

DEVELOPMENT
OF
THE URINARY BLADDER
AND
URETHRA

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Objectives

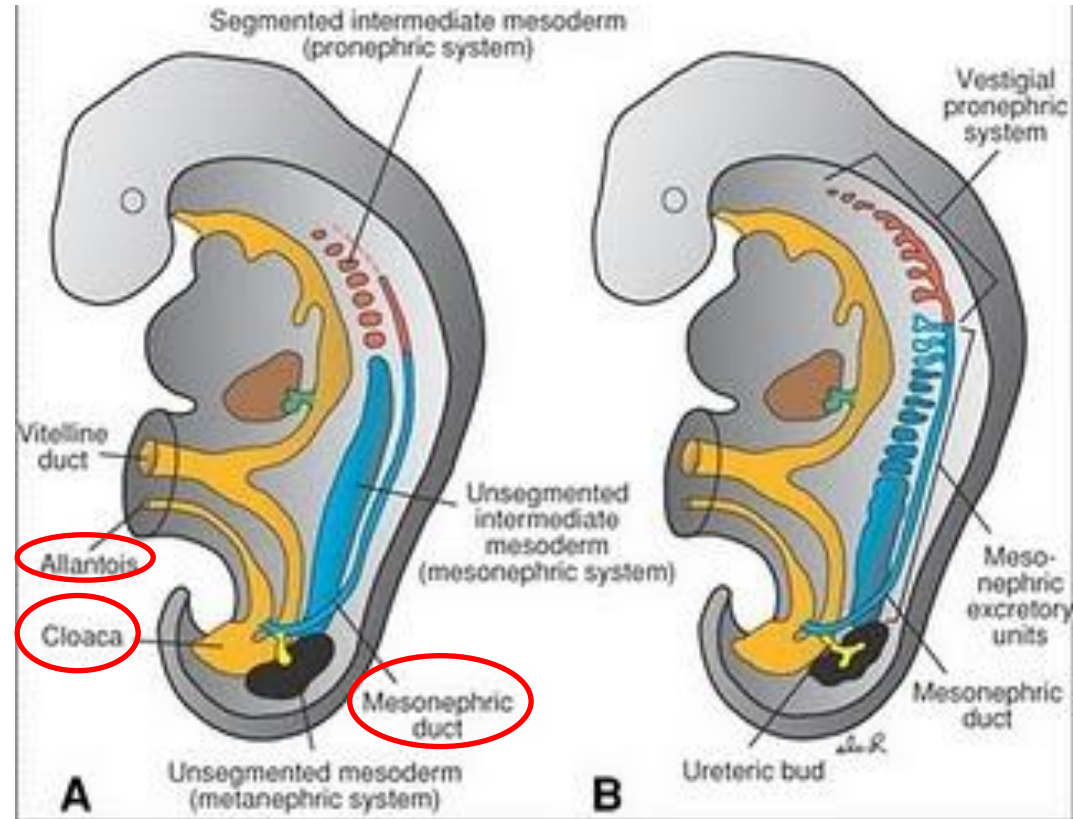
- ❖ At the end of the lecture the student is able to;
 - Describe the cloaca and the formation of the urogenital sinus.
 - Discuss the division of the urogenital sinus into various parts and name the adult organs that are derived from each part.
 - Describe how the caudal parts of the mesonephric ducts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

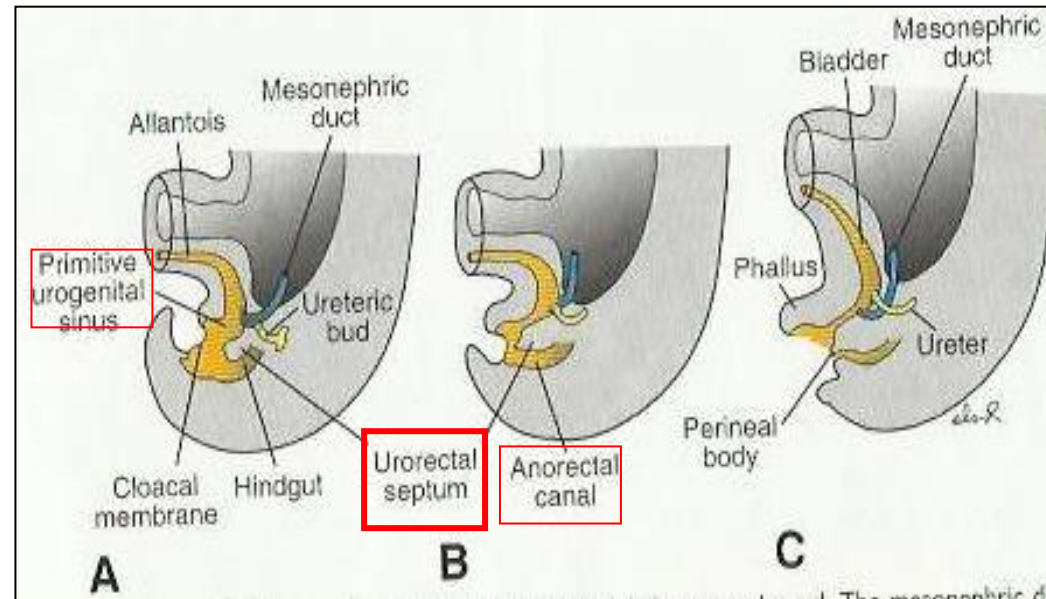
• that communicates with the **allantois** and the **mesonephric ducts**.

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

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

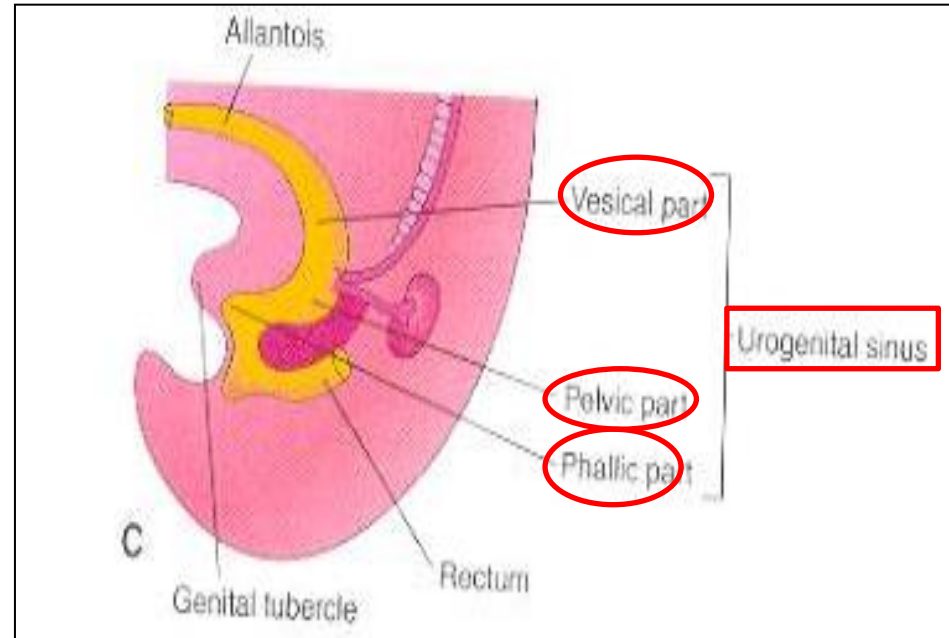
• that forms the **rectum** and upper part of **anal canal**.

• Its floor is the **anal membrane**.



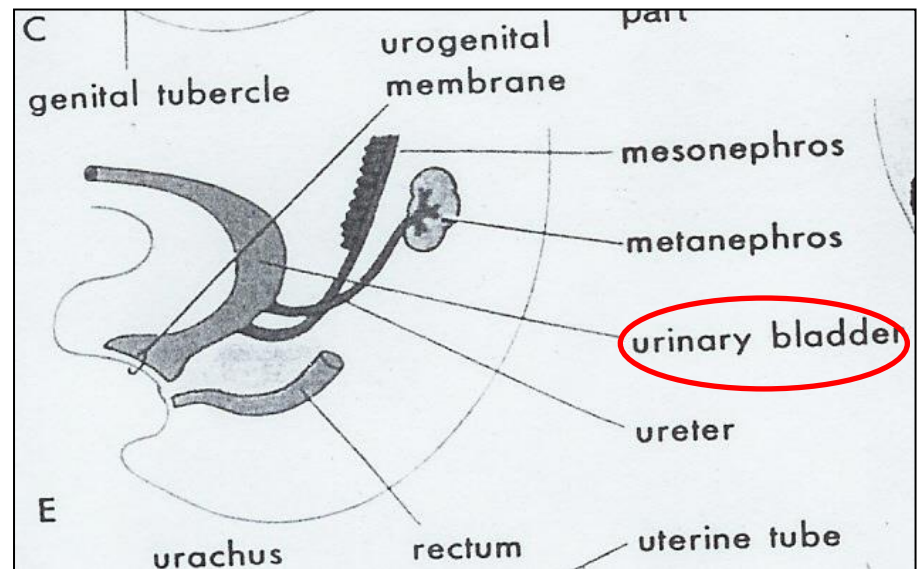
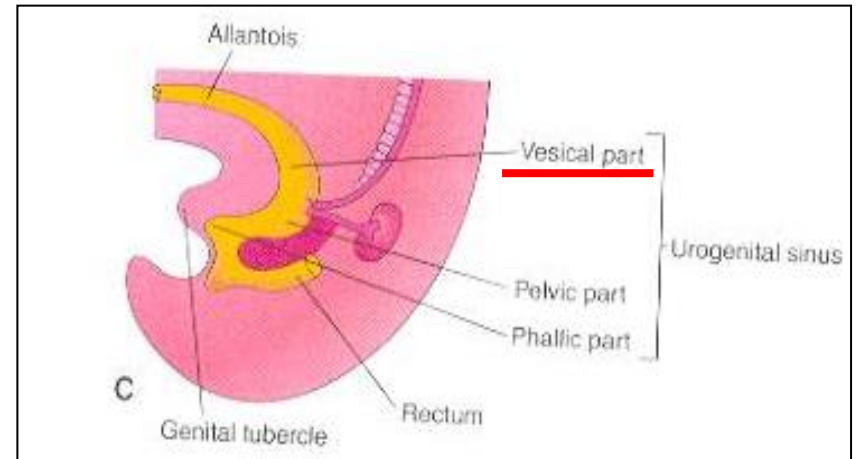
Primitive urogenital sinus

- 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.

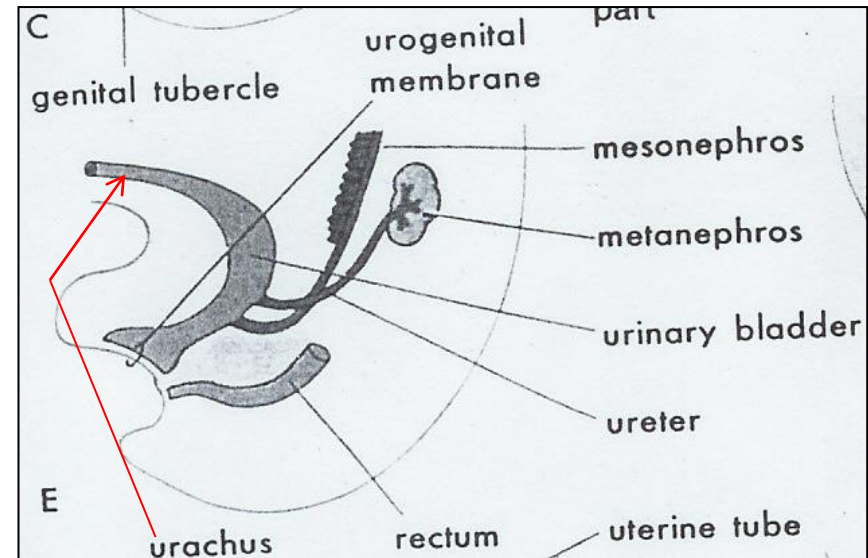
❑ The **allantois** is at first continues with the bladder ,

• then it becomes a thick fibrous cord **urachus** which extends from apex of the bladder to the umbilicus,

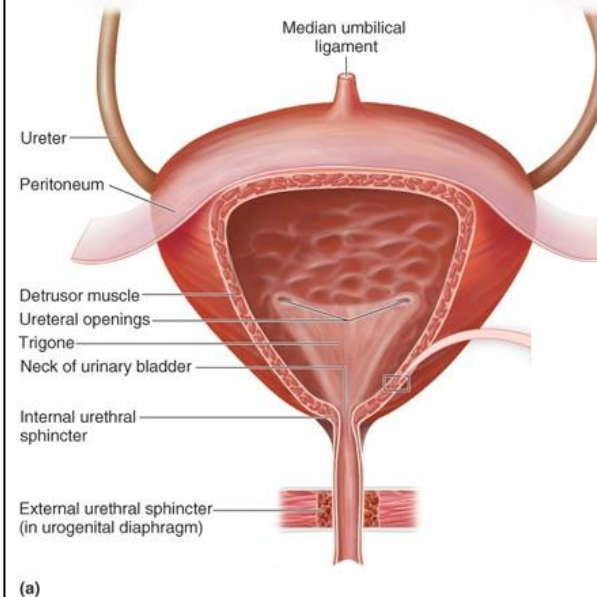
• in adult it is represented by the **median umbilical ligament**.

❑ After absorption of the mesonephric ducts to form the trigones,

❑ the **ureters** open separately in the bladder.



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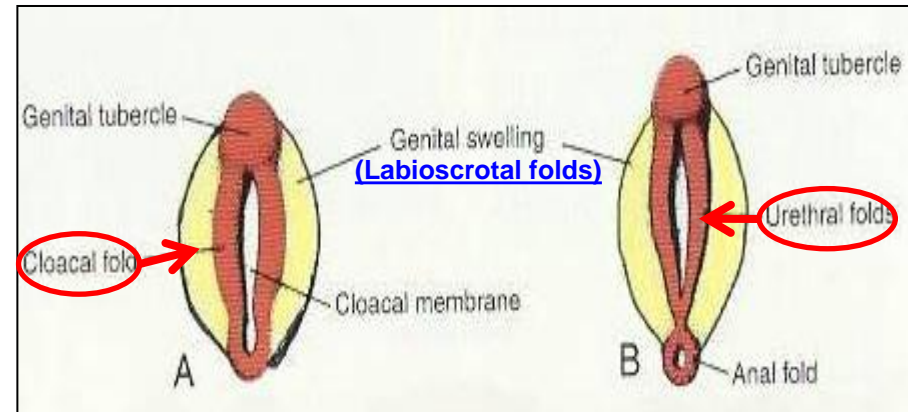


- ❑ In infants and children the bladder is an abdominal organ ,
- ❑ It starts to enter the greater pelvis at about 6 years and becomes a pelvic organ after puberty.

Urethra

Indifferent stage ;

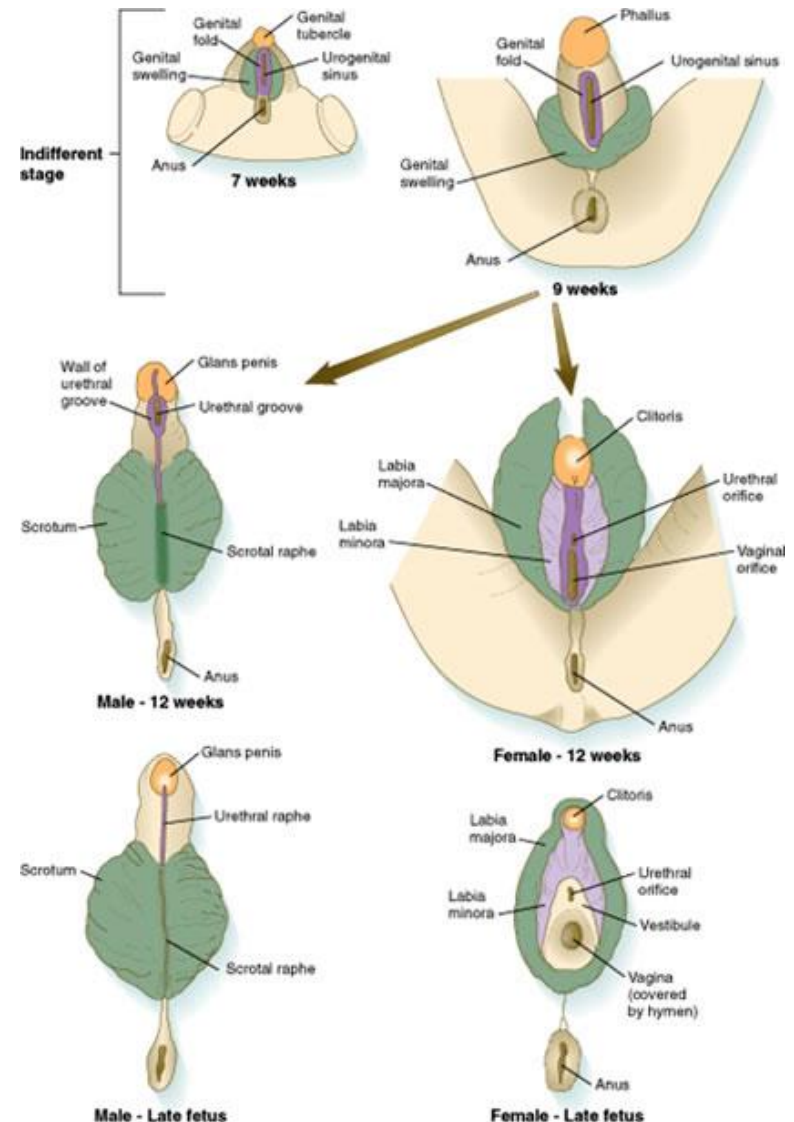
- ❑ The **genital tubercle** (mesenchymal elevation) develops at the cranial end of the cloacal membrane.
- ❑ Two **urethral folds**, develop on either side of the urogenital membrane.
- ❑ Laterally two **labioscrotal, (cloacal)** folds develop on either side of the urethral folds.
- ❑ Later on;
 - ❑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

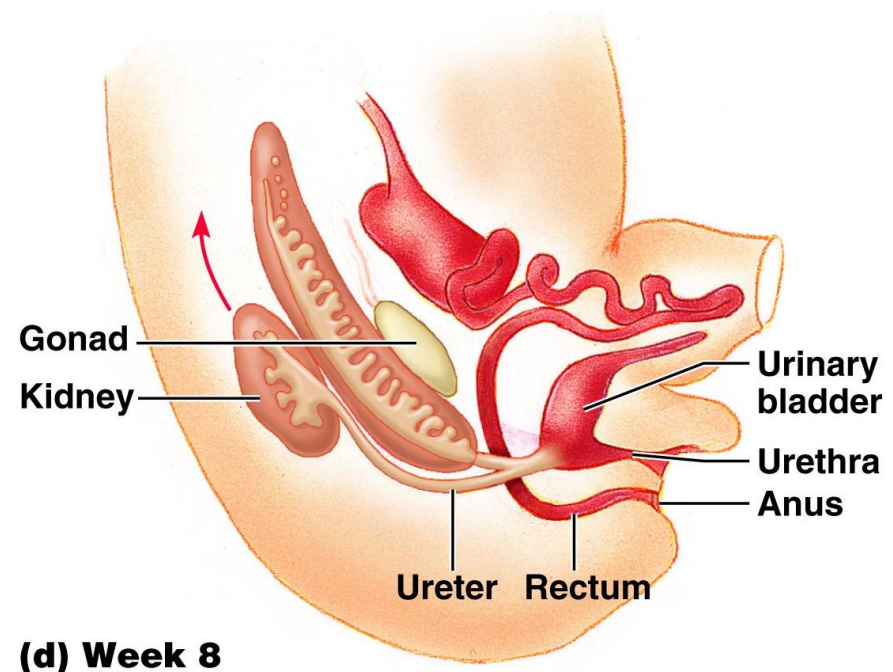
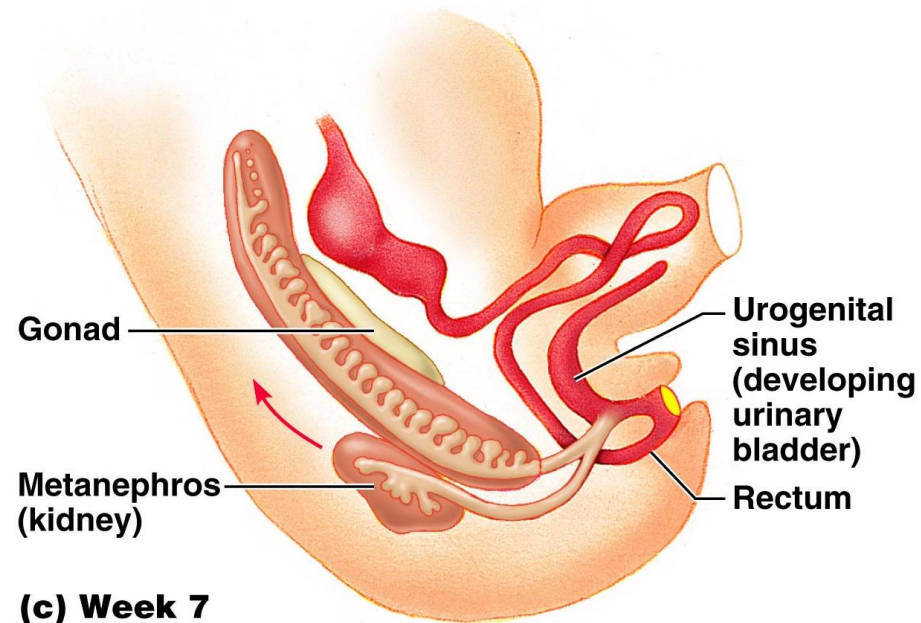
❑ The entire **female urethra** is derived from endoderm of the **pelvic** part of the **urogenital sinus**.

❑ 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

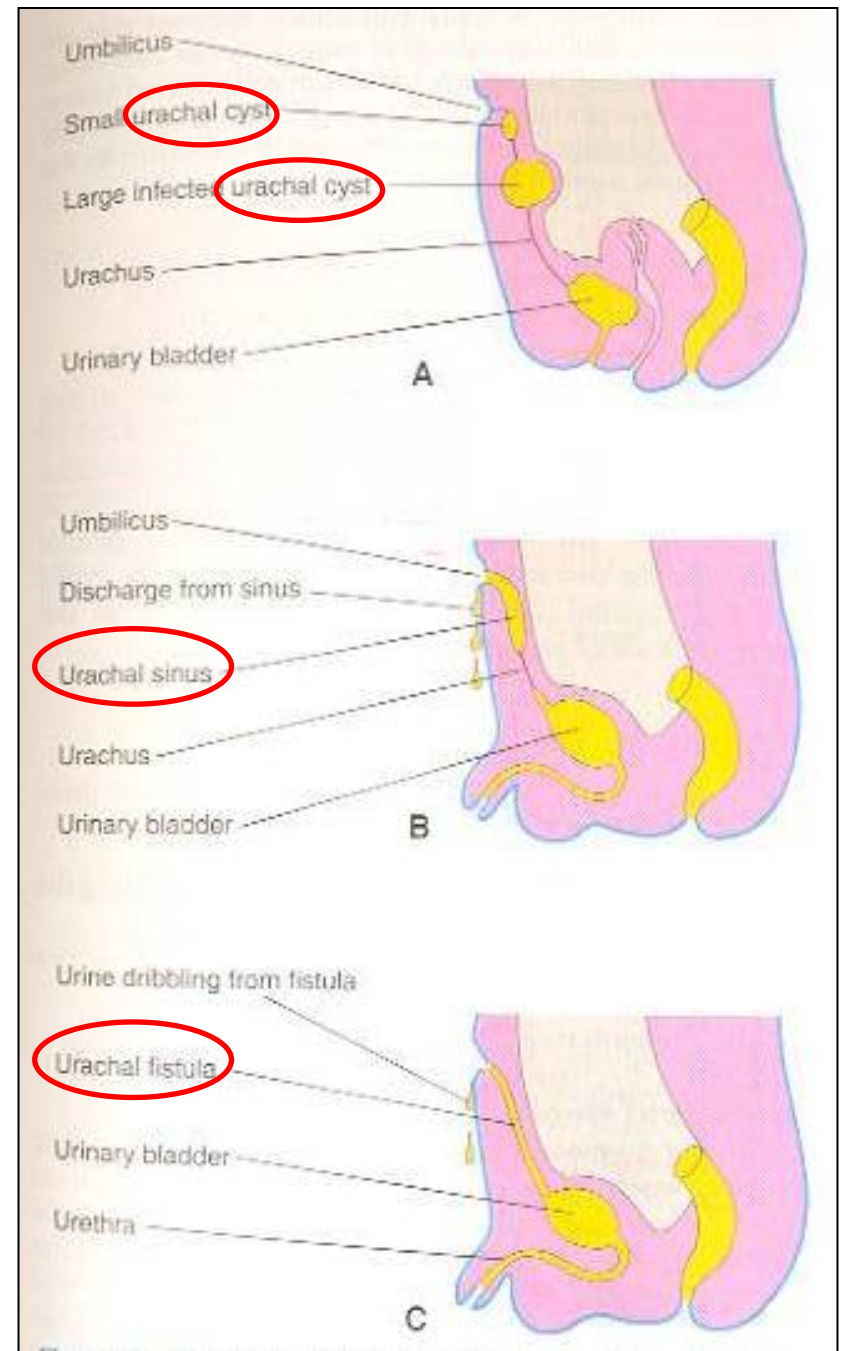
- ❑ Exstrophy of the bladder (Ectopiae vesicae); exposure of the posterior wall of the bladder due to a defect in the anterior abdominal wall and anterior wall of the bladder.

Urachal anomalies

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

B, Urachal sinus, discharge serous fluid from the umblicus.

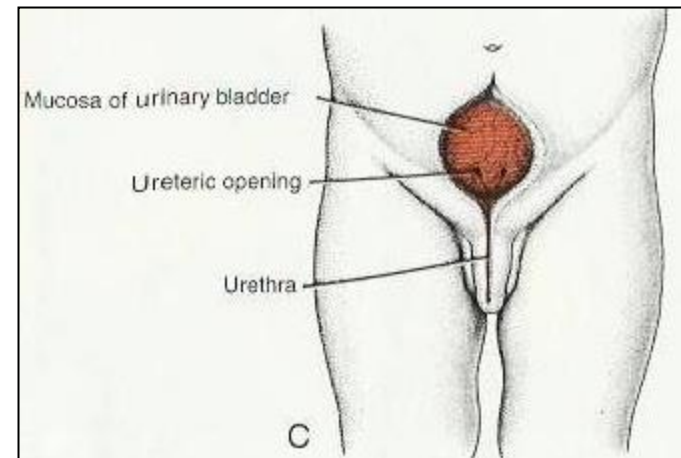
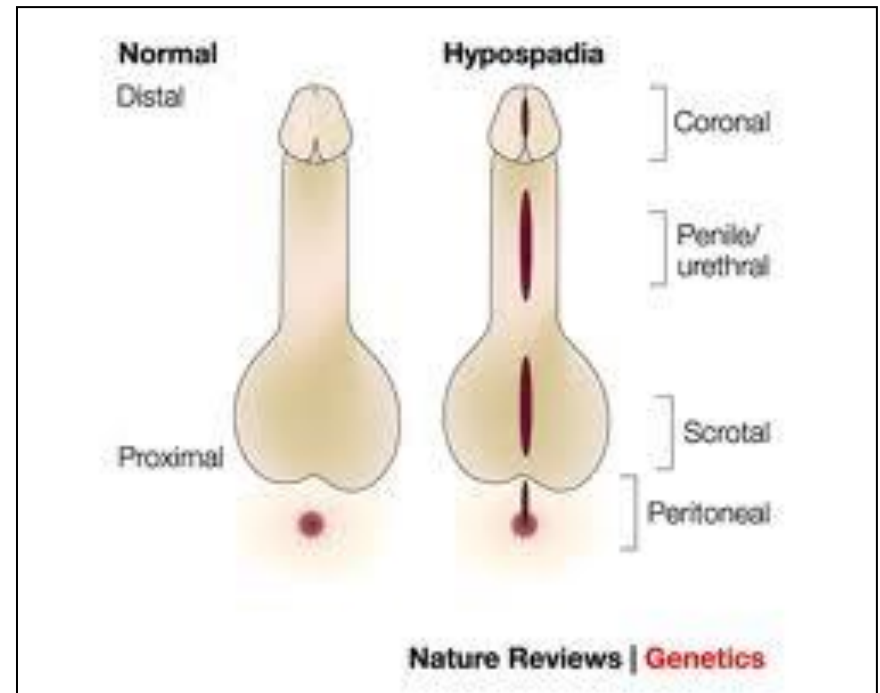
C, Urachal fistula, the entire urachus remains patent and allows urine to escape from the umblicus.



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