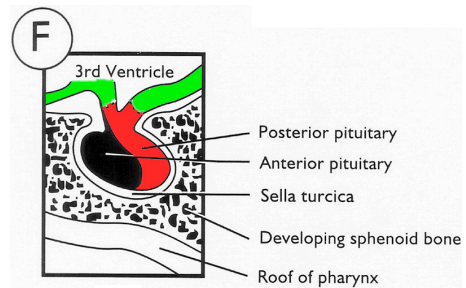
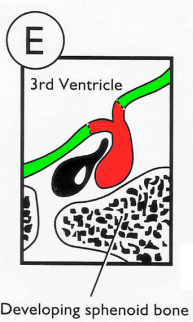
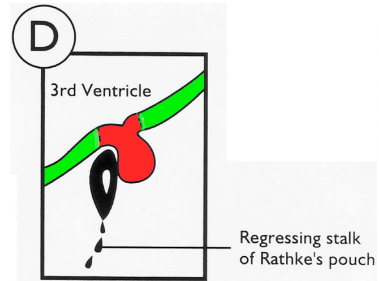
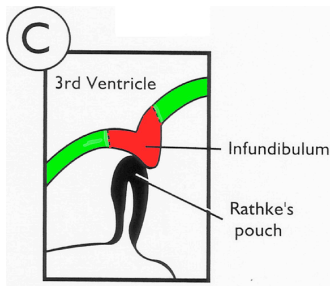
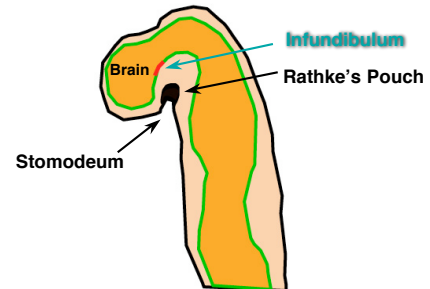


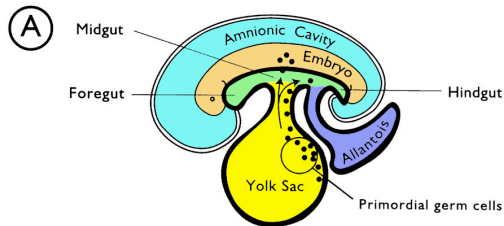
Animal Science 434 Reproductive Physiology

Lec 5: Embryogenesis of the Pituitary and Sexual Development

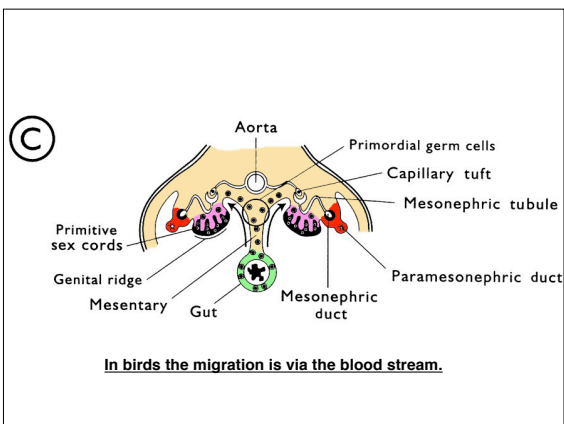
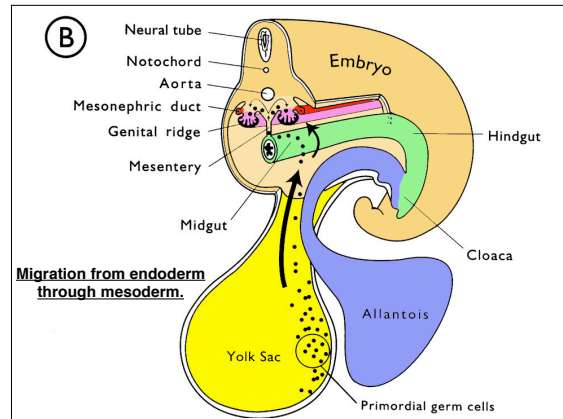
Development of the Pituitary Gland



Germ Cell Migration



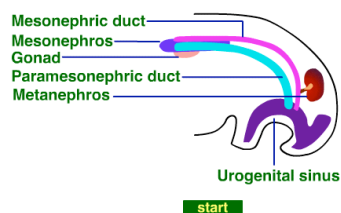
Migration begins by the 4 week of gestation in cow and human.



Fetal Kidneys

- **Pronephros**
 - » regresses
- **Mesonephros**
 - » portions of reproductive tract
- **Metanephros**
 - » Adult kidney and urinary ducts

Development of Mesonephros and Metanephros



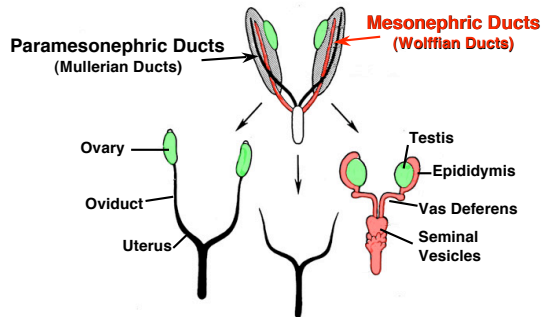
Development of Mesonephros and Metanephros

[Early Development Flash Movie](#)

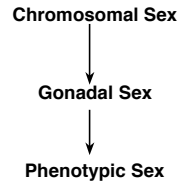
http://www.ansci.wisc.edu/jjp1/as434/powerpoint/fa07/early_dev.swf

Requires the free flash player which can be downloaded from: www.adobe.com

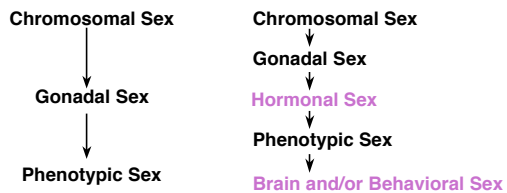
Jost Experiments



Sex Determination: The Jost Paradigm



Sex Determination: The Jost Paradigm



Chromosomal Sex

- Single Pair of sex chromosomes
 - » mammals, some but not all vertebrates
- Sex is environmentally determined
 - » sea worms, fish, reptiles
- Multiple sex chromosomes
 - » invertebrates, insects, reptiles
- Haplodiploidy
 - » bees, spiders

Chromosomal Sex

A. Drosophila

- Sex depends on the number of X chromosomes
 - X or XY or XO = Male
 - XX or XXX or XXY = Female

Chromosomal Sex

A. Drosophila

- Sex depends on the number of X chromosomes
 - X or XY or XO = Male
 - XX or XXX or XXY = Female

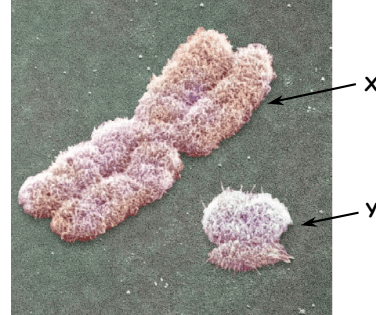
B. Human (mammals)

- XY or XXY or XXYY or XXXY = Male (testis)
- XX or XXX = Female (ovary)
- XO = Female with incomplete ovarian development
- XXY or XXYY or XXXY or XXXXY = testis but impaired sperm production

Chromosomal Sex

- A. *Drosophila*
- Sex depends on the number of X chromosomes
 - X or XY or XO = Male
 - XX or XXX or XXY = Female
- B. Human (mammals)
- XY or XXY or XXYY or XXXY = Male (testis)
 - XX or XXX = Female (ovary)
 - XO = Female with incomplete ovarian development
 - XXY or XXYY or XXXY or XXXXY = testis but impaired sperm production
- C. Conclusion
- The gene that controls testicular differentiation is on the Y chromosome in mammals.

Human X and Y Chromosomes



The Y Chromosome

- A. Region coding for testicular development
- Short arm of Y chromosome
 - H-Y Antigen
 - « no longer believed to be involved
 - SRY
 - « Codes for a DNA binding protein
 - « acts as a transcription factor
 - « Causes
 - primary sex chord (seminiferous tubule) development
 - Development of Sertoli Cells
 - Anti-Mullerian Hormone production by Sertoli Cells
 - « absence of SRY
 - 2nd sex chords (egg nests) develop

The Y Chromosome Cont.

- B. Other genes on the Y chromosome
- » Spermatogenesis
 - » androgen production
 - » long bone growth

SRY and Birds

- Birds
 - » females ZW, males ZZ
 - » W chromosome determines sex
 - » SRY is found on the Z chromosome !
- SRY is not the only sex determining gene in animals

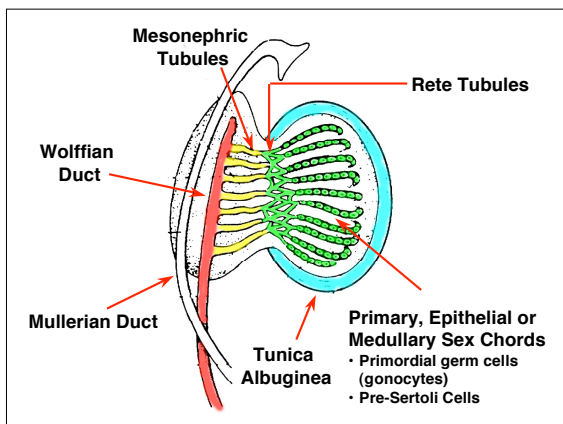
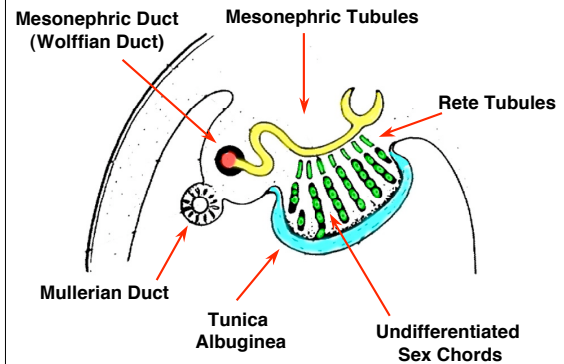
Gonadal Sex

XY Male

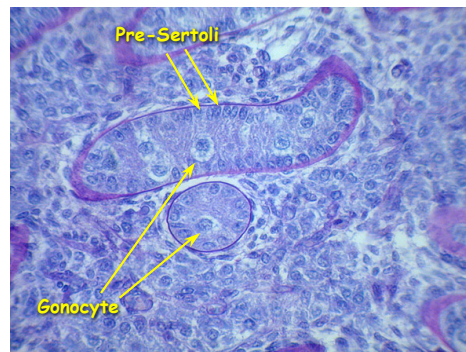
Testis Determining Factor
(SRY gene product)

Testes develop

Testicular Development



Primary Sex Chords in Fetal Testis



Hormonal Sex

XY Male

Testis Determining Factor
(SRY gene product)

Testes develop

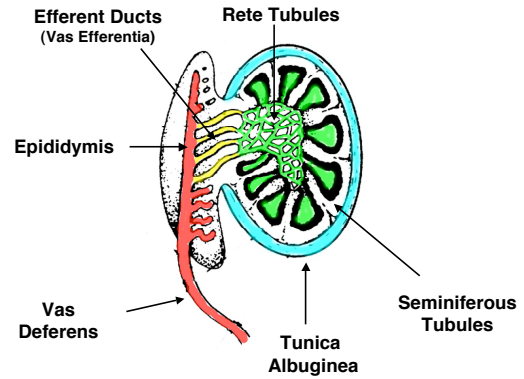
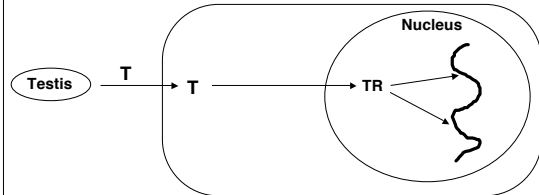
Sertoli cells secrete
anti-mullerian hormone (AMH)

AMH causes leydig
cells to differentiate

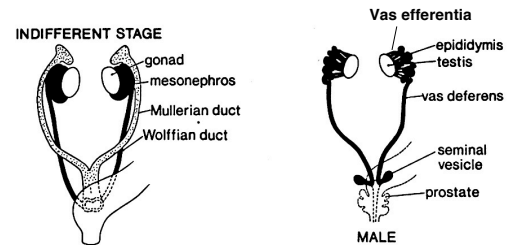
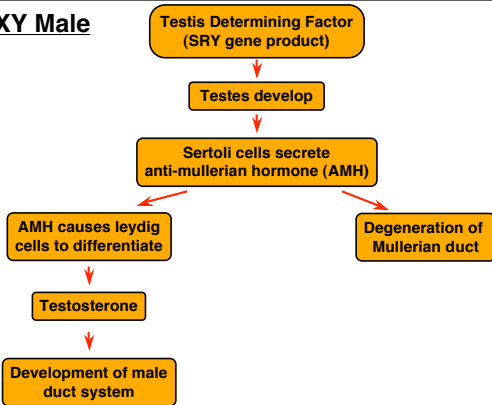
Testosterone

Development of male
duct system

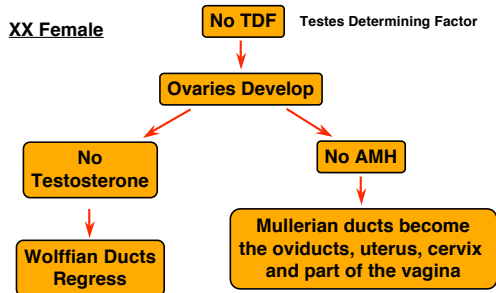
Wolffian Duct Cells



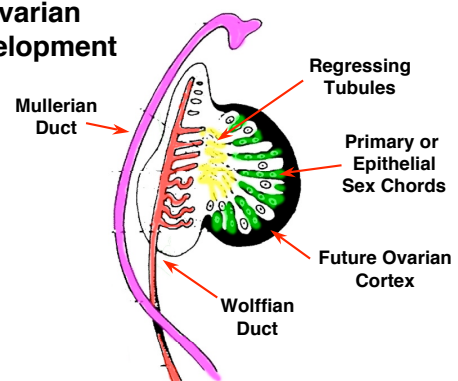
XY Male

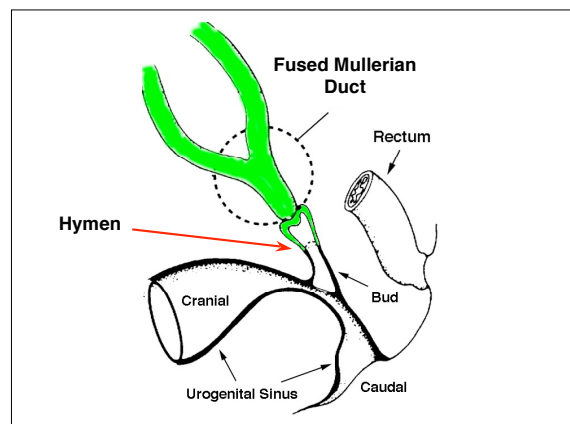
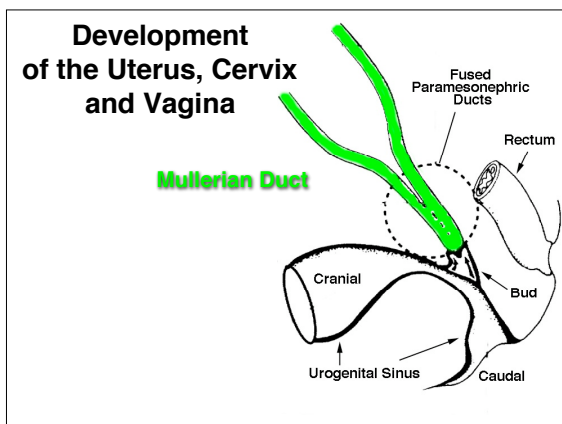
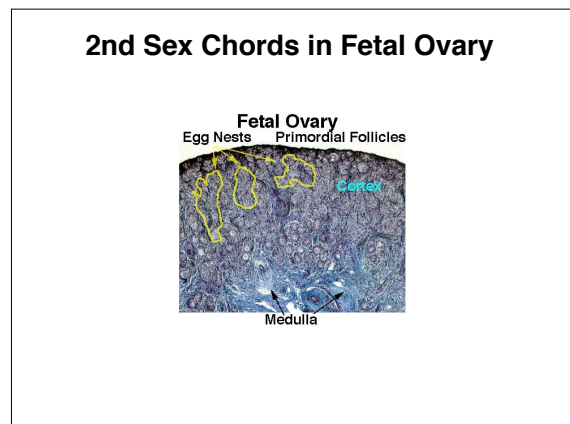
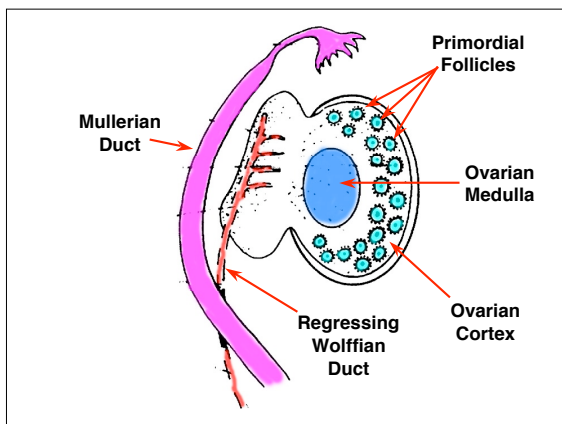
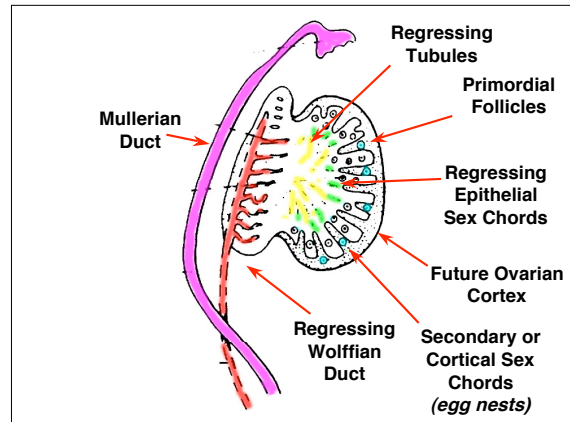
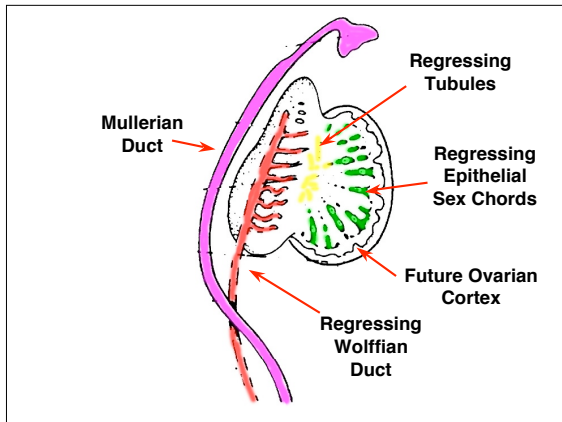


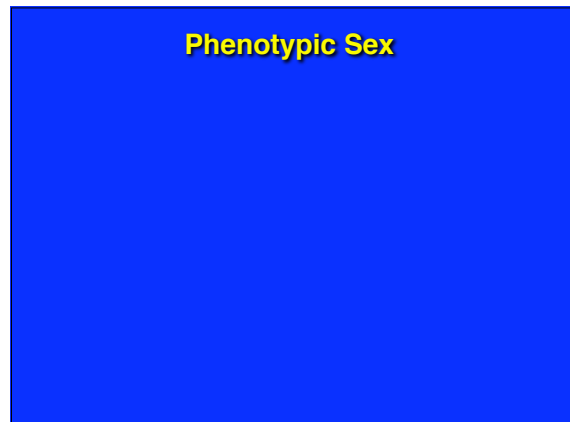
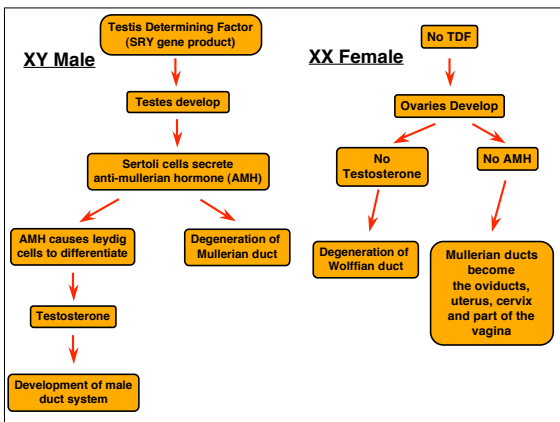
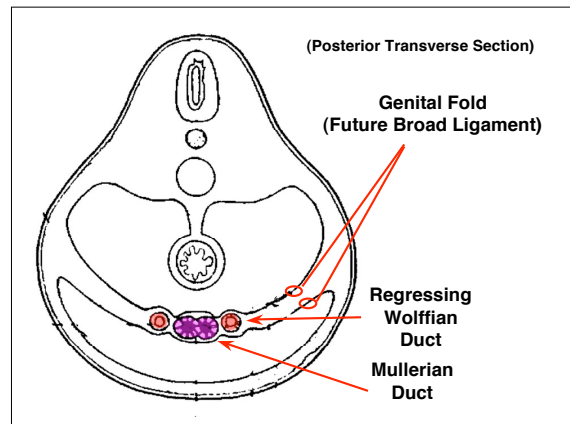
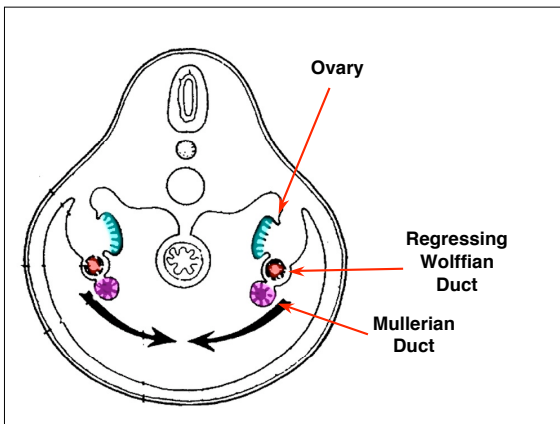
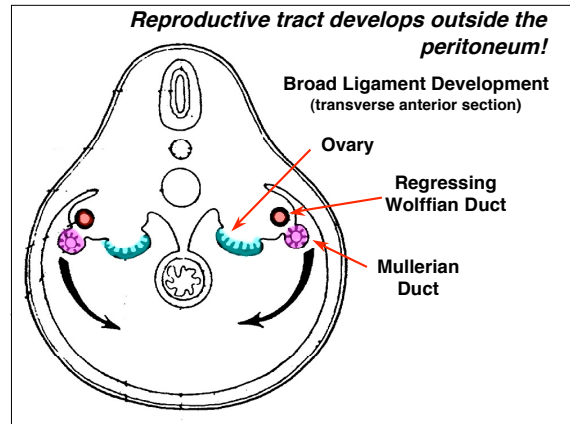
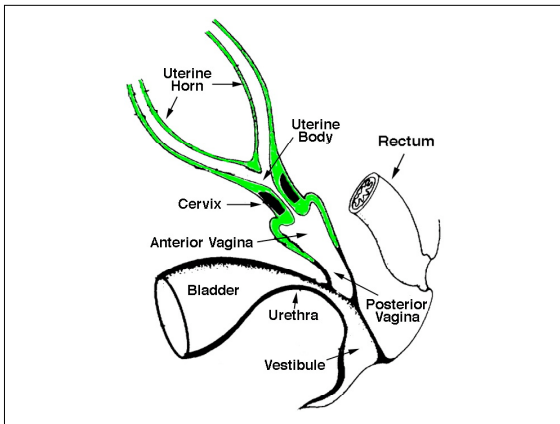
Female Development

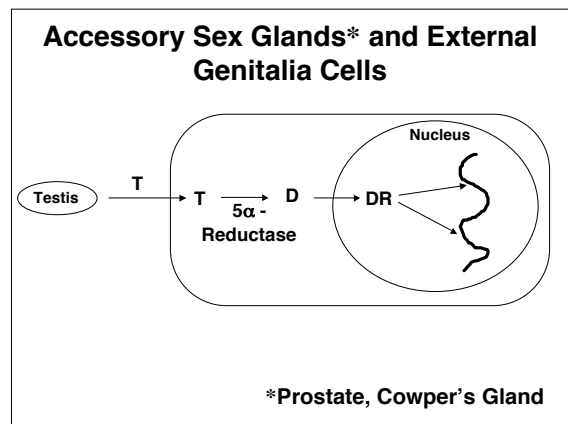
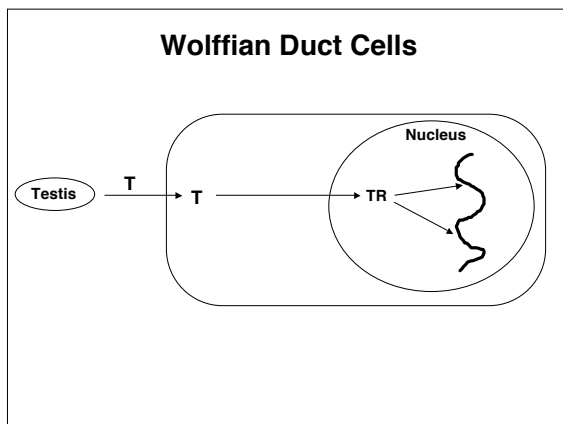
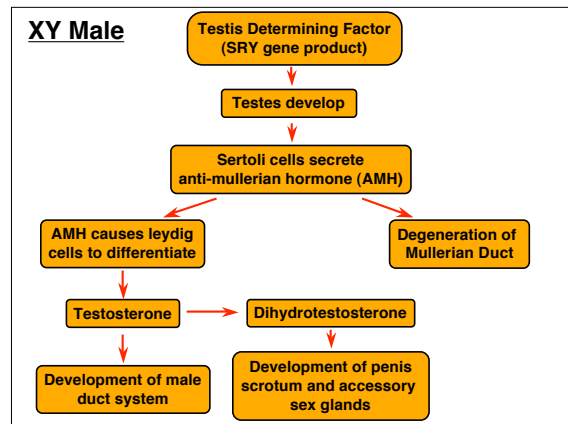
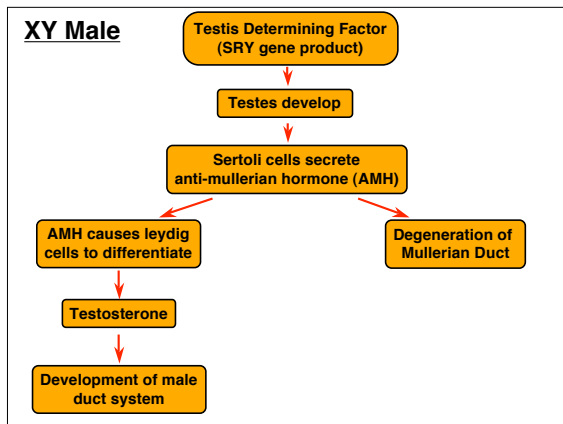


Ovarian Development









Significance of DHT

- Androgen receptor has a higher affinity for DHT
- Can get effects with low levels of circulating testosterone
- Secondary sex characteristic tissue in the male expresses 5α-reductase

External Genitalia Differentiation

