce mature oocyte
 - primordial follicle - germ cell (oocyte) with a single layer of mesodermal cells around it
 - as development of follicle progresses, oocyte will obtain a 'halo' of cells and membranes that are distinct:
 - ◆ 1. zona pellucide (ZP)
 - ◆ 2. granulosa (Gr)
 - ◆ 3. theca interna and externa (TI & TE)

Human Ovary



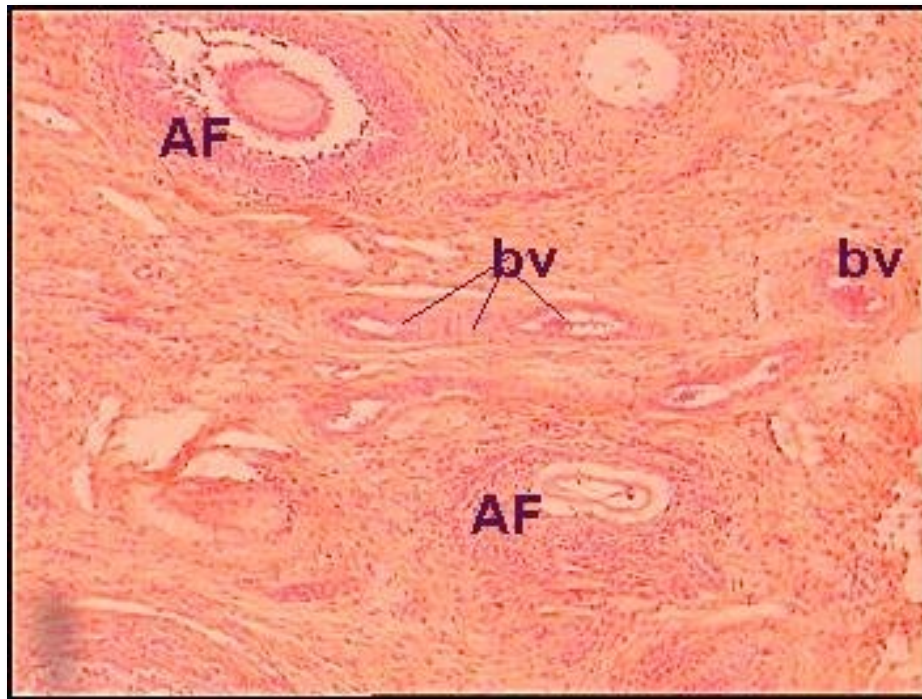
Corpora Lutea (CL)

- ◆ remnant of ovulated follicle
 - following ovulation theca and granulosa cells remain in ovary
 - these cells luteinize and produce progesterone
 - will remain 'active' for a species specific period of time and then undergo luteolysis - luteal death



Atresia

- ◆ Atretic follicles - follicles undergoing death = **atresia**



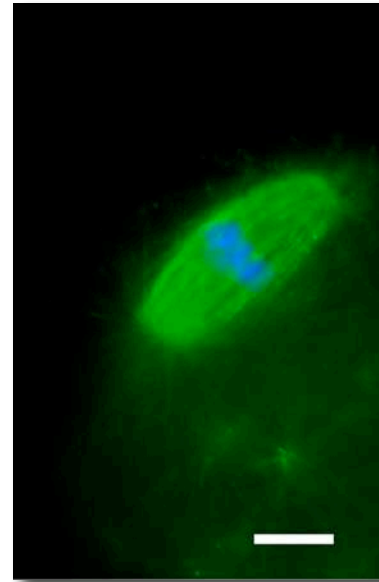
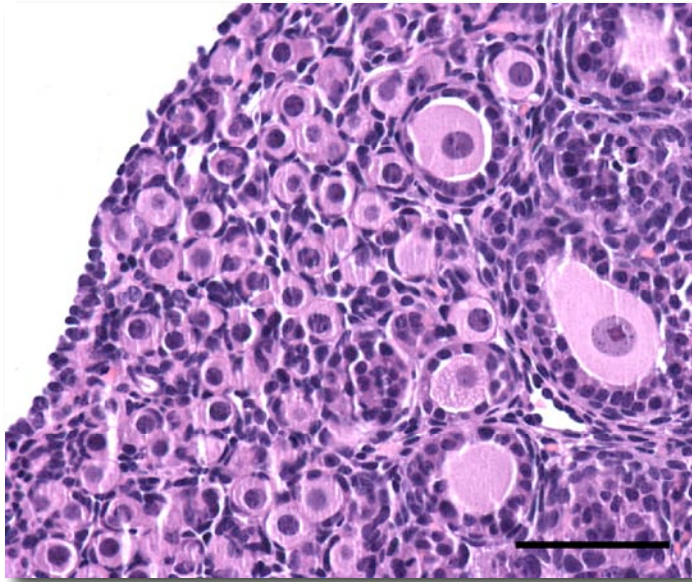
Human Ovary

- ◆ at 5 months in utero - ovary has >3,500,000 germ cells
 - they then begin to die - atresia
- ◆ at birth each ovary has 400,000 germ cells
 - all she will have for rest of life
- ◆ at puberty = 83,000/ovary
- ◆ at 35 yrs = 30,000 follicles

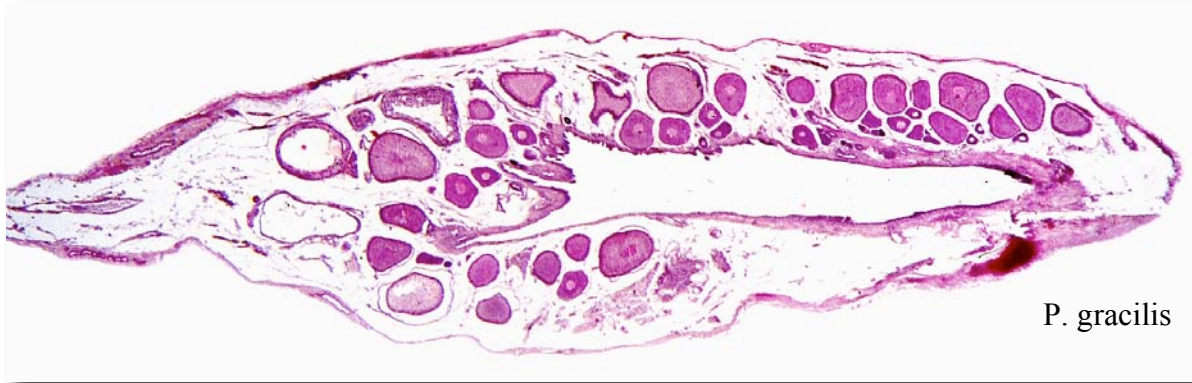
Oogonial Nests

◆ Oogonial Nests

- Adults of some species retain clumps of oogonia that undergo mitosis to generate new follicles.
 - ✦ Not found in mammals or birds



Fish (Teleost) Ovary - Histology



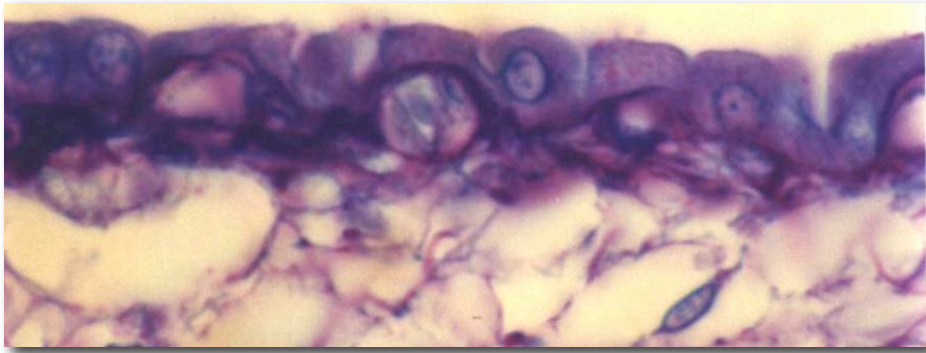
P. gracilis

- Hollow, fused
- Ovulation toward the central cavity



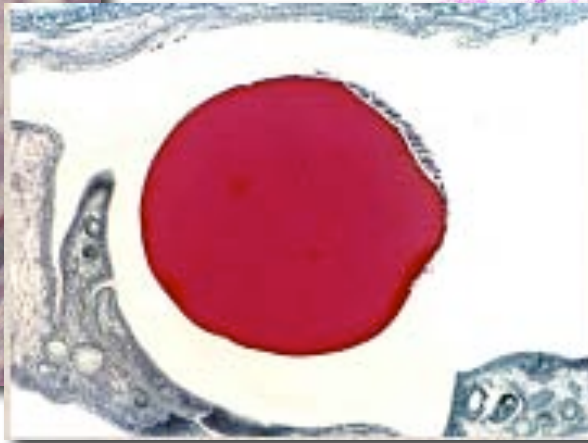
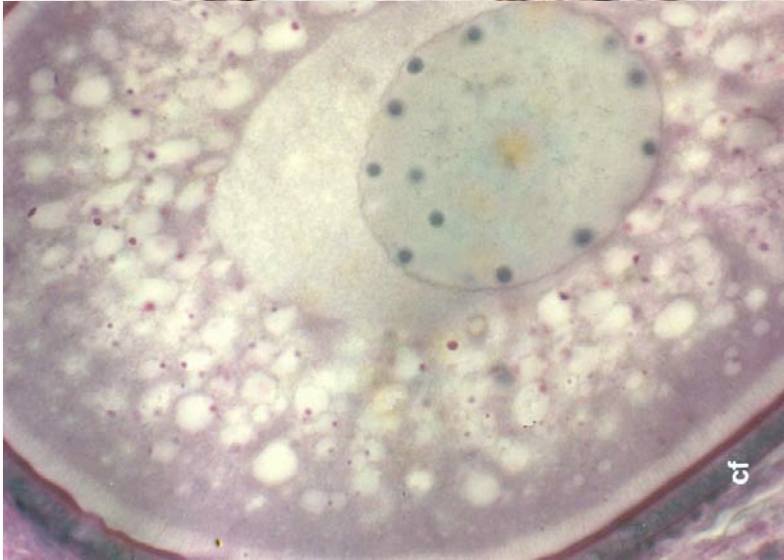
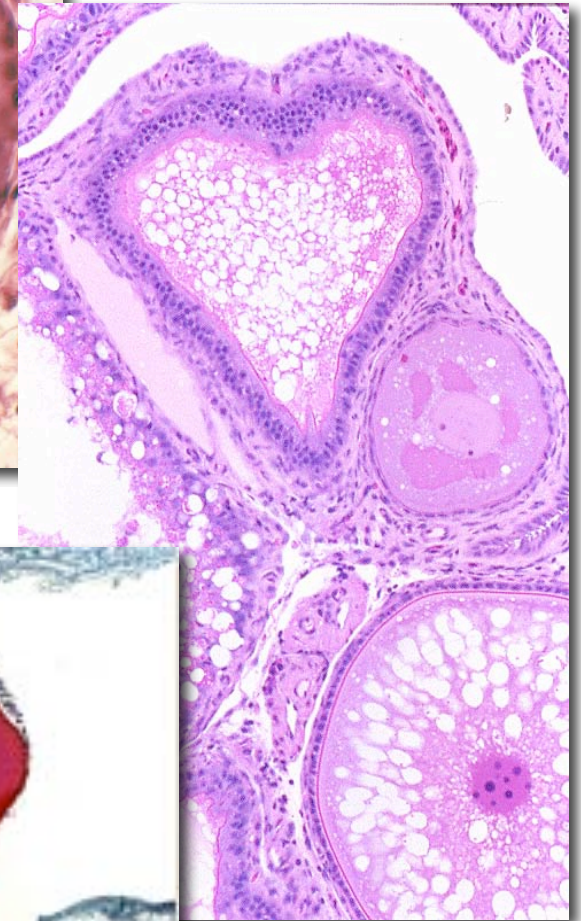
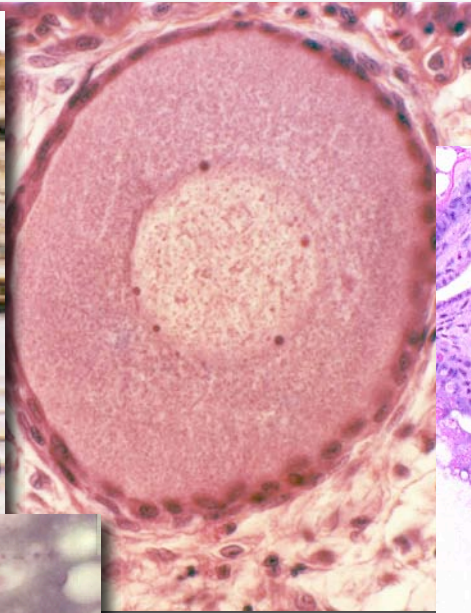
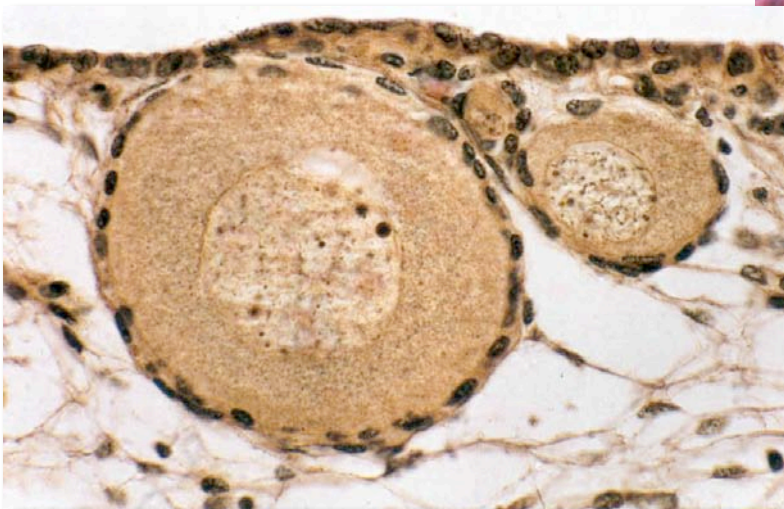
I. whitei

Fish Ovary - Germinal Epithelium



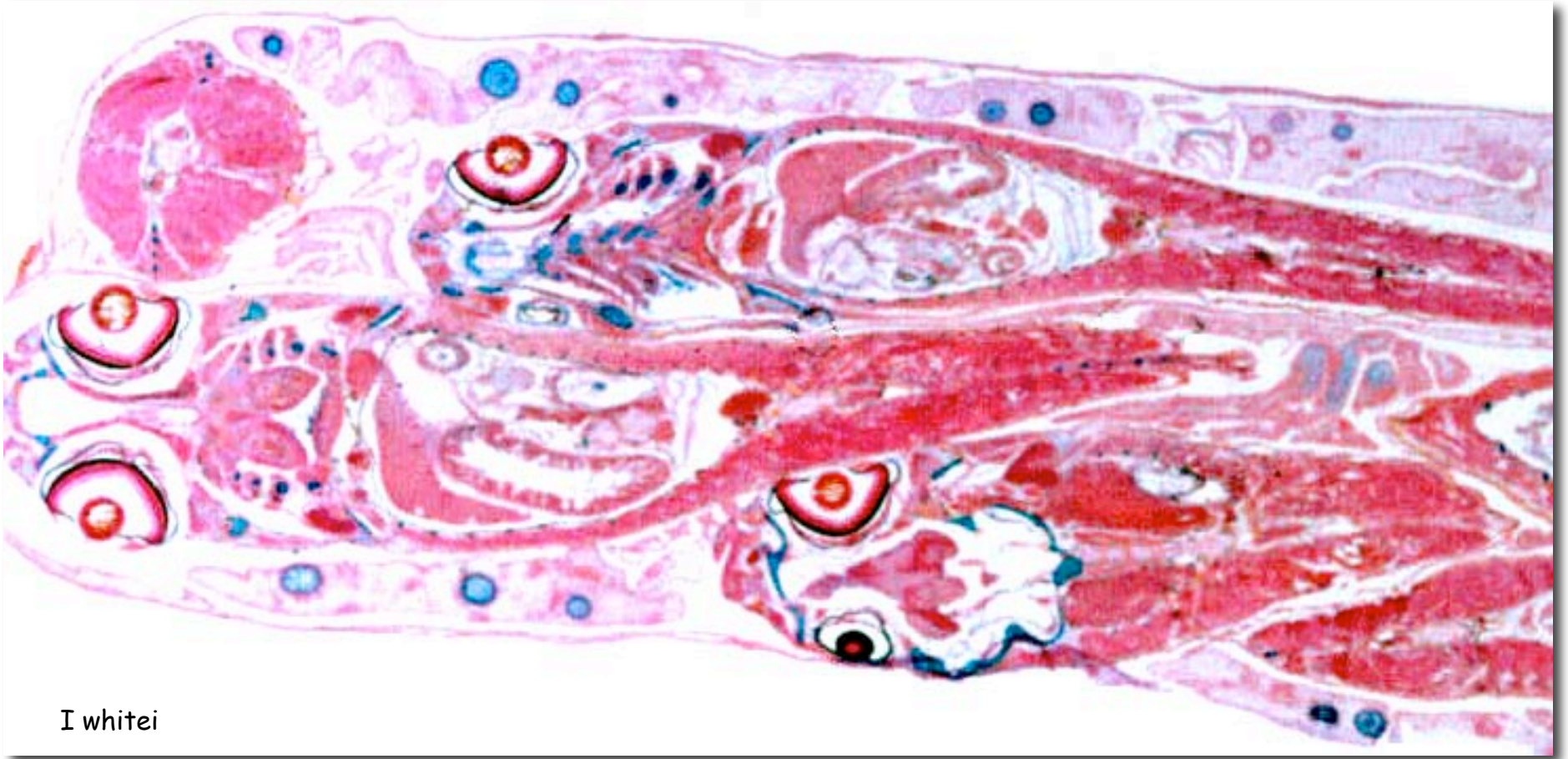
- Germ cells (oogonia) lie below surface of ovarian epithelium

Fish Follicles at various stages



Images from Dra. Mari Carmen Uribe - UNAM

What is this?



I whitei

Ovary of viviparous fish with developing embryos in it!

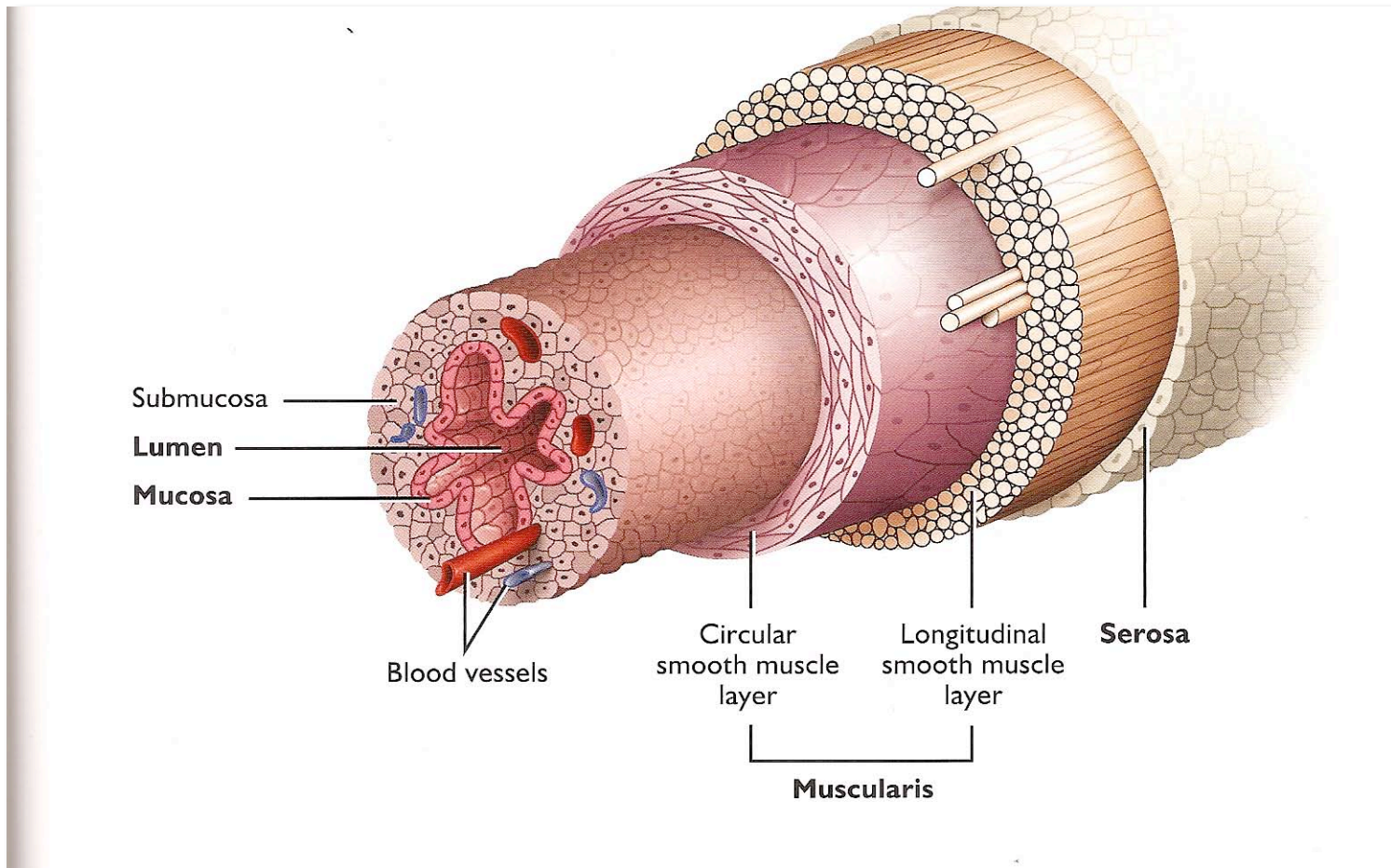
Summary - Ovary

- Chondrichthyes - - paired, fused, solid
- Osteichthyes
 - Teleosts - paired, fused or not, hollow
 - Holostean - paired, separate, solid
- Amphibians - paired, separate, solid
- Reptiles - paired, separate, solid (some ribbon)
- Birds - paired, separate, solid
- Mammals - paired, separate, solid

Duct system

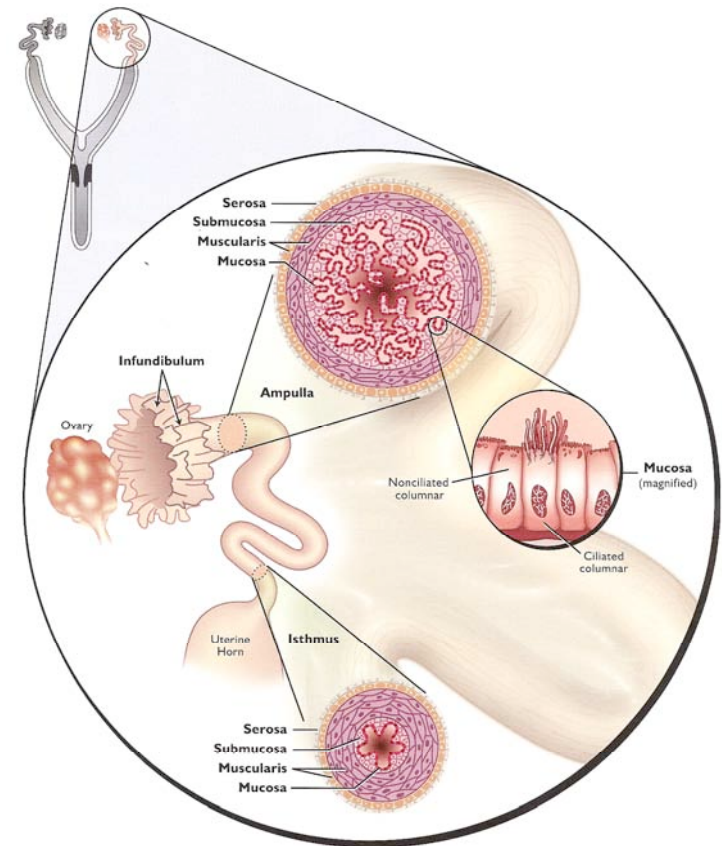
- ◆ all derived from the embryonic Müllerian duct
- ◆ whole duct is termed **oviduct** in comparative biology
 - in mammals - oviduct usually refers to Fallopian tube

Female Tubular Structures



Mammalian Fallopian tube

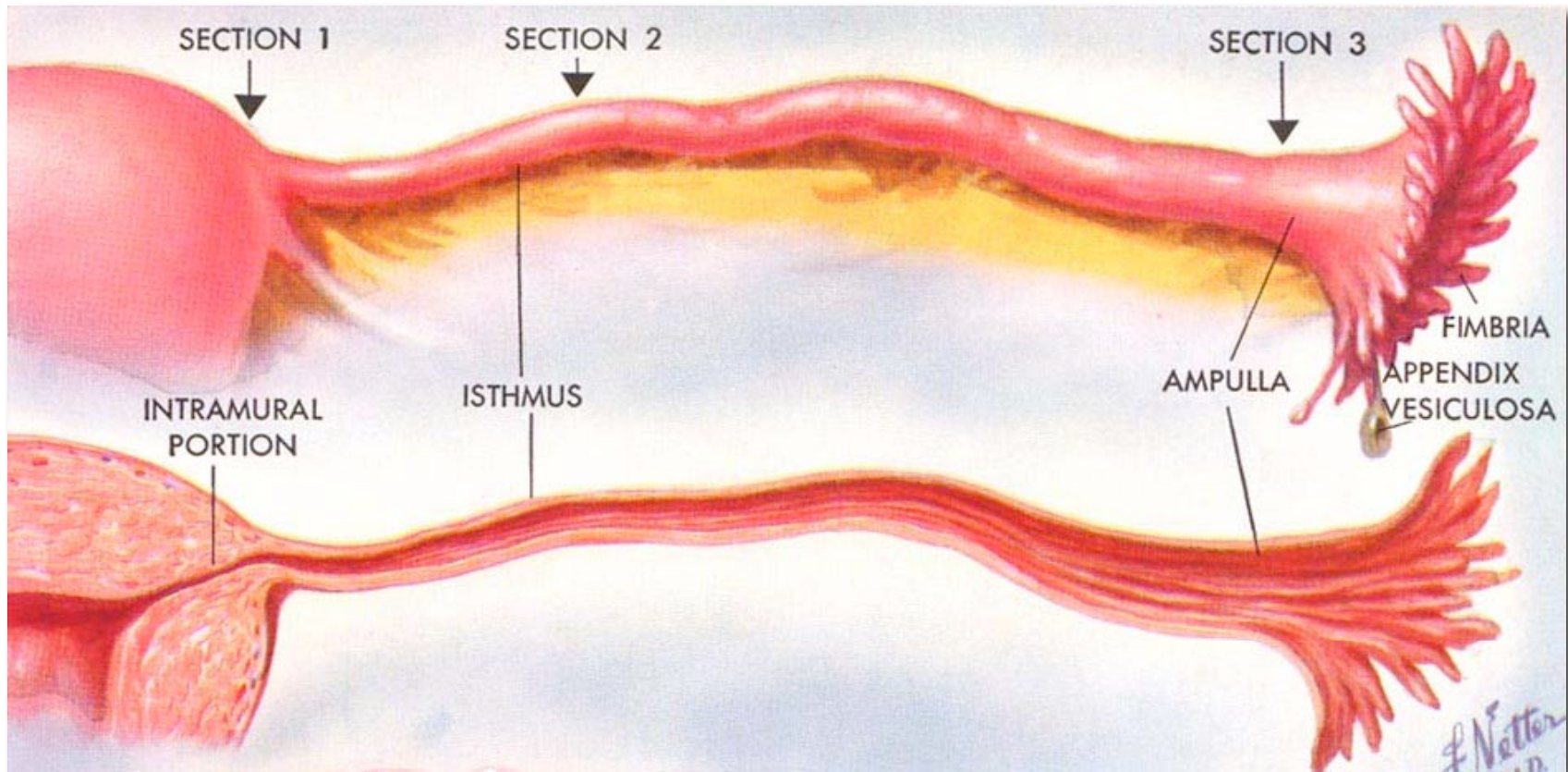
- ◆ after Fallopius
- ◆ three regions
 - infundibulum, ampulla, isthmus (& intramural region)
- ◆ **infundibulum** - top thin walled region that receives the egg
 - opening is **ostium**
 - finger-like projections are **fimbria**
- ◆ **ampulla** - ciliated for sperm and ova transport
 - region where egg is fertilized in many species
 - egg 'white' or albumen is secreted
- ◆ **isthmus** - junction with uterus
 - usually aglandular
 - **Intramural region** - region thru wall of uterus (mammals)



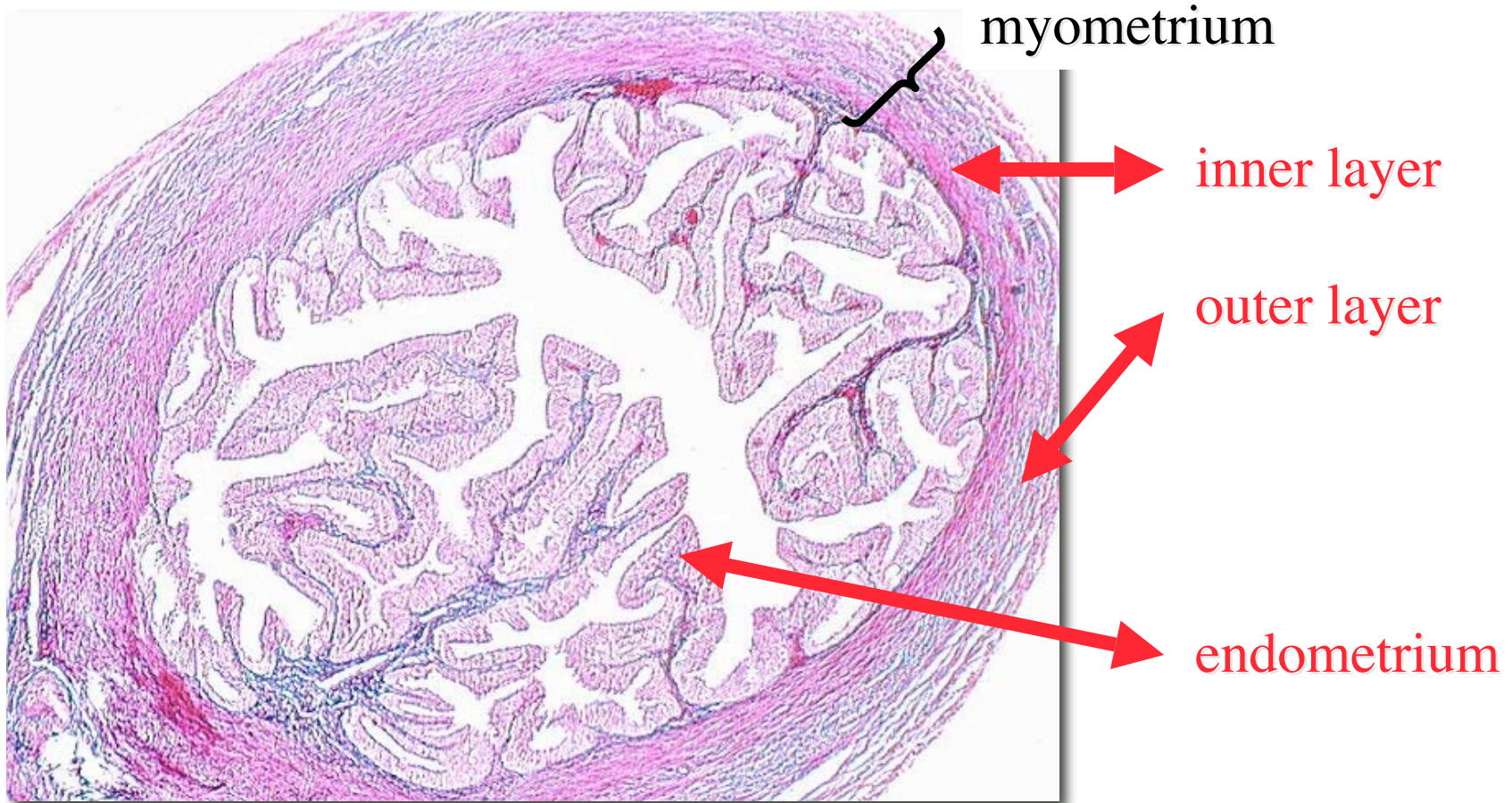
Fallopian Tube

- ◆ thin walled muscular tube
- ◆ three layers
 - **Serosa** - outer connective tissue covering
 - **Myometrium** - thin layers of smooth muscle
 - ✦ Inner layer - circular
 - ✦ Outer layer - longitudinal
 - **Endometrium** - layer(s) of epithelial cells
 - ✦ Can be 'thrown into folds'

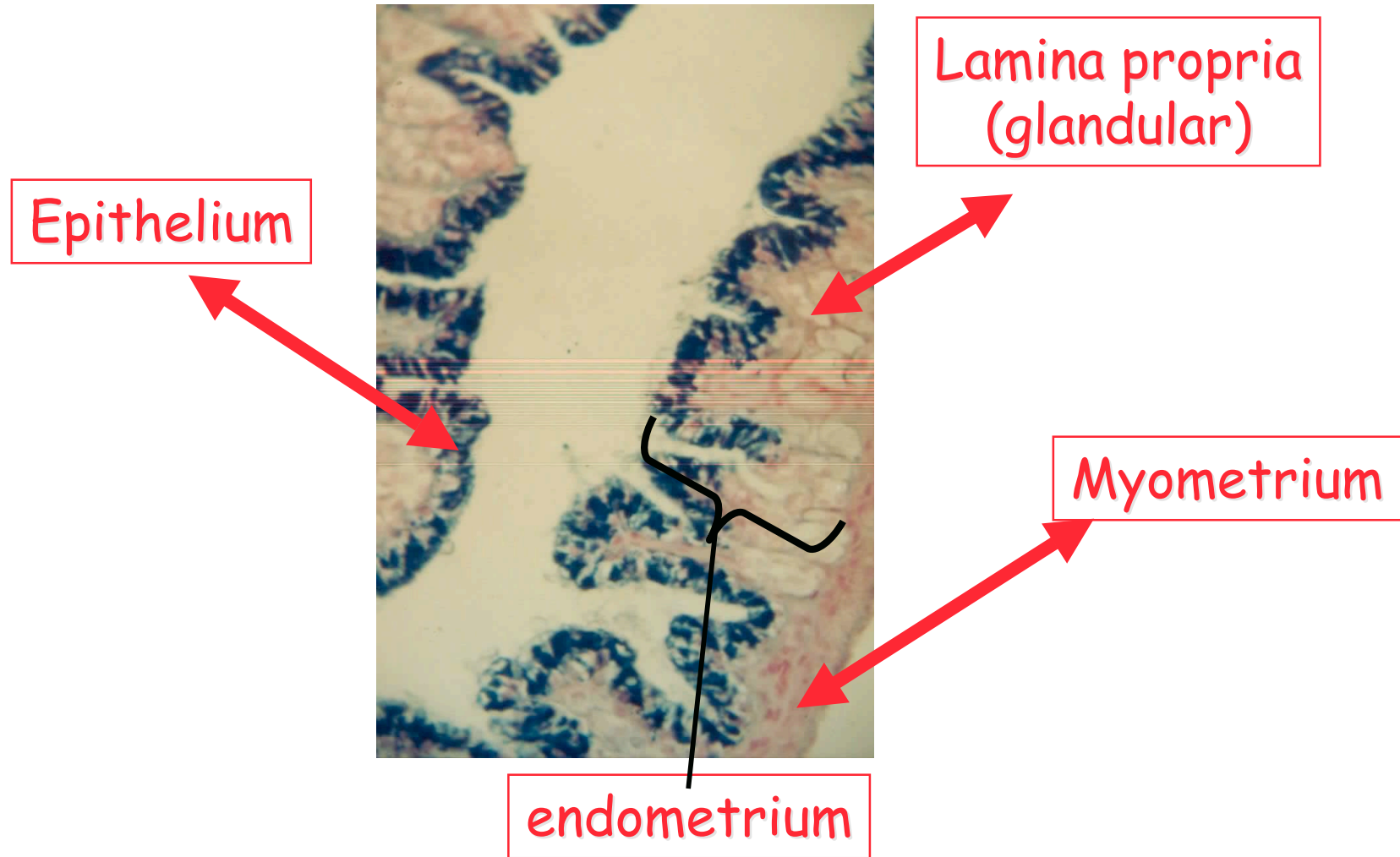
Mammalian Fallopian tube anatomy



Mammalian Tube - Isthmus



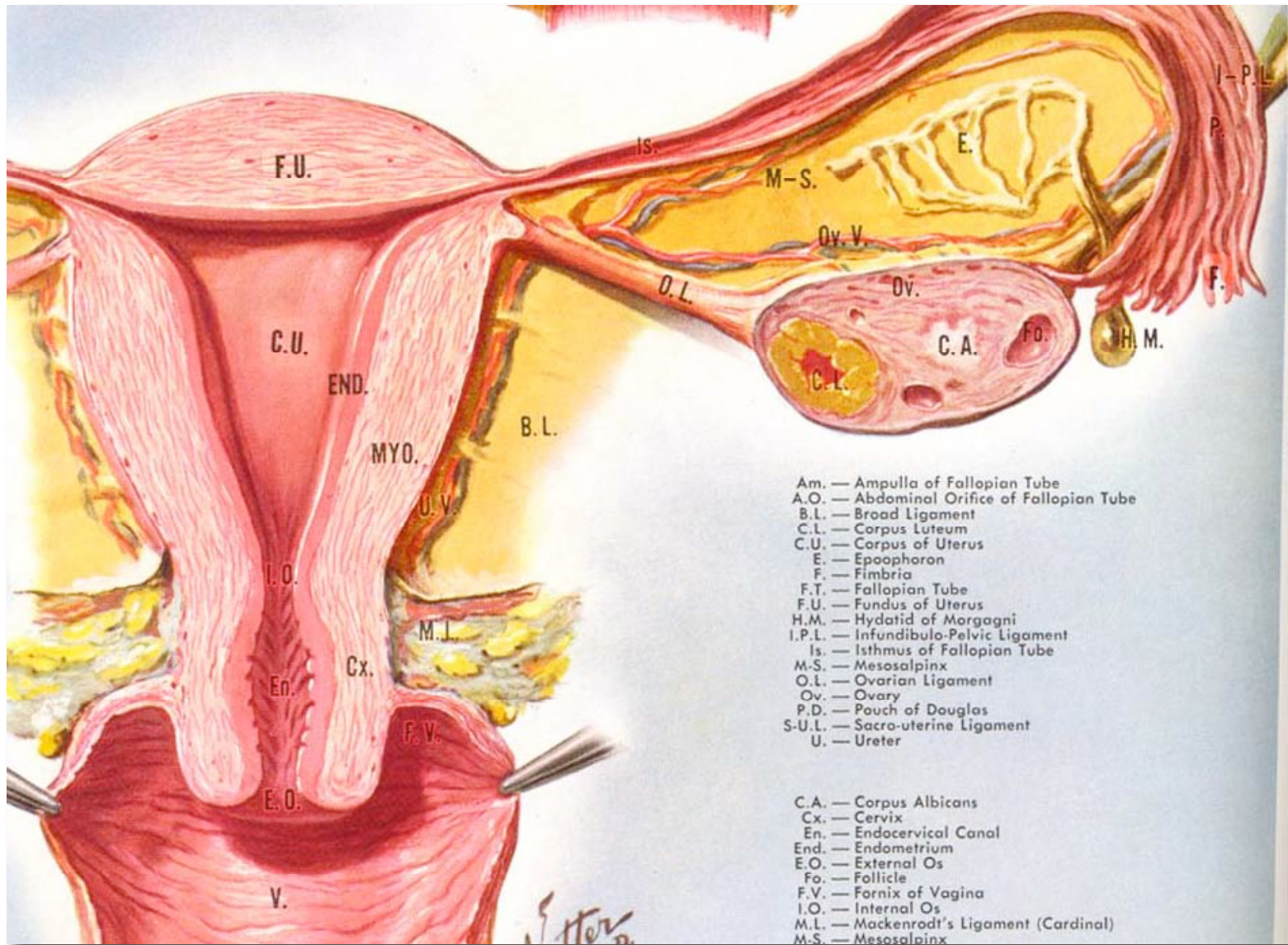
Reptilian Tube - Isthmus



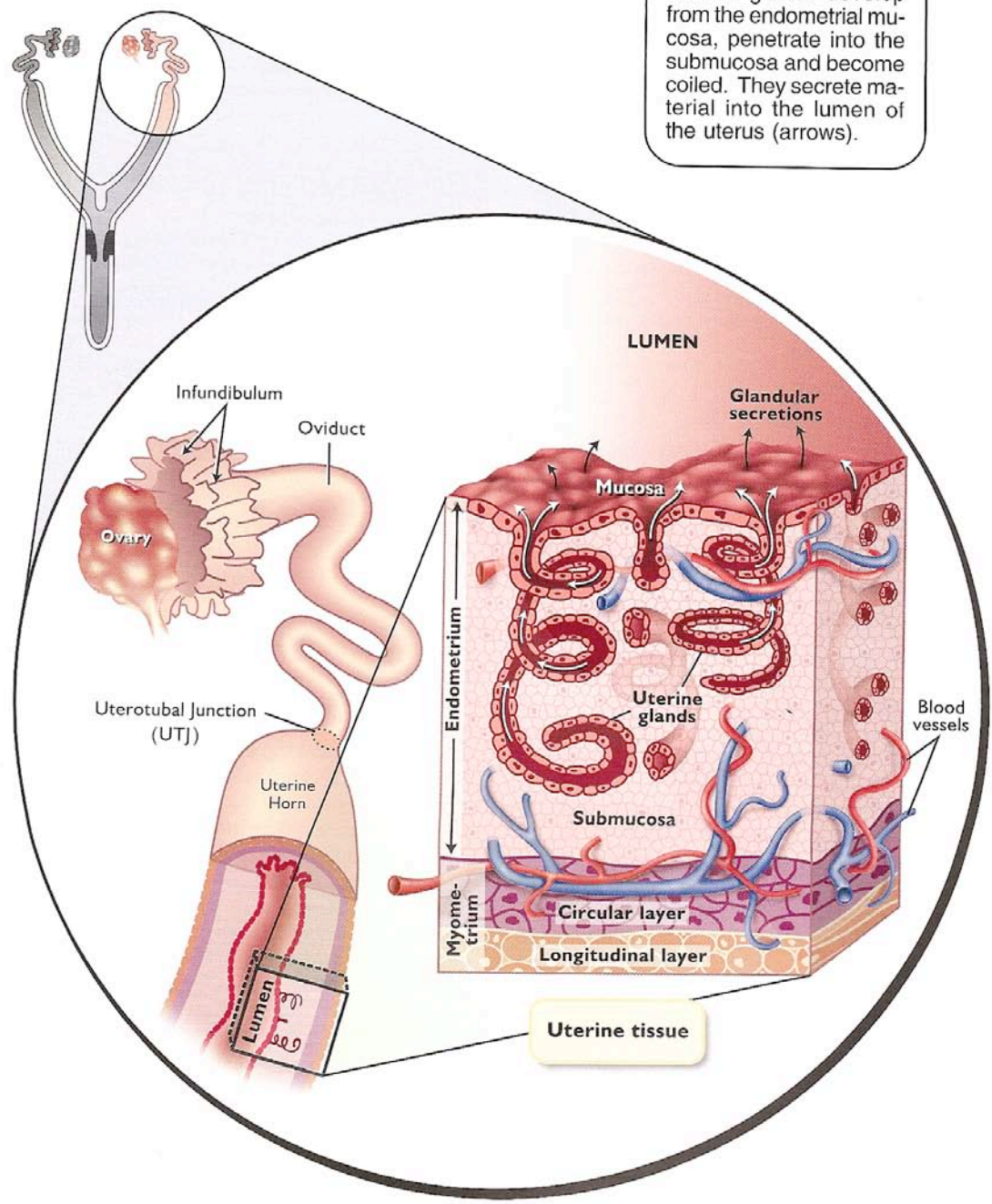
Uterus

- ◆ thick walled muscular tube
- ◆ three layers
 - serosa, myometrium, endometrium
- ◆ region for egg / embryo development in viviparous species
- ◆ egg shell protein and calcium secreted in oviparous species
- ◆ structure and shape variable depending on species and stage of reproductive activity

Human Uterine Anatomy

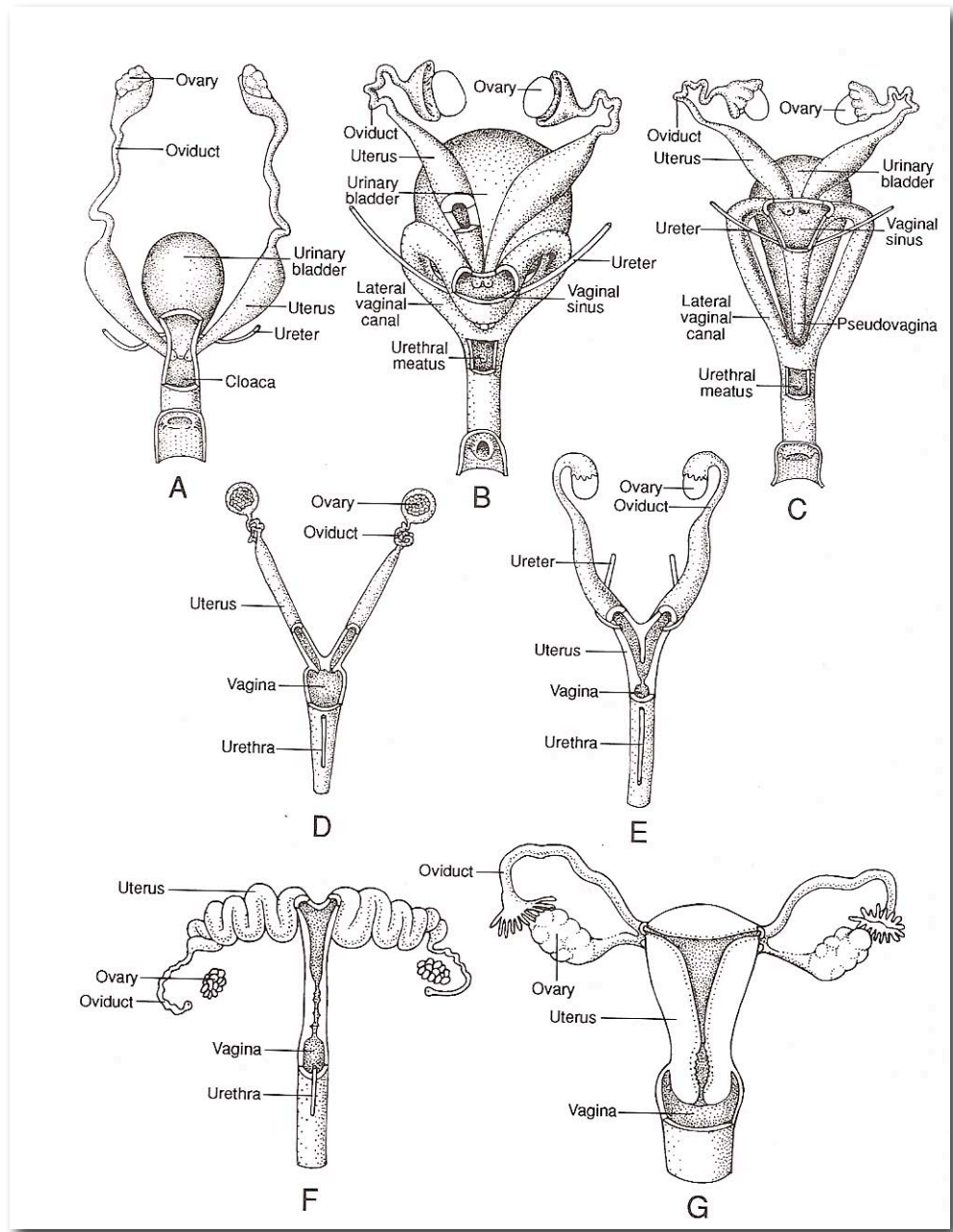


Uterine glands develop from the endometrial mucosa, penetrate into the submucosa and become coiled. They secrete material into the lumen of the uterus (arrows).

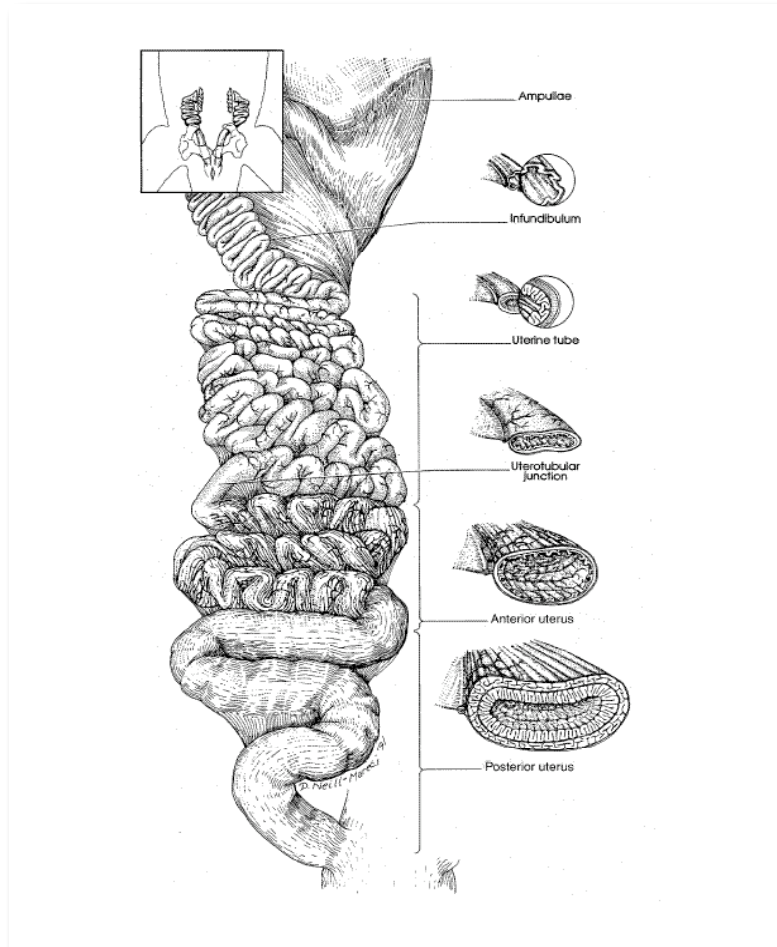


Mammalian Uteri

- ◆ A = Monotreme (Echidna)
- ◆ B = Marsupial (Opossum)
- ◆ C = Marsupial (Kangaroo)
- ◆ D = Eutherian (Rat)
- ◆ E = Eutherian (Cat)
- ◆ F = Eutherian (Pig)
- ◆ G = Eutherian (Woman)



Comparative Duct Systems

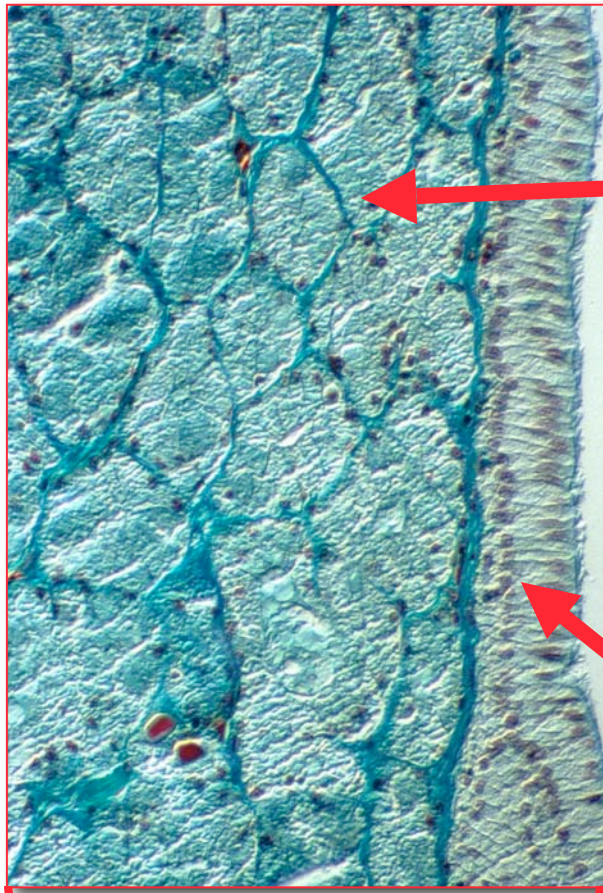


- ◆ Derived from Müllerian duct
- ◆ May have one or two 'horns'
 - Most birds have one
- ◆ Functions
 - Sperm transport
 - Egg shell/jelly production
 - Growth factor synthesis

Alligator Uterus - Isthmus

Fiber Region

Calcium Region



Lamina propria (glandular)



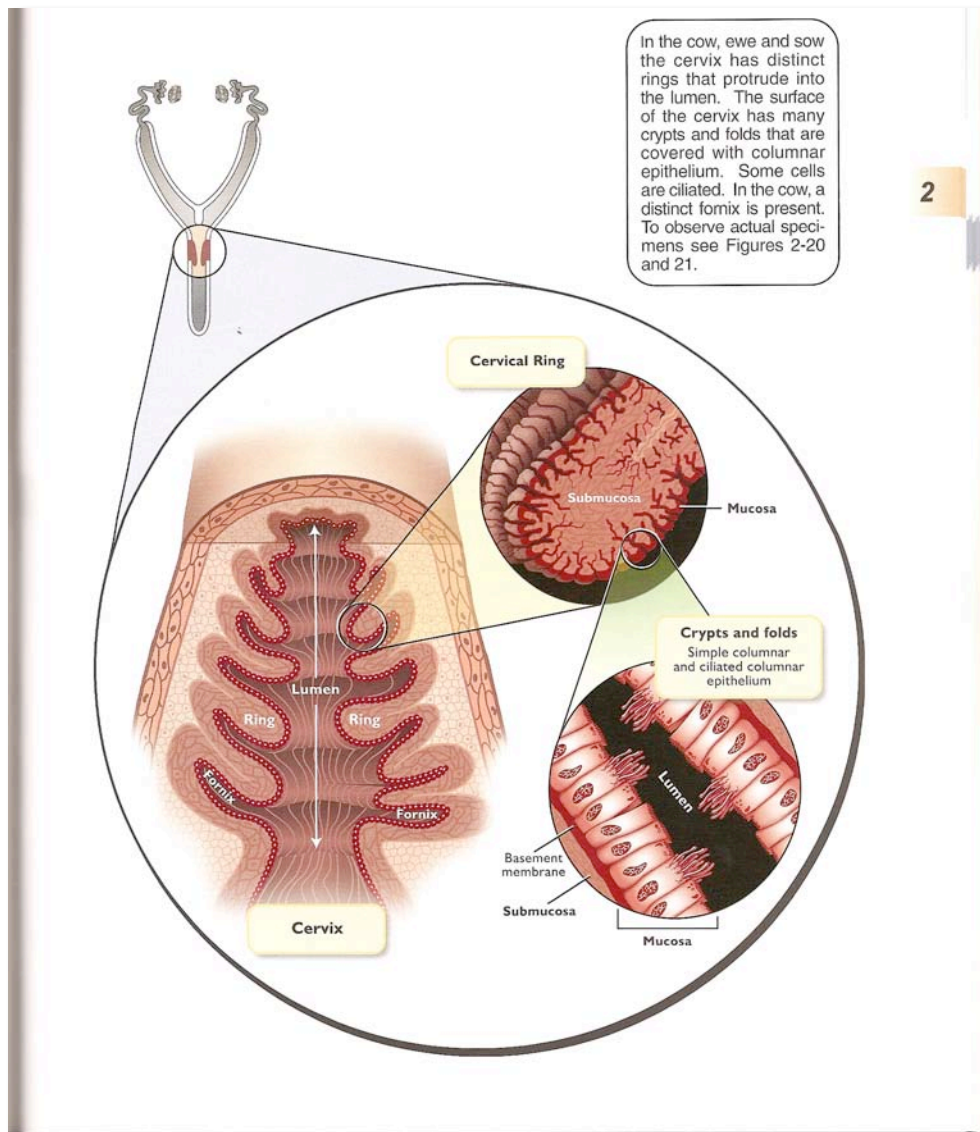
Epithelium

endometrium

endometrium

Cervix

- ◆ Highly muscular walls
- ◆ Barrier to sperm
- ◆ Functions to retain egg in uterus

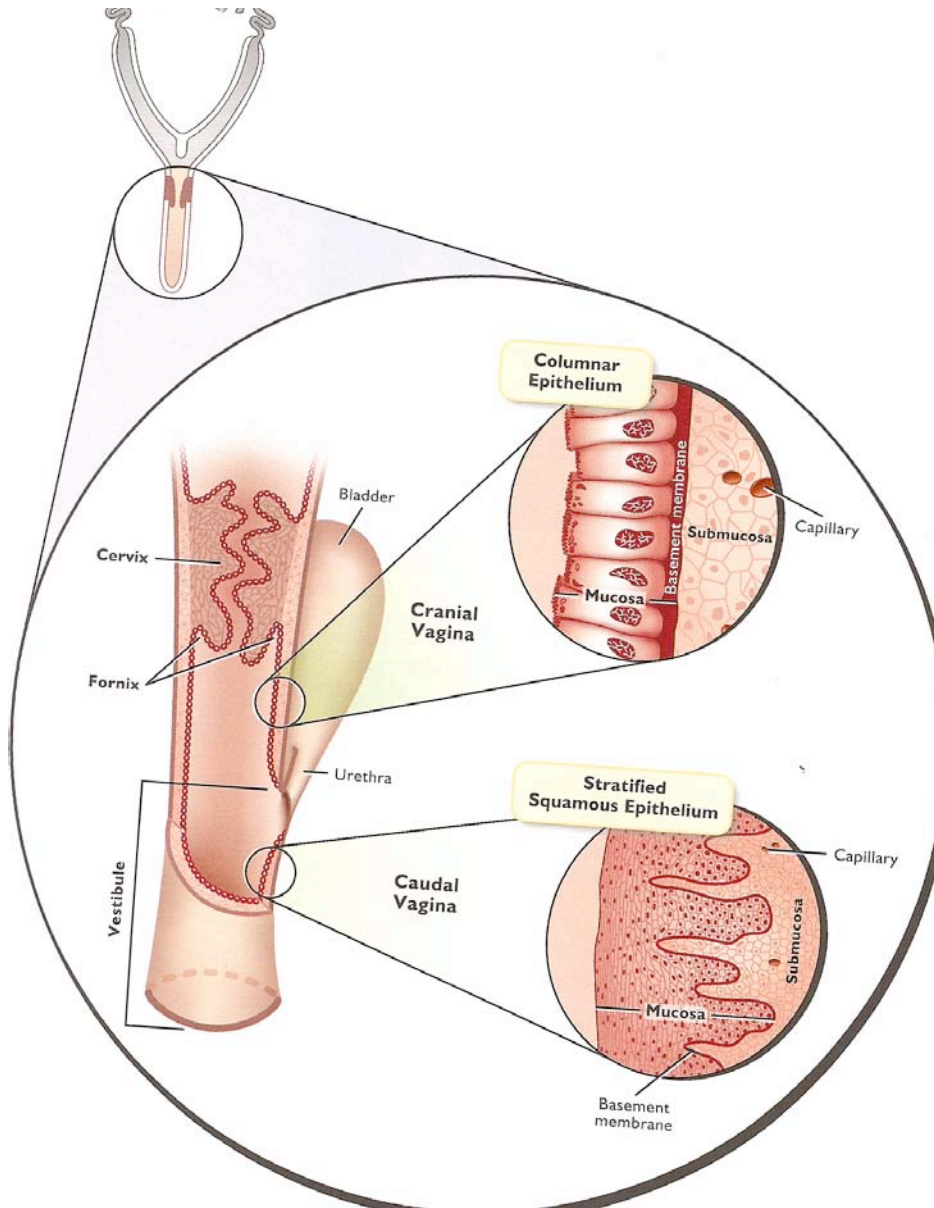


Vagina/Cloaca

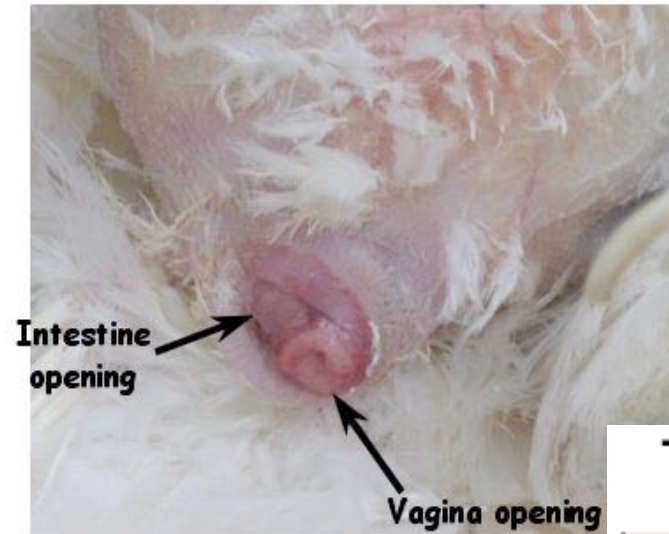
- ◆ communicates with outside and connects uterus via cervix
- ◆ receives sperm in internal fertilizers
- ◆ in some - connects to **cloaca** - common vestibule for urinary, digestive and reproductive systems

Vagina

- ◆ Thick muscular walls
- ◆ Sperm transport and selection
- ◆ Embryologically from two origins
 - Müllerian duct
 - External genitalia



Cloaca of Chicken



Cloaca

- ◆ Common region into which the vagina and intestine open
- ◆ Latin for 'sewer'
- ◆ Common in birds, reptiles

Typical Cloaca

