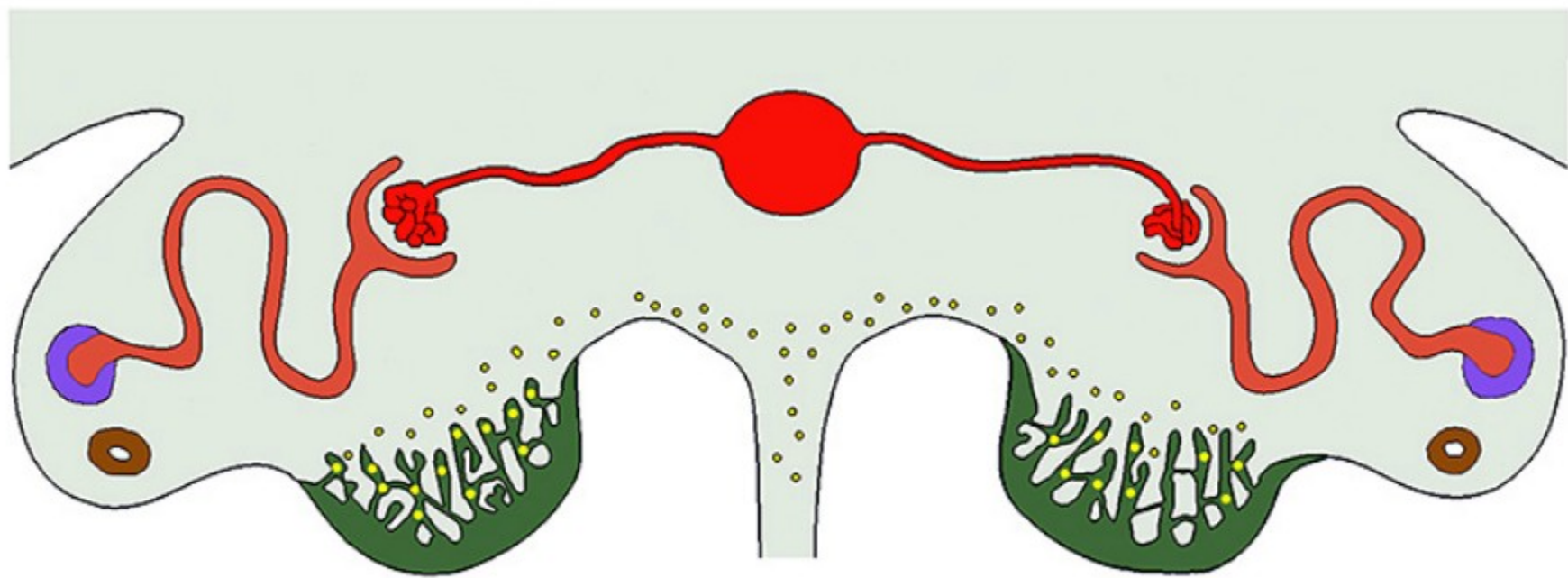
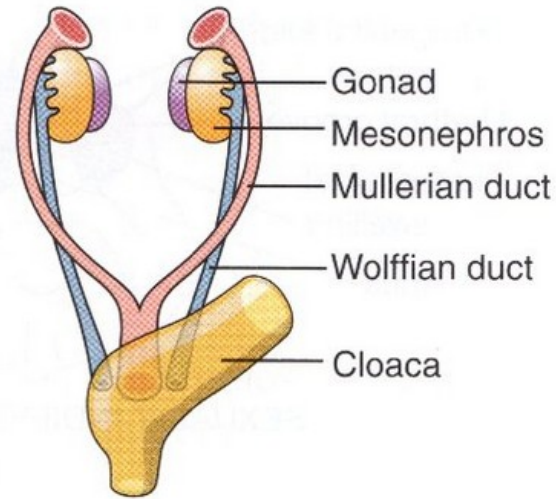


# Development and teratology of reproductive system.

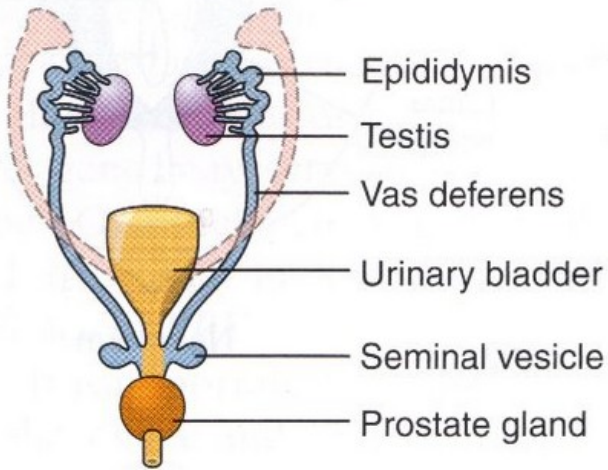
Anna Mac Gillavry

05.04.2021

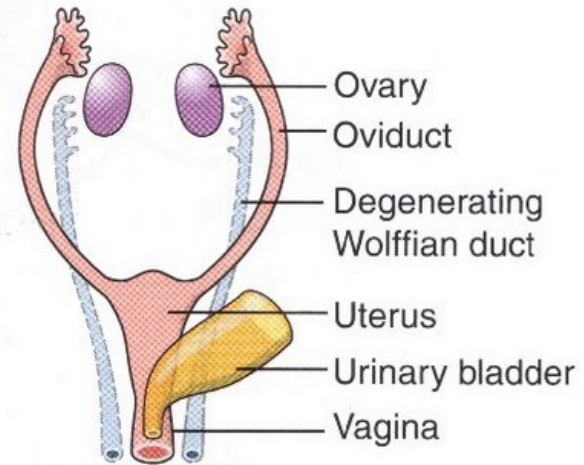




INDIFFERENT STAGE



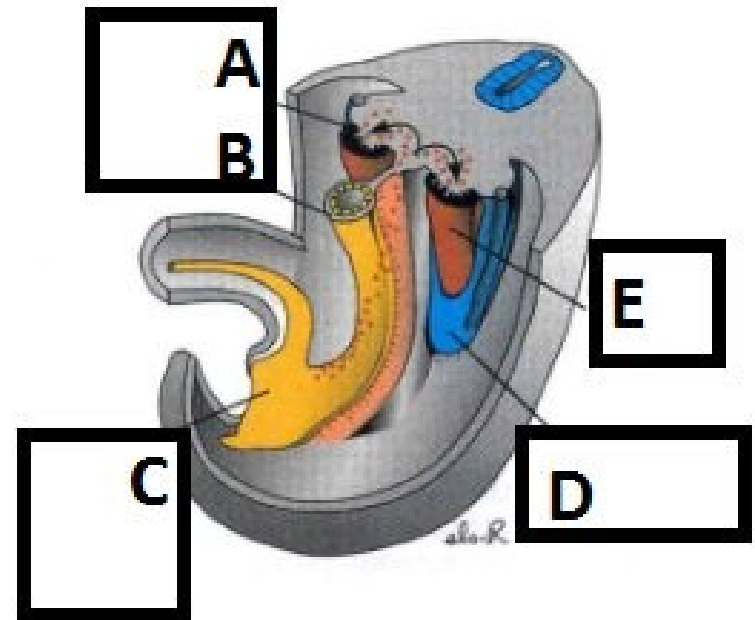
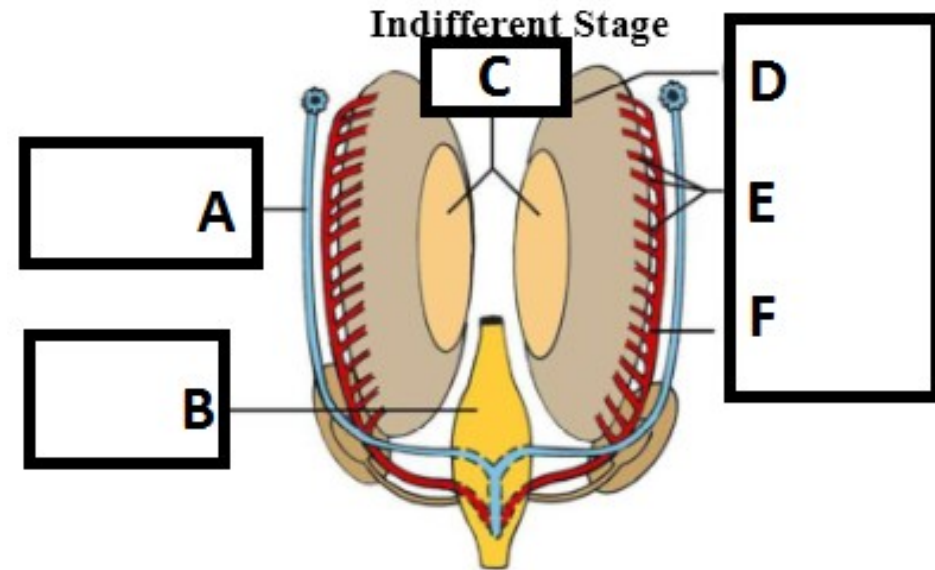
MALE



FEMALE

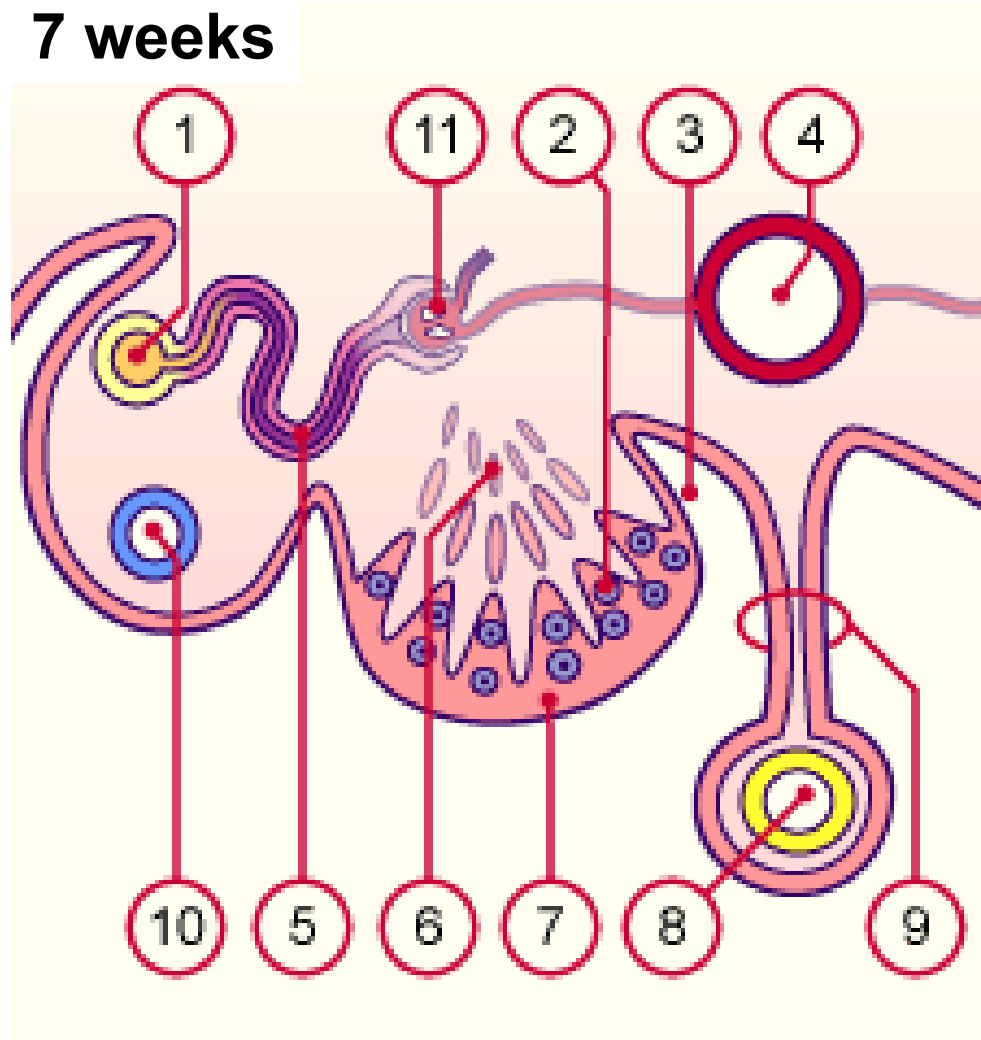
# Development of gonad

- **indifferent gonad**  
to 6th-7th week of development
  - germ cell (wall of yolk sac)
  - genital (gonadal) ridge – mesoderm
  - coelomic epithelium
    - mesoderm – primitive sex cords



# Development of gonad - differentiation to ovary

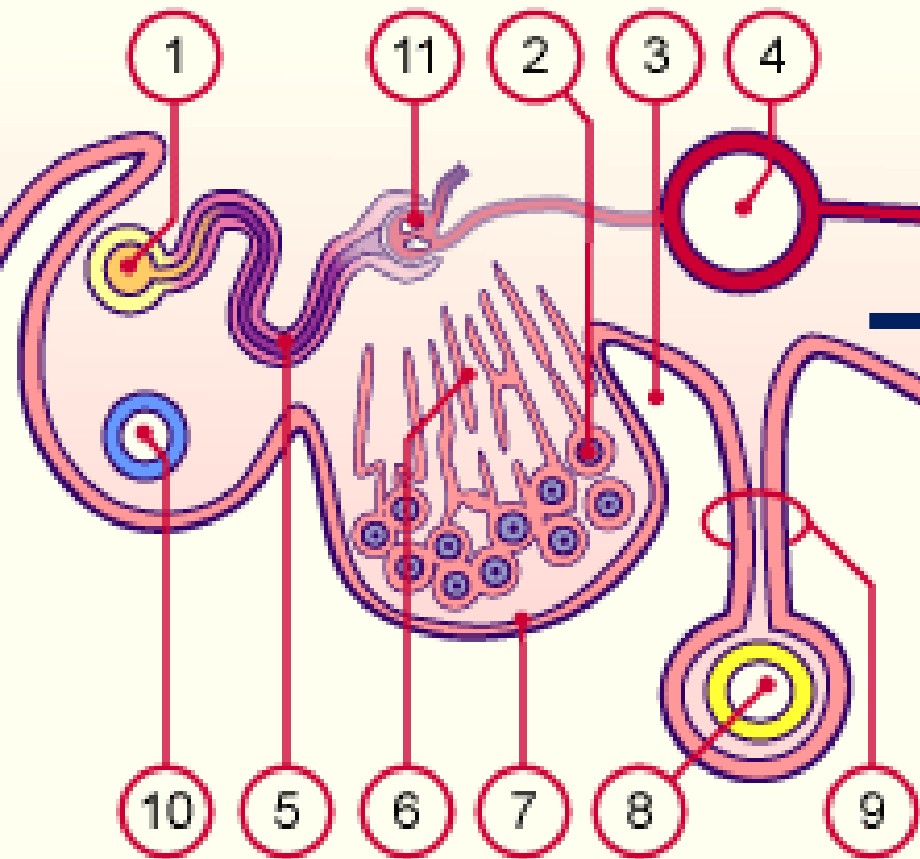
- 2 generations of cords
  - medullary disappears
  - 7th week – cortical cords arise → form follicles, remain close to the surface
- germ cells → oogonia



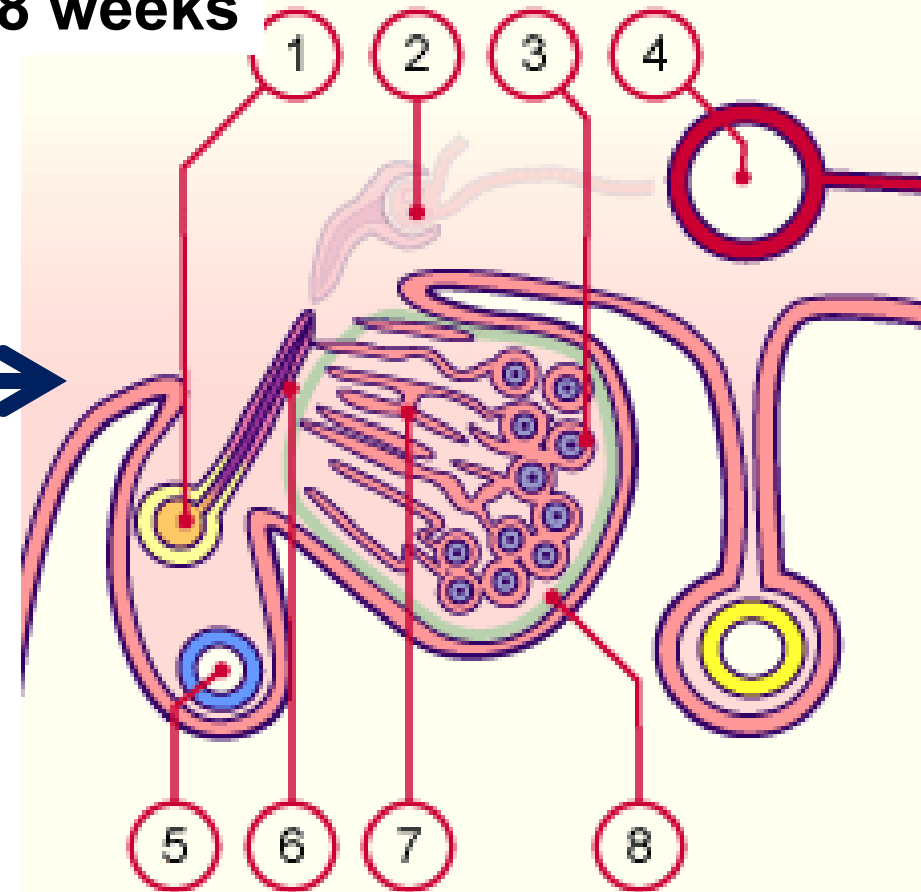
# Development of gonad - differentiation to testis

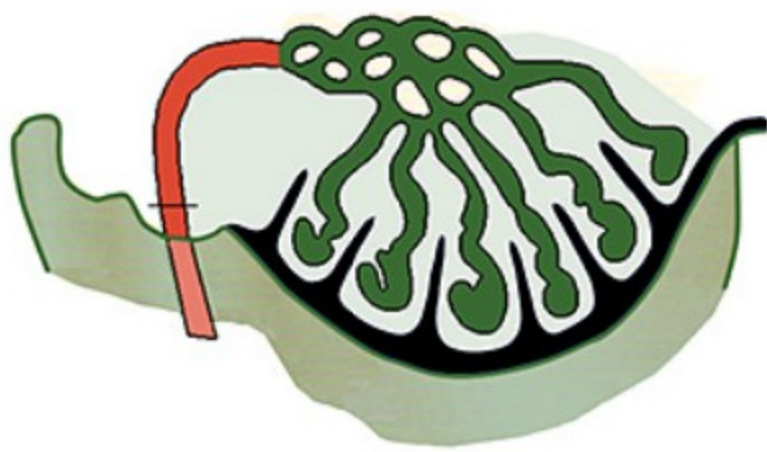
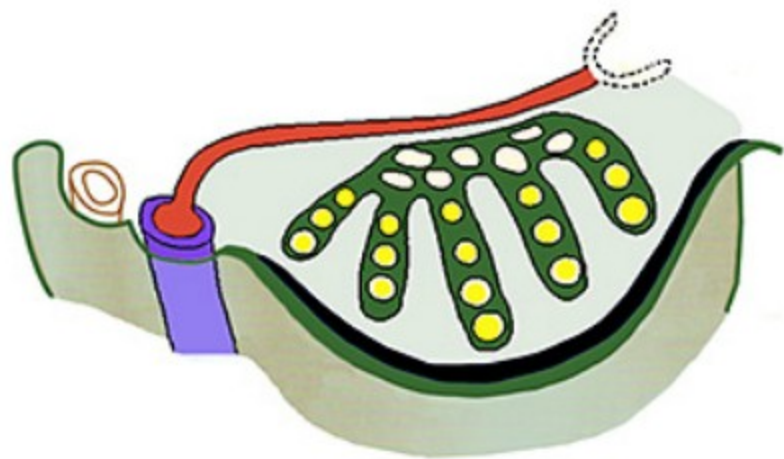
- 1 generation of genital cords, separating from the coelomic epithelium

**7 weeks**



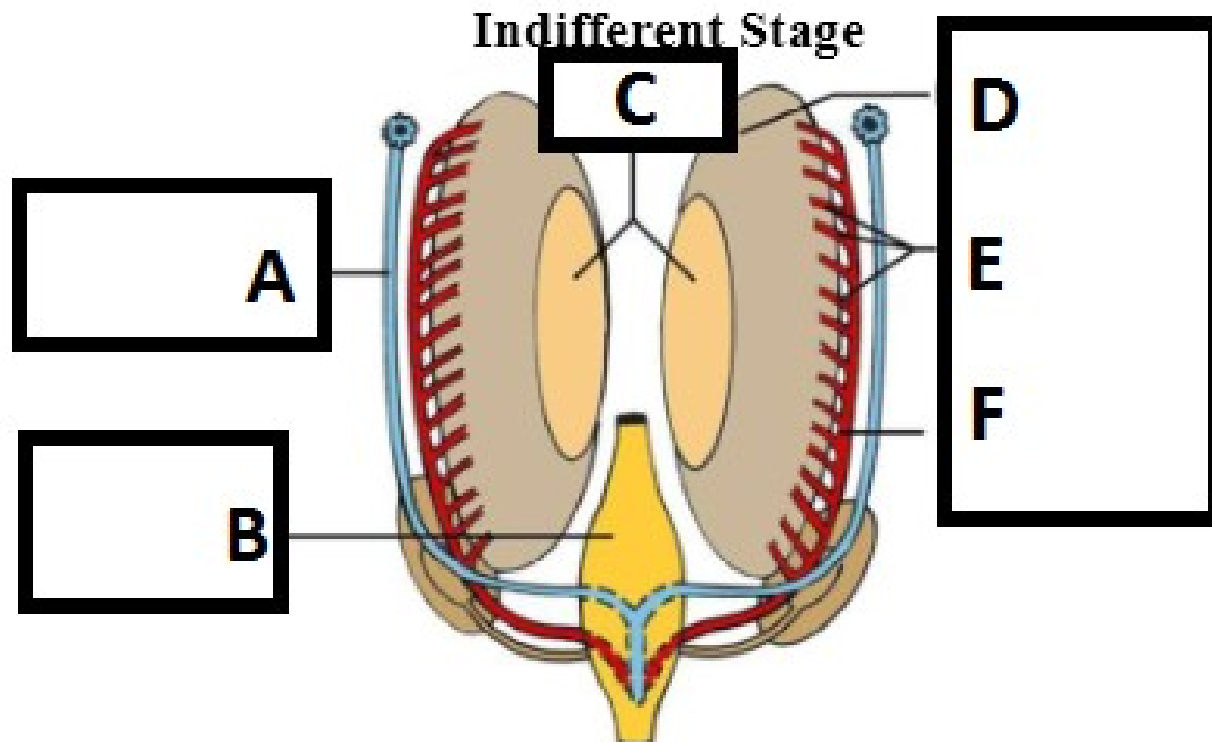
**8 weeks**





# Development of genital ducts

- **indifferent stage**
  - mesonephric duct (Wolffian)
  - paramesonephric duct (Müllerian) – longitudinal invagination of coelomic epithelium at the urogenital cord

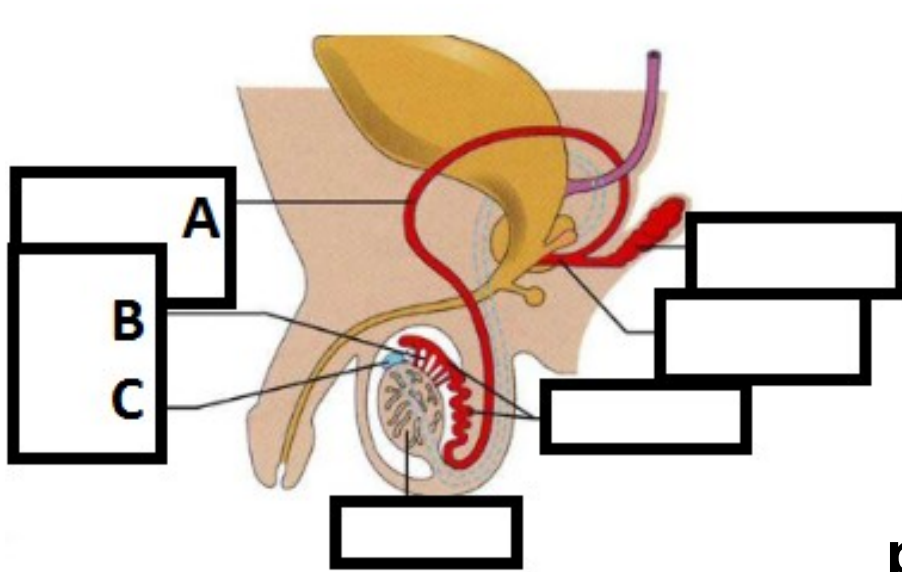




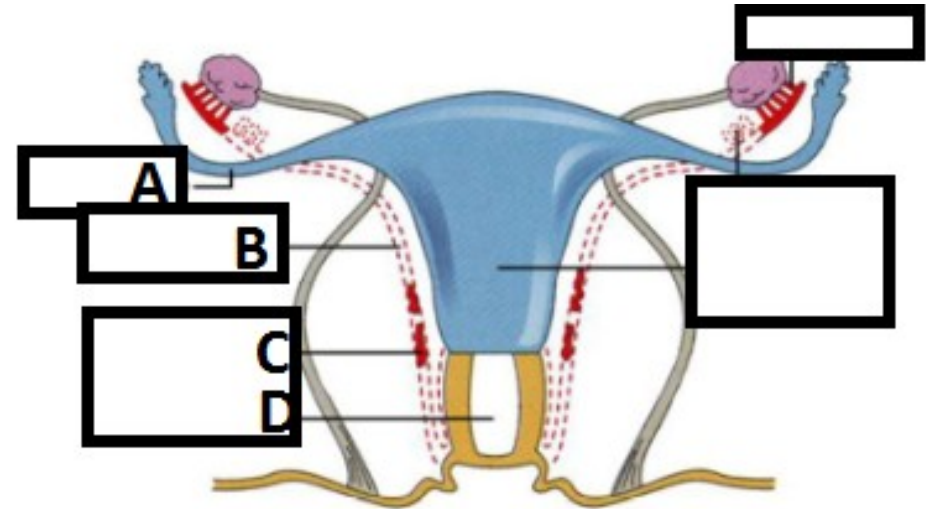
# Differentiation

towards **male** sex

towards **female** sex



**mesonephric duct – Wolff**

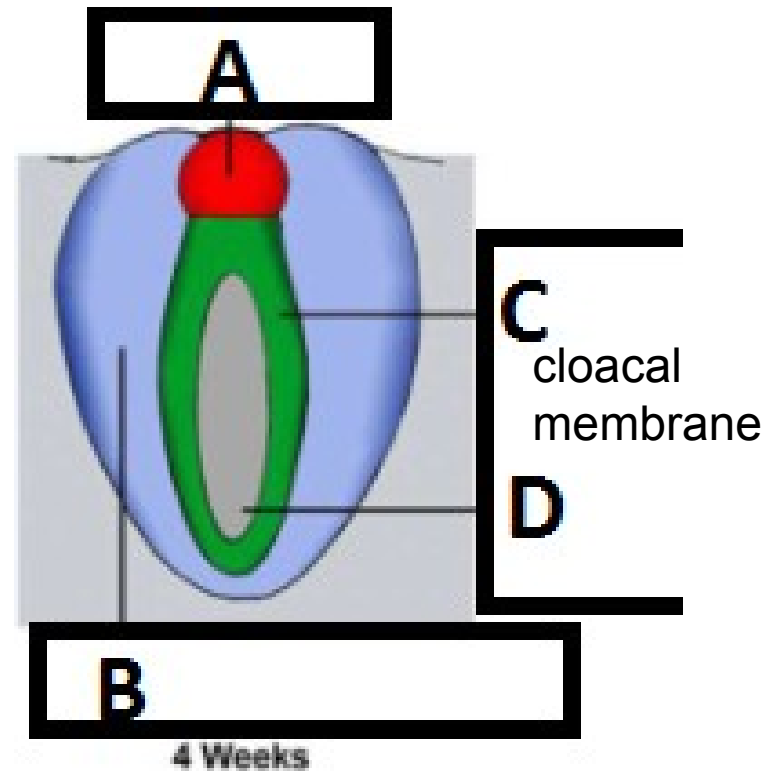


**paramesonephric duct - Müller**

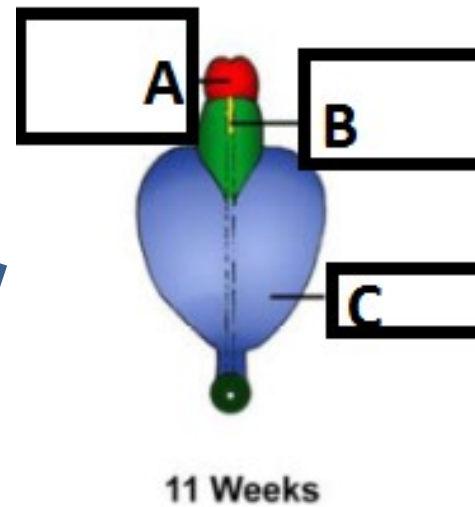
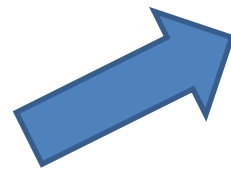
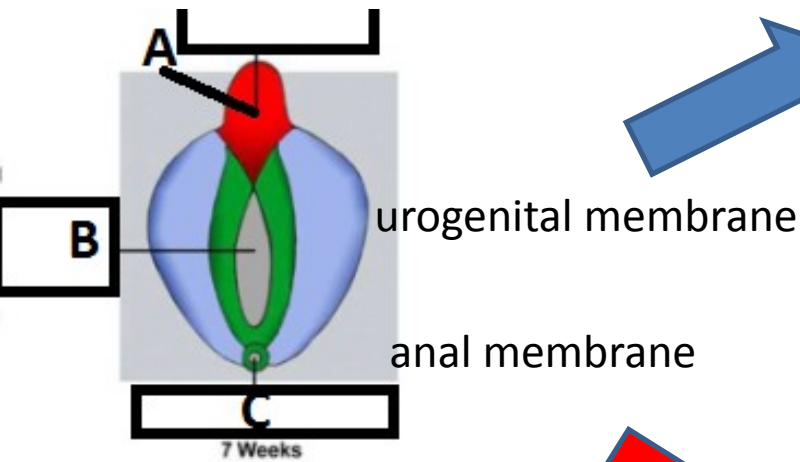
- vertical
- horizontal do not fuse → uterine tube
- vertical - both ducts fuse → **uterovaginal primordium** – uterus and cranial part of vagina

# Development of external genitalia

- indifferent stage
  - cloacal **folds** around the cloacal membrane
    - anteriorly **urethral** (urogenital) folds
    - posteriorly anal folds
  - genital **tubercle (phallus)**
  - genital **swellings**

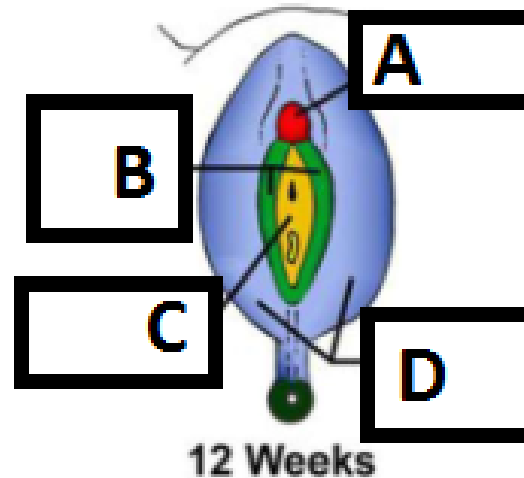
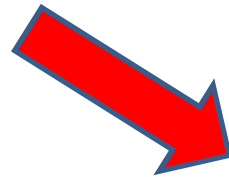


# Development of external genitalia - differentiation



## MALE

- genital tubercle → penis
- urogenital folds fuse → pars spongiosa urethrae m.
- genital swellings fuse → scrotum



## FEMALE

- genital tubercle → clitoris
- urethral (urogenital) folds → labia minora
- genital swellings (tori genitales) → labia maiora

# Disorders of sexual development „hermaphrodites“

- Ambiguous genitalia: clitoral hypertrophy/small penis with hypospadias
- Ovotestes – less than 1 in 20000 in 70 % of cases, the karyotype is 46, XX
- Genotype does not match the phenotype
  - congenital adrenal hyperplasia, most common cause;
  - androgen insensitivity syndrome (AIS): complete (CAIS), mild (MAIS) or partial (PAIS)
  - 5- $\alpha$ -reductase deficiency – affects males

# Chromosomal aberrations

- Klinefelter syndrom – 47, XXY (XXXY...) – 1 in 1000 males: decreased fertility, small testes, decreased testosterone levels, gynecomastia in app. 33%
- Gonadal dysgenesis – oocytes are absent:
  - Swyer syndrome – XY female gonadal dysgenesis – point mutation or deletions of the SRY gene
  - Turner syndrome – 45, X

# Hernias and cryptorchidism

- Congenital indirect inguinal hernia
- Hydrocele of the testis and/or spermatic cord
- Cryptorchidism

# Uterine and vaginal defects

- Duplication of the uterus
  - uterus didelphys
  - uterus bicornus
  - uterus arcuatus
- Uterus bicornus unicollis
- Cervical atresia
- Vaginal atresia

# Defects in male genitalia

- Hypospadias – 3 to 5 in 1000 births
- Epispadias – 1 in 30000 – most often associated with extrophy of the bladder and abnormal closure of the ventral body wall
- Micropenis – insufficient androgen stimulation – primary hypogonadism, hypothalamic or pituitary dysfunction
- Bifid penis