

DEVELOPMENT  
OF  
THE URINARY BLADDER  
AND  
URETHRA

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# Objectives

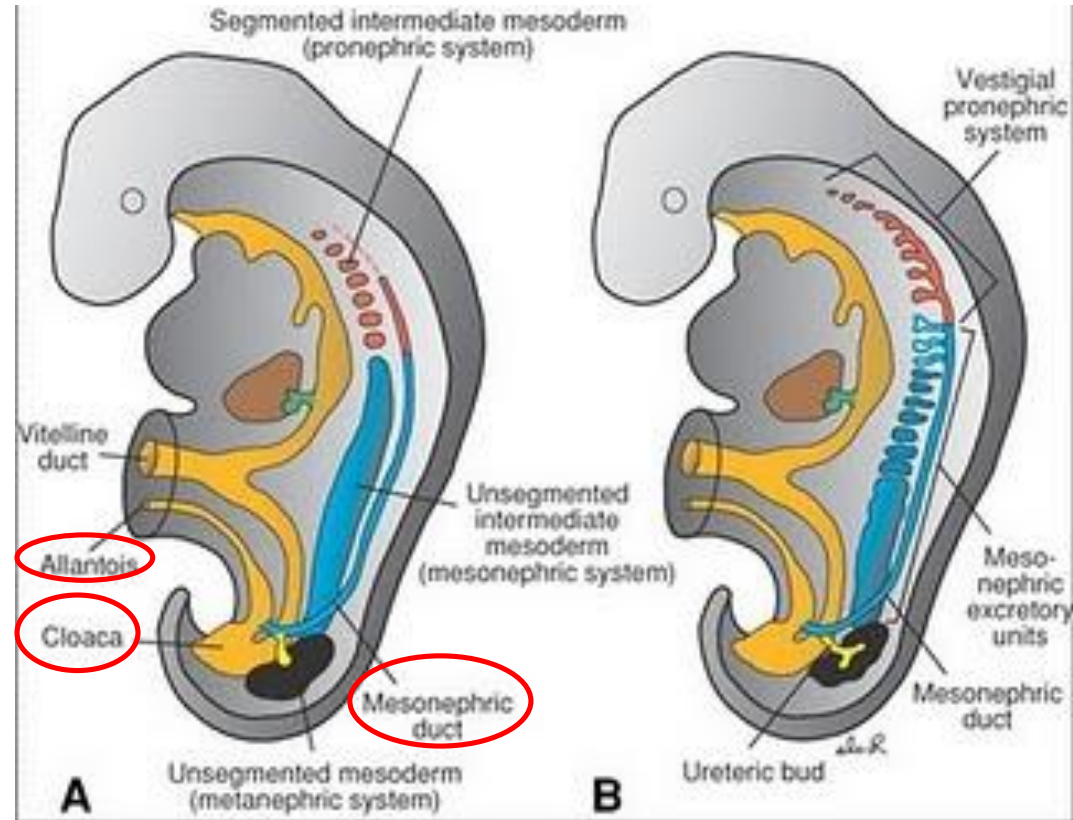
- ❖ At the end of the lecture the student is able to;
  - Describe the cloaca and the formation of the urogenital sinus.
  - Discuss the division of the urogenital sinus into various parts and name the adult organs that are derived from each part.
  - Describe how the caudal parts of the mesonephric 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

□ The cloaca is the dilated terminal part of the **hind gut**.

■ It receives the **allantois** and the **mesonephric ducts**.

■ Its floor is closed by the cloacal membrane.



# Cloaca, con.

❑ A mesodermal **urorectal septum** divides the cloaca and the cloacal membrane into:

❑ **Ventral part**; the **primitive urogenital sinus**;

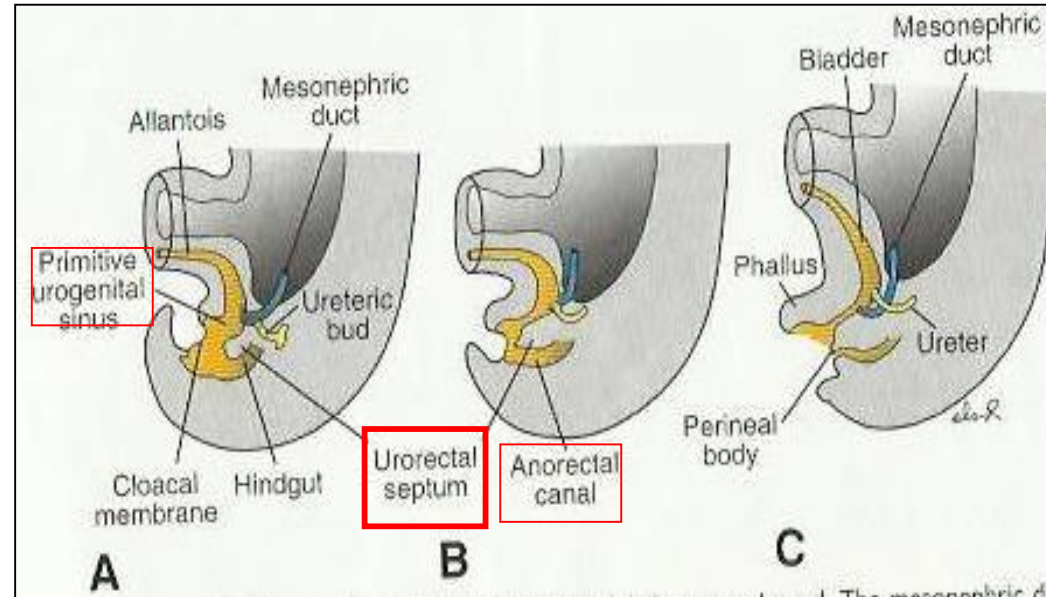
• that communicates with the **allantois** and the **mesonephric ducts**.

• Its floor is the **urogenital membrane**.

❑ **Dorsal part**; the **anorectal canal**,

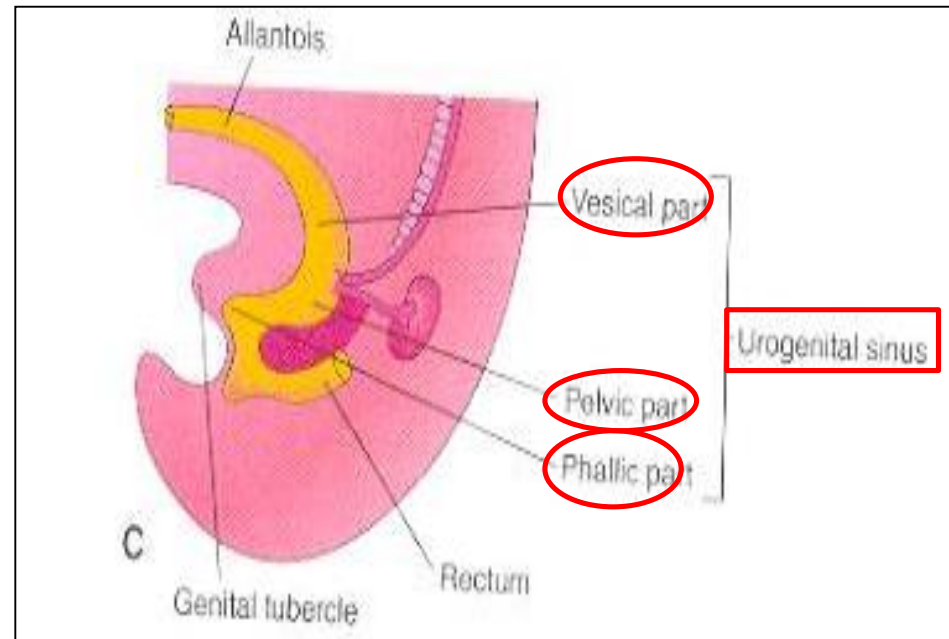
• that forms the **rectum** and upper part of **anal canal**.

• Its floor is the **anal membrane**.



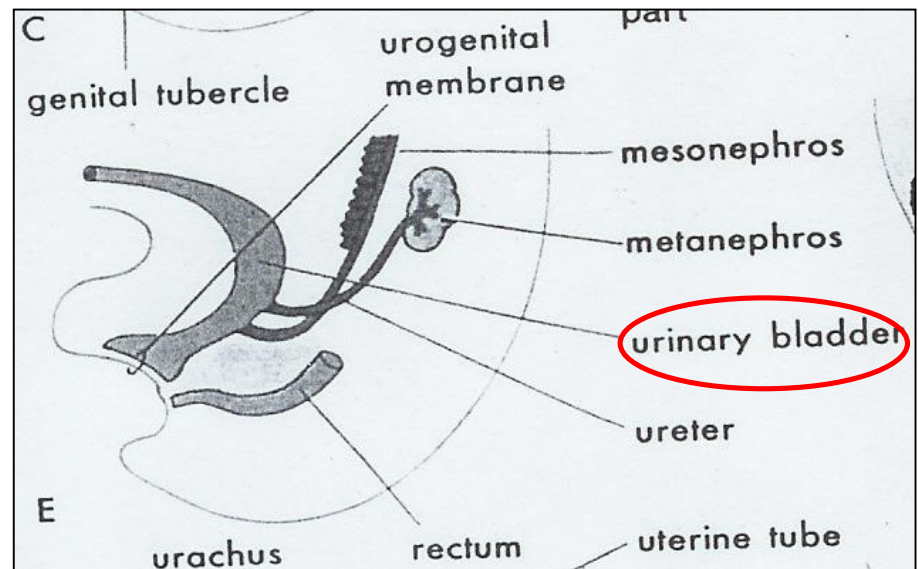
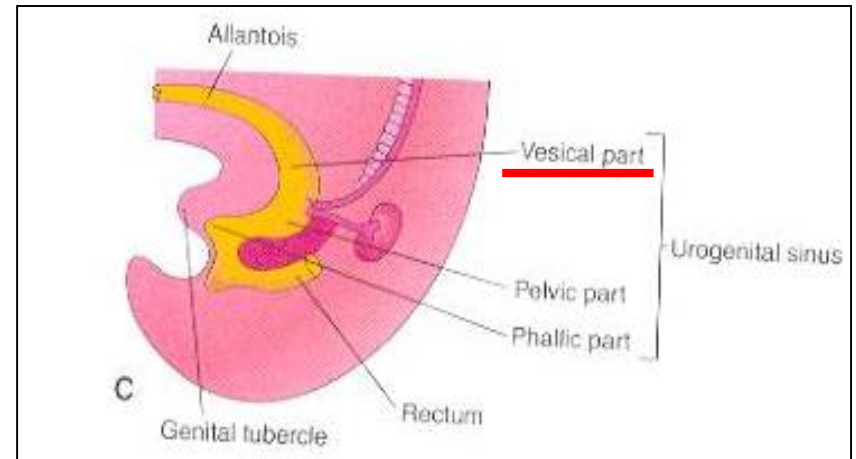
# Primitive urogenital sinus

- Is divided into three parts;
  - A **cranial; vesical part**; forms most of the bladder and continuous with the allantois.
  - A **middle; pelvic part**; forms main part of **male urethra** and entire **female urethra**.
  - A **caudal; phallic part** grows towards genital tubercle and shares in the formation of the **male urethra**.



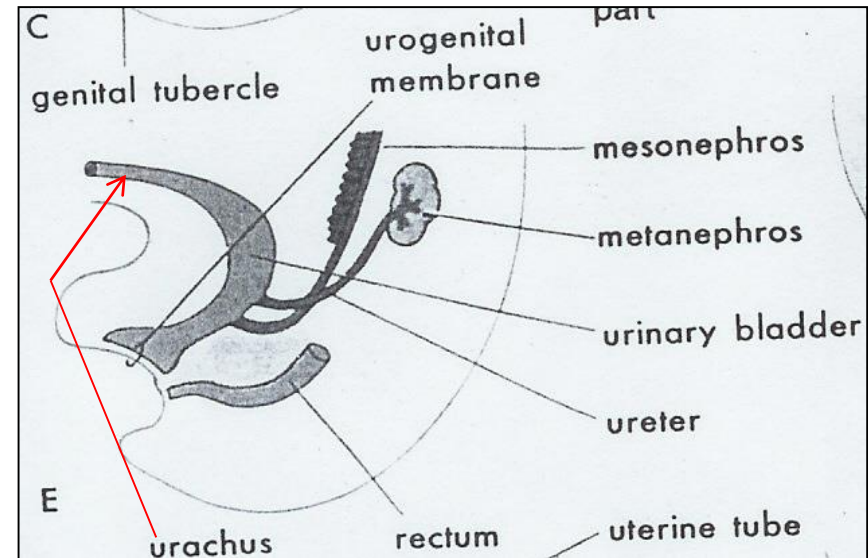
# Urinary bladder

- ❑ It develops mainly from the **vesical part** of the urogenital sinus.
- ❑ The **trigone** is derived from the absorbed distal parts of the **mesonephric ducts**.
- ❑ The epithelium is **endodermal** in origin, of the **urogenital sinus**.
- ❑ The other layers are derived from the **splanchnic mesoderm**.

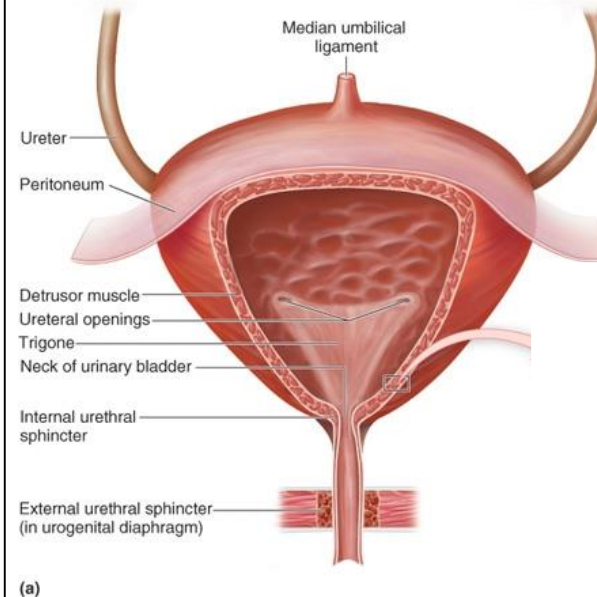


# Urinary bladder, con.

- ❑ The **allantois** is at first continuous with the bladder ,
- then it becomes a thick fibrous cord **urachus** which extends from apex of the bladder to the umbilicus,
- in adult it is represented by the **median umbilical ligament**.
- ❑ After absorption of the mesonephric ducts to form the trigones,
- ❑ the **ureters** open separately in the bladder.



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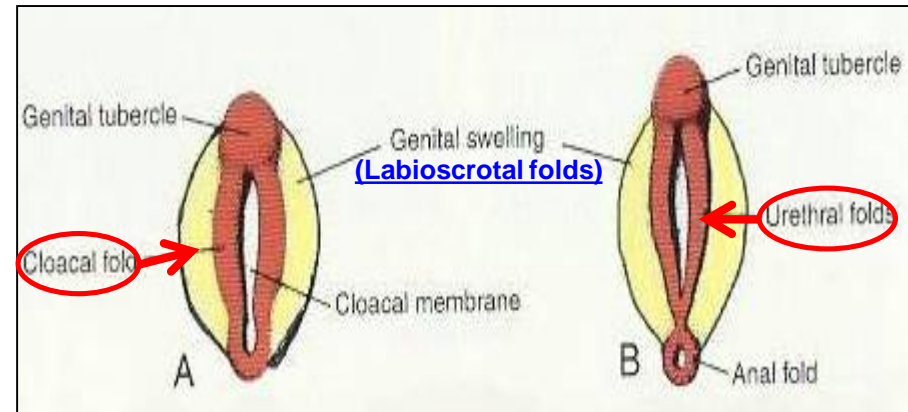
- ❑ In infants and children the bladder is an abdominal organ ,
- ❑ It starts to enter the greater pelvis at about 6 years and becomes a pelvic organ after puberty.



# Urethra

## Indifferent stage ;

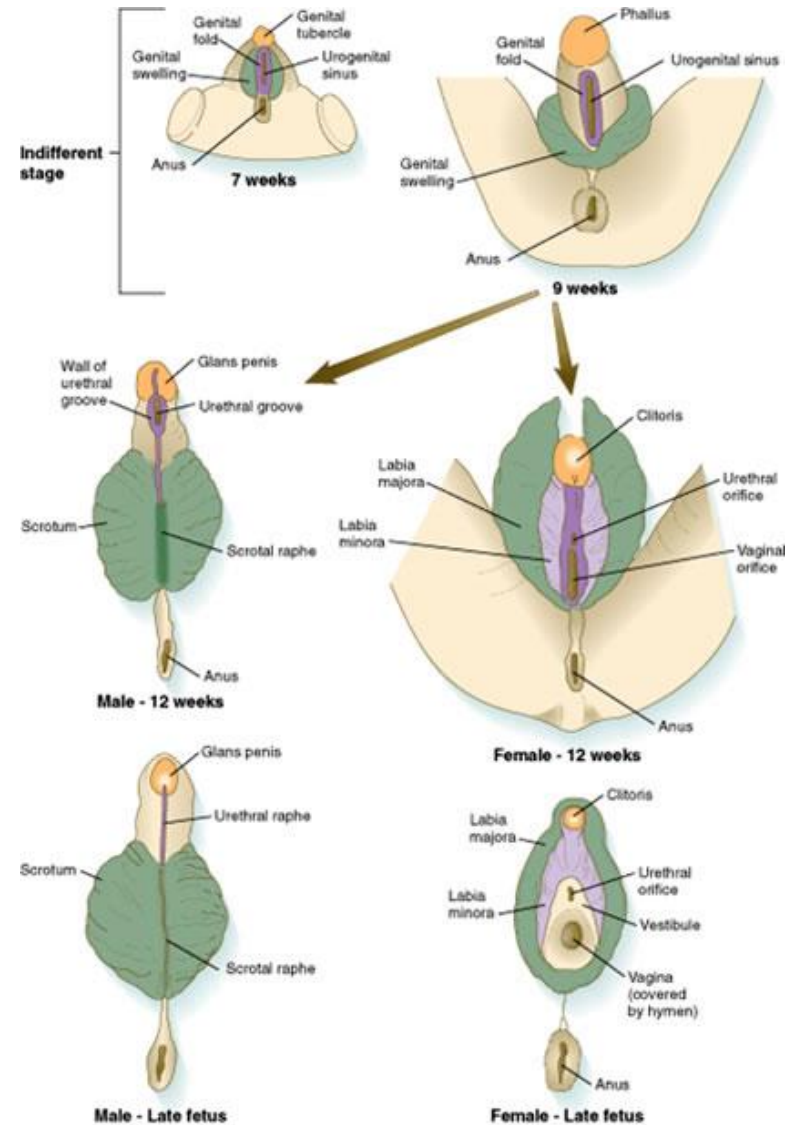
- ❑ The **genital tubercle** (mesenchymal elevation) develops at the cranial end of the cloacal membrane.
- ❑ Two **urethral folds**, develop on either side of the urogenital membrane.
- ❑ Laterally two **labioscrotal, (cloacal)** folds develop on either side of the urethral folds.
- ❑ Later on;
  - ❑ **The urethral folds in male** fuse with each other to **close the penile urethra**.
  - ❑ **The urethral folds in female** remain separate to form **labia minora**.



# Female Urethra

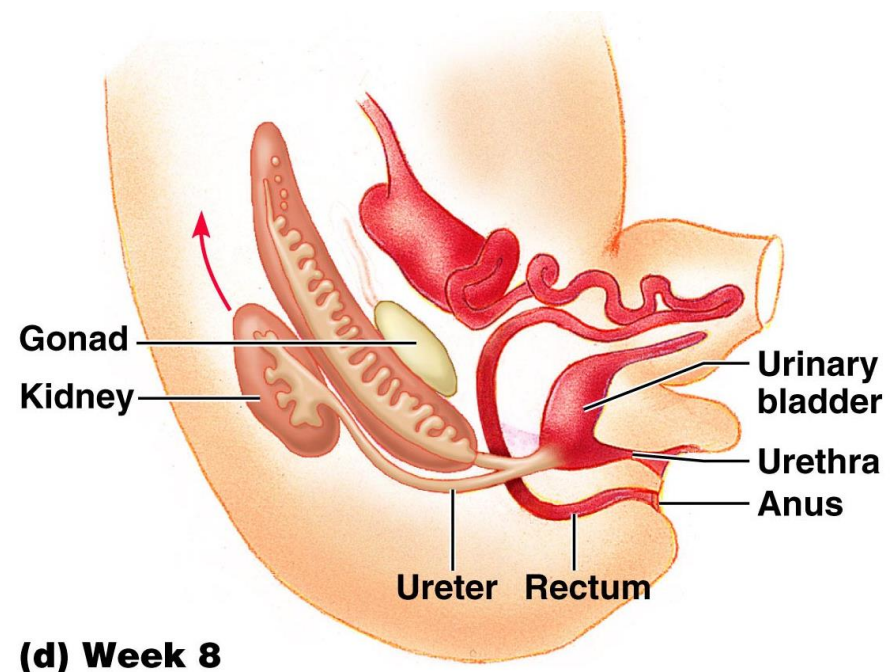
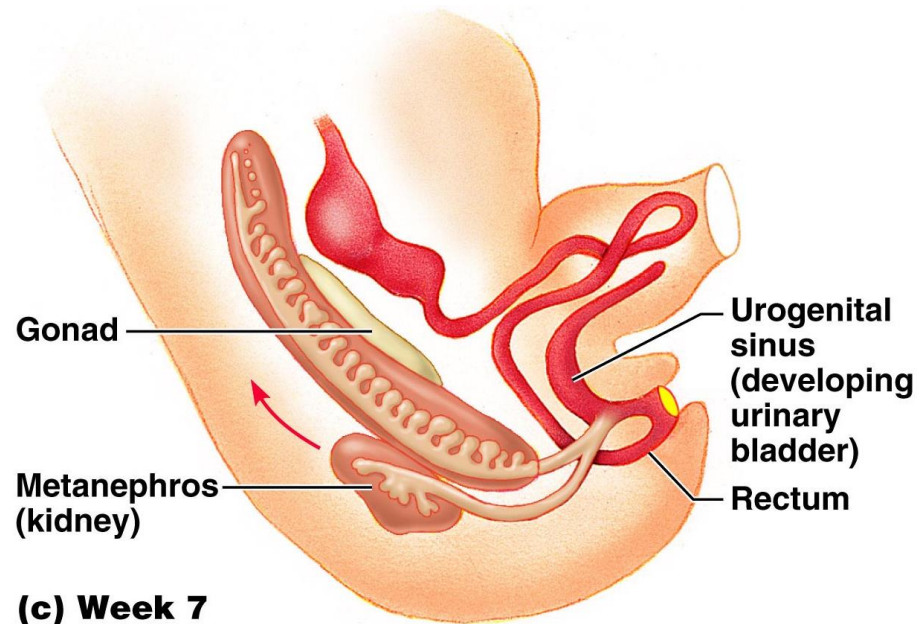
❑ The entire **female urethra** is derived from endoderm of the **pelvic** part of the **urogenital sinus**.

❑ 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 most **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:

- ❑ Urachal anomalies

- ❑ Urethral Anomalies

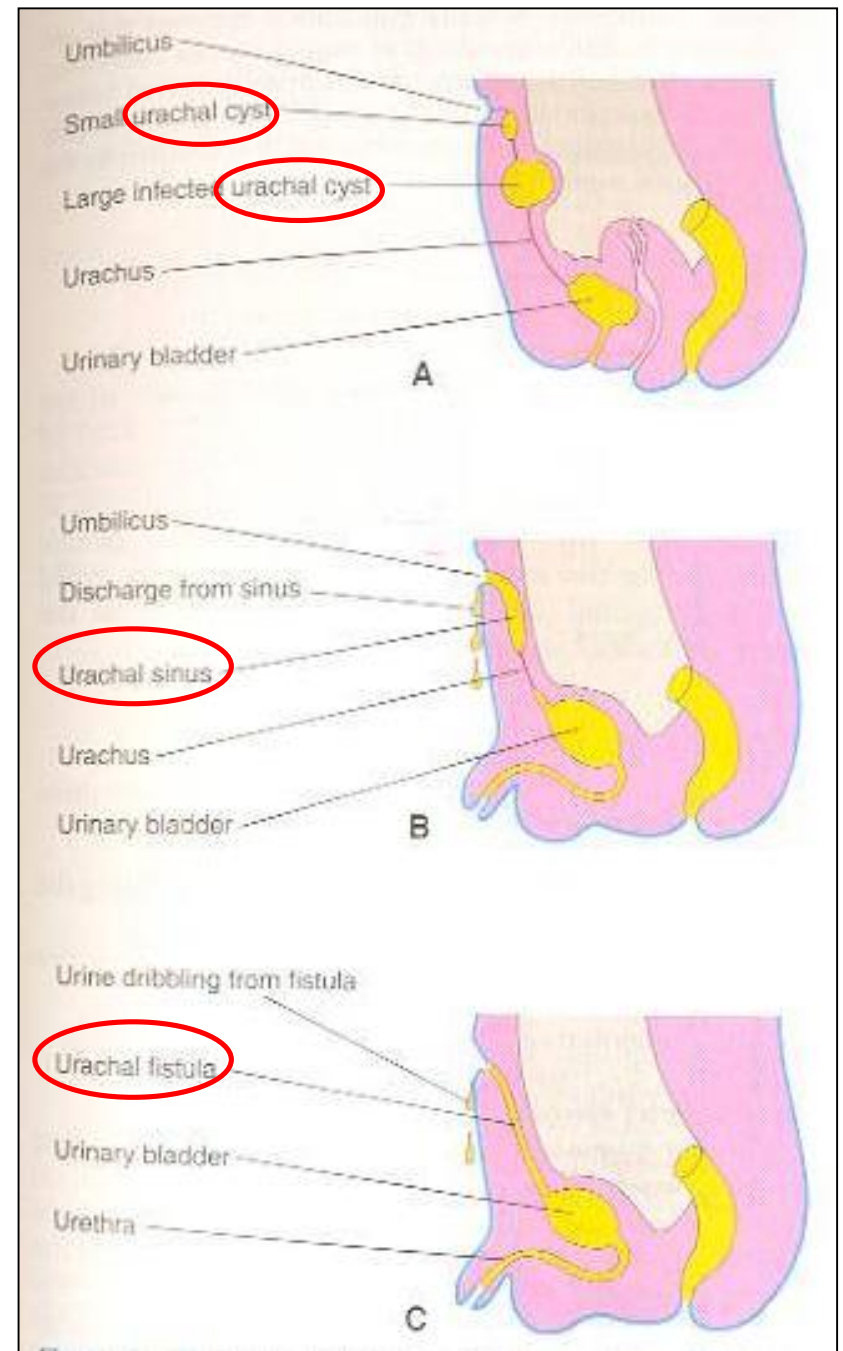
- ❑ Exstrophy of the bladder (Ectopiae vesicae); exposure of the posterior wall of the bladder due to a defect in the anterior abdominal wall and anterior wall of the bladder.

# Urachal anomalies

**A, Urachal cyst** persistence or remnant of epithelial lining of urachus

**B, Urachal sinus**, discharge serous fluid from the umbilicus.

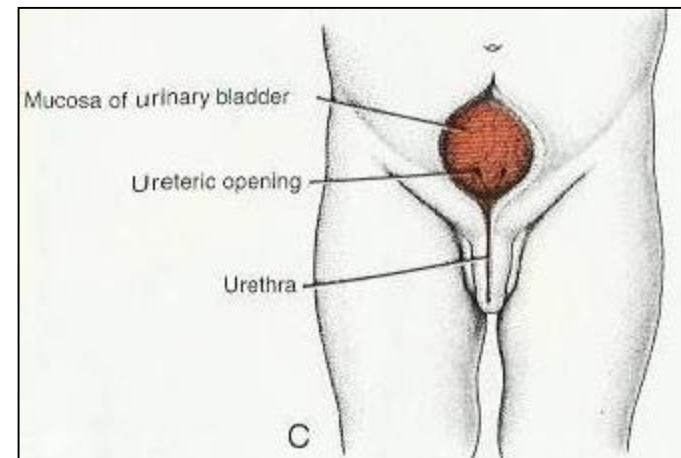
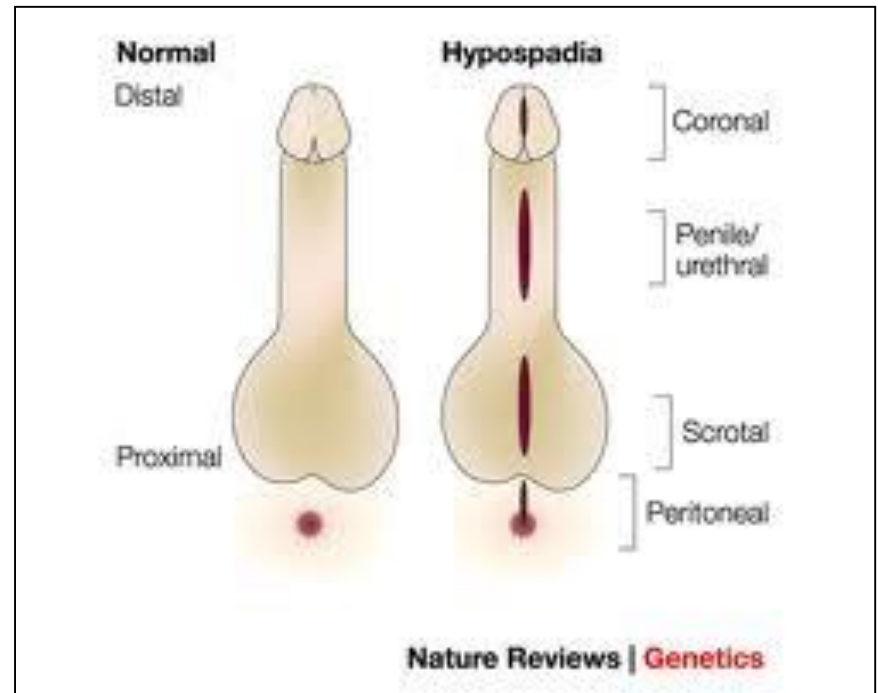
**C, Urachal fistula**, the entire urachus remains patent and allows urine to escape from the umbilicus.



# Urethral Anomalies

**1-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.

**2-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**.



*Thank you*