

LECTURE

#2

EMBRYOLOGY

Development of urinary Bladder and Urether





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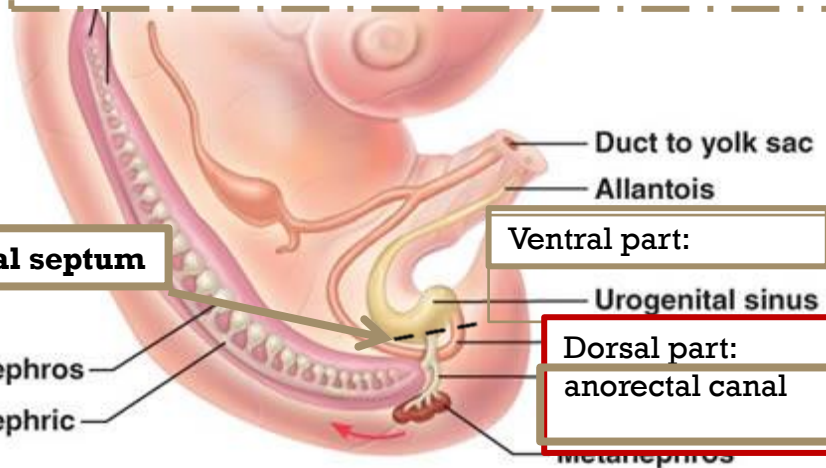
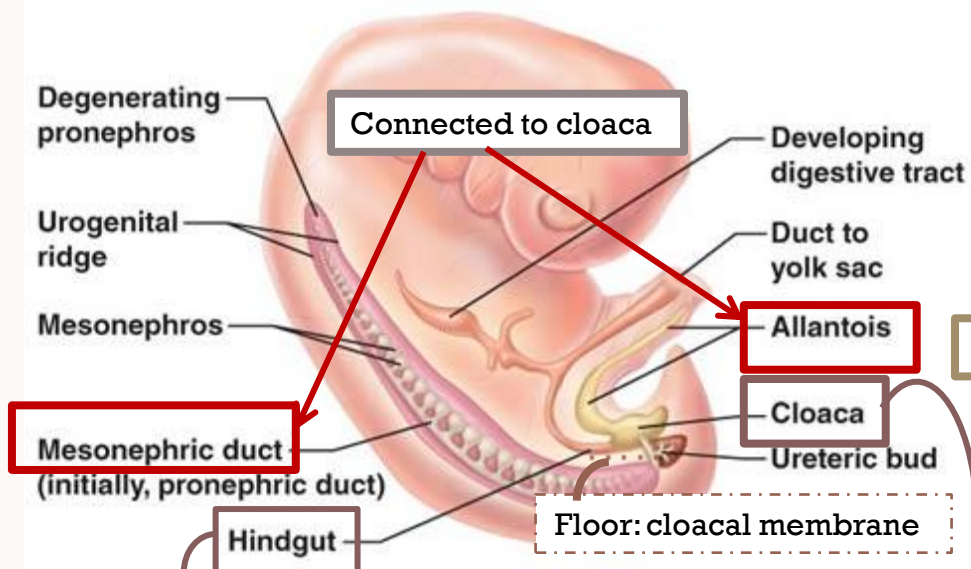
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By the end of the lecture, you should be able to:

- ❖ Describe the Cloaca and the formation of the urogenital sinus.
- ❖ Discuss the division of the urogenital sinus into various parts and name the adult organs that are derived from each part.
- ❖ Describe how the caudal parts of the mesonephric ducts and ureters are absorbed into the urogenital sinus and the significance of this embryonic event.
- ❖ Discuss the position of the urachus and its significance and fate.
- ❖ Describe the various anomalies concerned with the urinary bladder and urethra.

#CLOACA AND PRIMITIVE UROGENITAL SINUS:

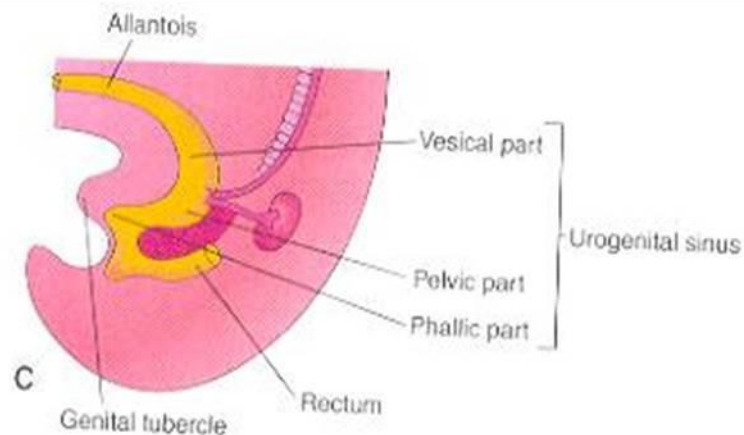
- The ventral part communicates with the **allantois and the mesonephric ducts**. And Its floor is the **urogenital membrane**.
- While the dorsal part forms the **rectum** and upper part of **anal canal**. And Its floor is the **anal membrane**.



It's located in terminal dilated part of hind gut

❖ Primitive urogenital sinus:

- 1) Cranial (**vesical part**) > most of **the bladder** + continuous with the allantois
- 2) Middle (**pelvic part**) > males ♂ = main part of urethra, females ♀ = entire urethra
- 3) Caudal (**phallic part**) > the rest of male urethra + grows toward genital tubercle





#URINARY BLADDER:

- ❖ **Location:** In infants and children the bladder is located in the abdomen then it enters the greater pelvis at about **6 years** and becomes a **pelvic organ after puberty**.
- ❖ **Origin:** vesical part of the urogenital sinus, The epithelium is endodermal in origin, other layers are derived from the splanchnic mesoderm.
- ❖ The mesonephric ducts get absorbed to form the **trigones**, after that the ureters open separately in the bladder.

❑ **The allantois:** (which helps in collecting liquid waste from the embryo and exchange gases)

Location: at fist continues with the bladder.

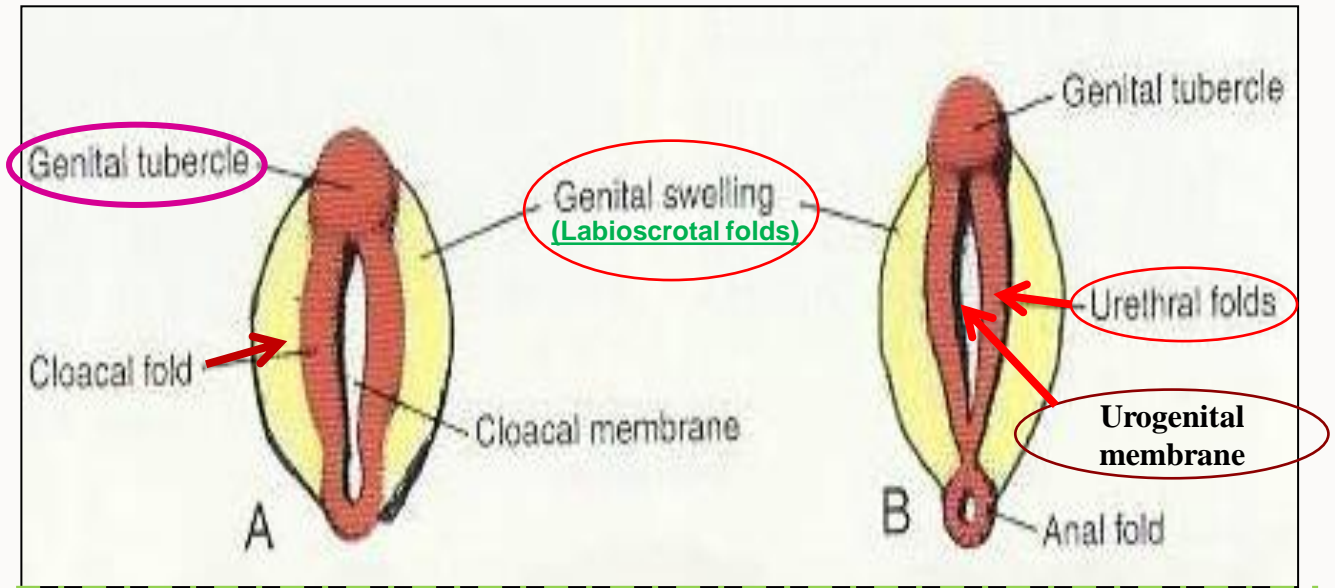
> Then it becomes a thick fibrous cord called **urachus**.

The urachus extends from apex of the bladder to the umbilicus. Which later (in adults) forms **median umbilical ligament**.

#URETHRA:

❖ Indifferent stage ;

- ✓ The **genital tubercle** (mesenchymal elevation) develops at the cranial end of the **cloacal membrane**.
- ✓ Two **urethral folds**, develop on either side of the **urogenital membrane**.
- ✓ Laterally two **labioscrotal, (cloacal)** folds develop on either side of the urethral folds.



Fate of Urethral fold:

In male
♂

In Female
♀

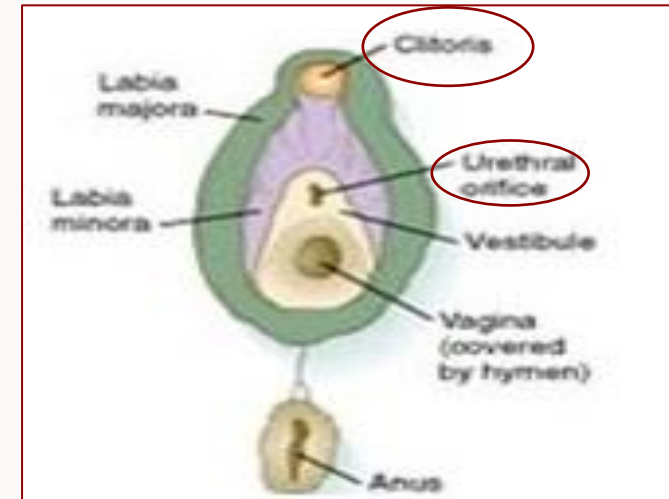
➤ fuse with each other to close the **penile urethra**.

➤ remain separate to form **labia minora**.

- Medial to lateral :
urogenital membrane → urethral Fold → lobiosctoral Folds.

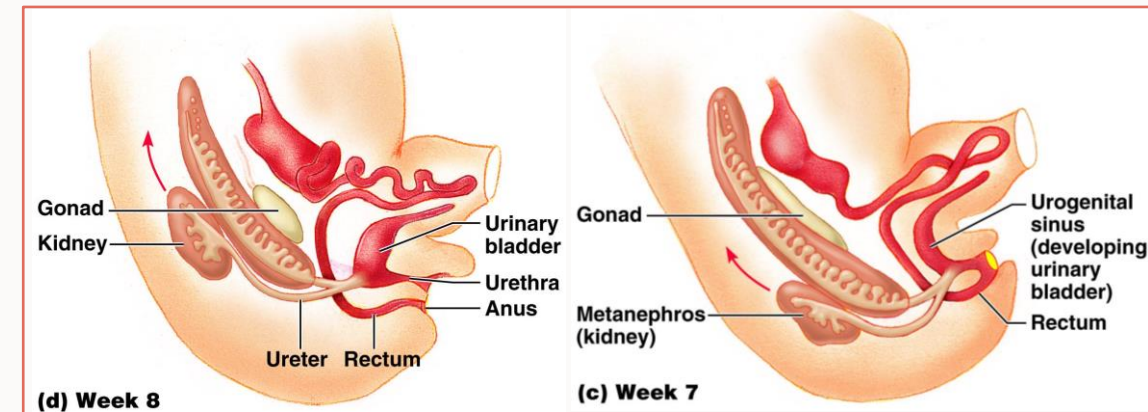
➤ Female urethra:

- ✓ The **entire female urethra** is **derived** from **endoderm of the pelvic part** of the urogenital sinus. (The Middle Part) .
- ✓ The **external urethral orifice** opens **dorsal to the glans clitoris**.

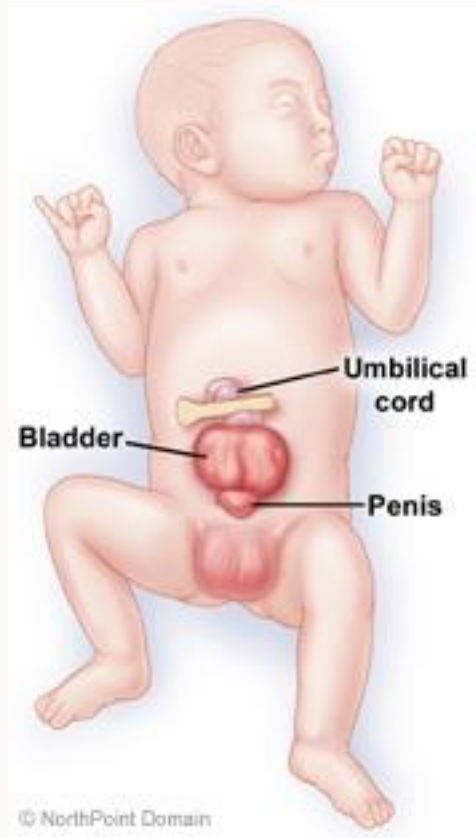


➤ Male urethra:

- ✓ The genital tubercle elongates forming the **phallus**, which is the precursor of the penis.
- ✓ **Most of the male urethra prostatic** (membranous and spongy parts) is derived from **endoderm of the pelvic and phallic** parts of urogenital sinus.
- ✓ The **distal (terminal) part** of male urethra in glans penis starts as **ectodermal solid cord** that grows towards the root of penis to meet the spongy urethra , later it canalizes.



#ANOMALIES:



- **Extrophy of the bladder (Ectopiae vesica):**
exposure of the posterior wall of the bladder due to a defect in the anterior abdominal wall and anterior wall of the bladder.

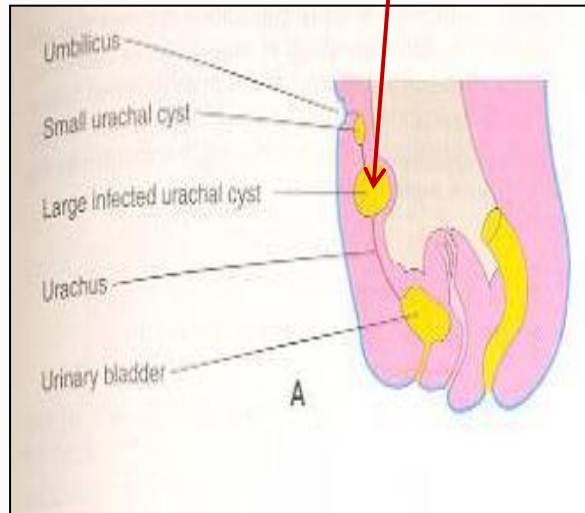
- **Urachal anomalies**

- **Urethral Anomalies**

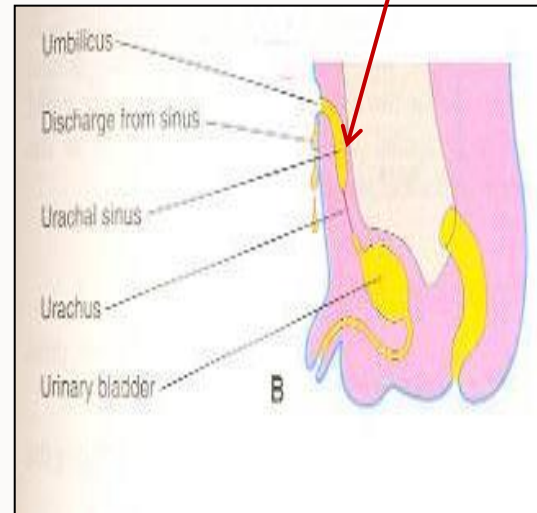
Anomalies

➤ URACHAL ANOMALIES:

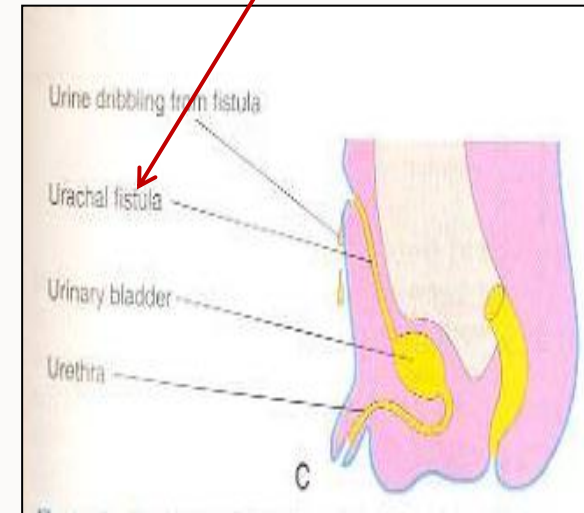
➤ **Urachal cyst:**
persistence or remnant
of **epithelial** lining of
urachus



➤ **Urachal sinus:**
discharge serous
fluid from the
umbilicus.

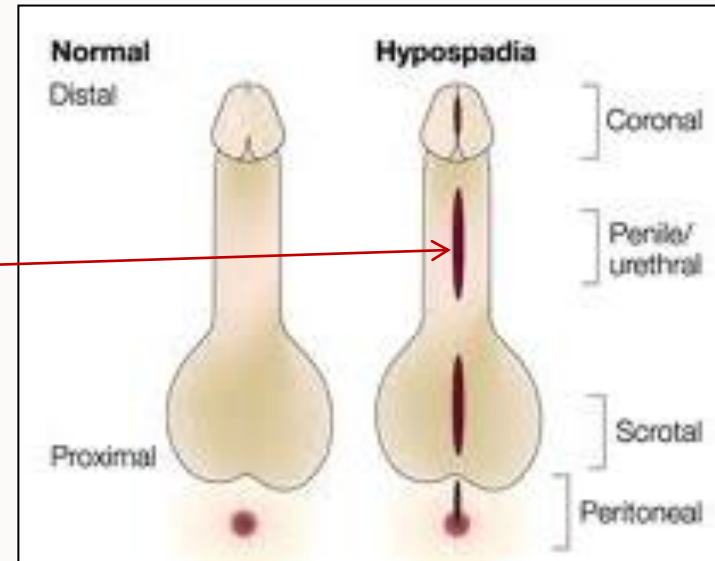


➤ **Urachal fistula:**
the entire urachus
remains patent and
allows urine to escape
from the umbilicus.

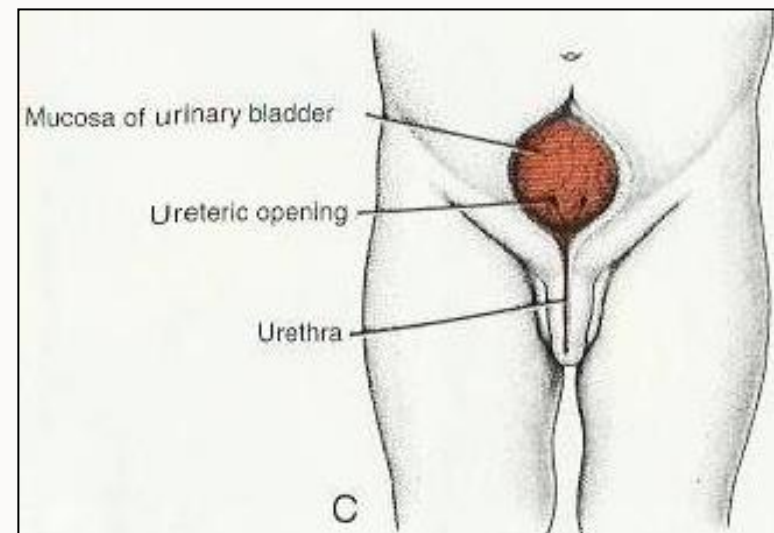


➤ URETHRAL ANOMALIES:

❖ **Hypospadias :**
is the most common anomaly, with **incomplete** fusion of the urethral folds, and abnormal openings of the urethra occur along the ventral (inferior) aspect of the penis.



❖ **Epispadias :**
is a rare abnormality, in which the urethral meatus is found on the dorsum of penis, it is most often associated with **exstrophy of the bladder**





MULTIPLE CHOICES QUESTIONS

1. The cloaca is the dilated terminal part of the :

- a. Hing gut.
- b. Cranial gut.
- c. Middle gut.

2. Peliv part of the Primitive urogenital sinus in female forms:

- a. Most of the bladder.
- b. Main part of the urethra.
- c. Entire urethra

3. Fate of the urachus is:

- a. Forms the bladder
- b. Forms median umblical ligament.
- c. Absorbed and disappears

4. Which type of Urachal anomalies is defined by “discharge serous fluid from the umblicus”:

- a. Urachal cyst.
- b. Urachal fistula.
- c. Urachal sinus.



4.	C
3.	B
2.	C
1.	A

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