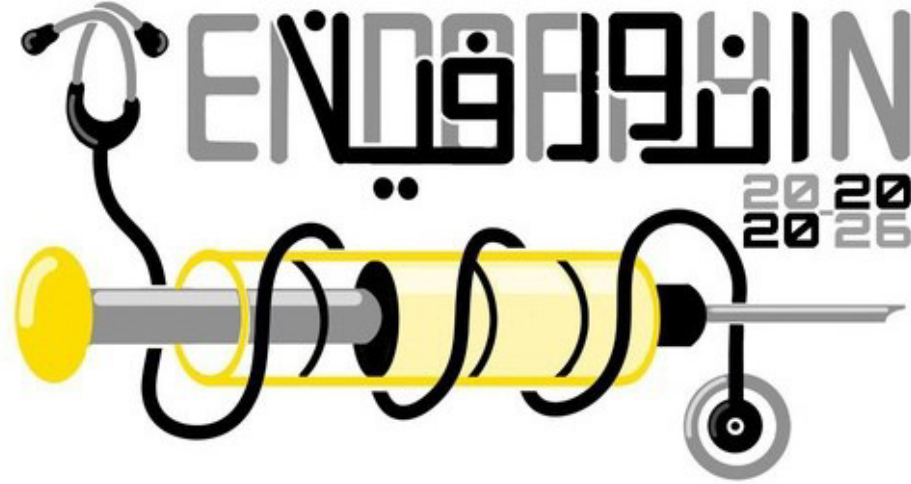


Anatomy



Sheet: 16

Lecture title:

Date:

Done by: Huda Shehadeh

Edited by: Huda Shehadeh

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Development of Hindgut

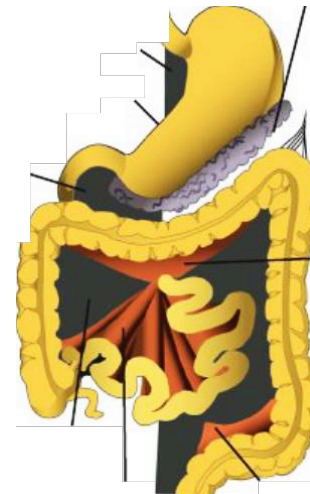
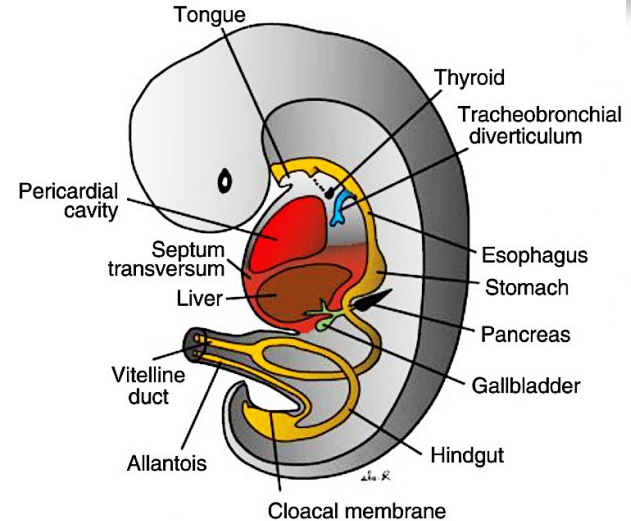
Dr. Refat AboGhazleh

• بشكل عام المحاضره مهمه

Derivatives of Hindgut

The derivatives of the hindgut are: *afg*

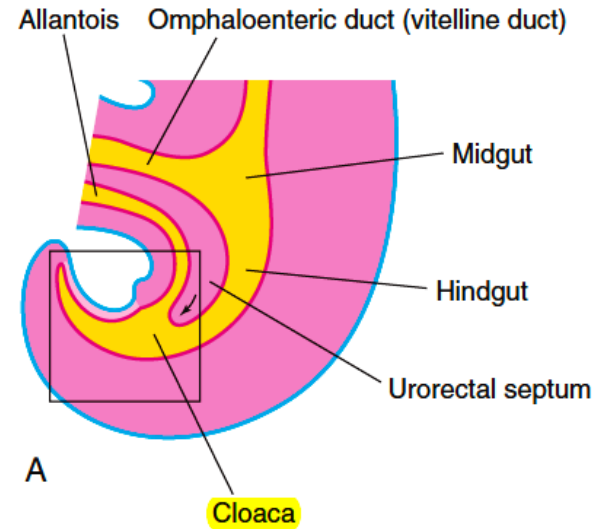
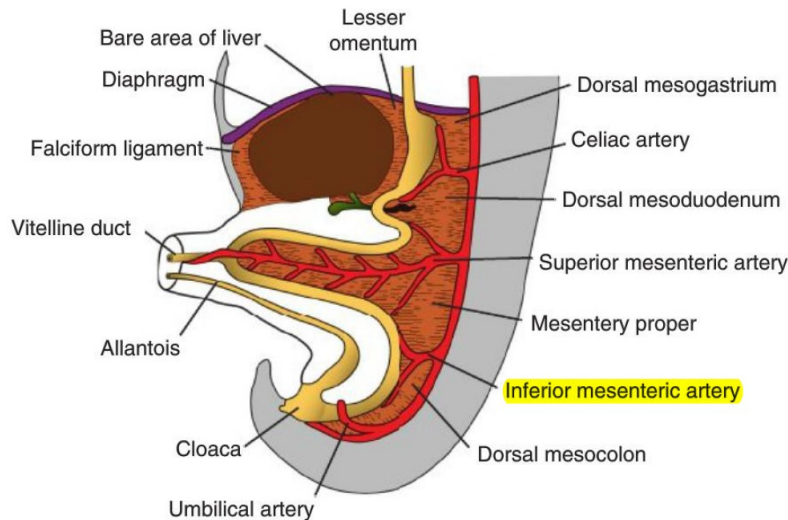
- Distal 1/3rd of the transverse colon
- Descending colon
- Sigmoid colon
- Rectum
- Superior part of the anal canal
- The **endoderm** of the hindgut also forms the internal lining of the urinary bladder and urethra.

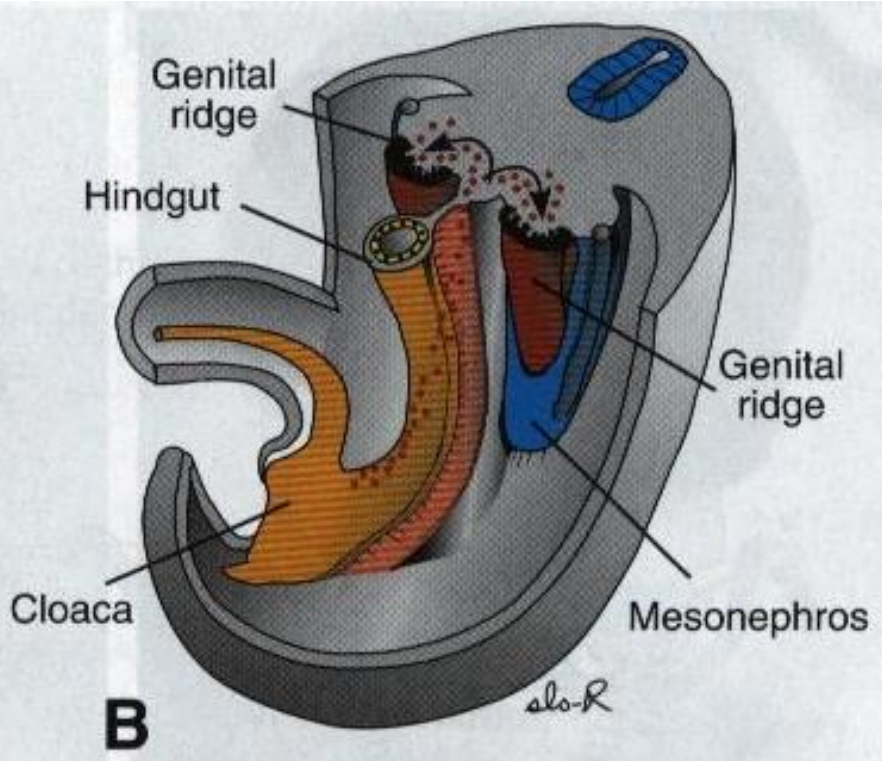
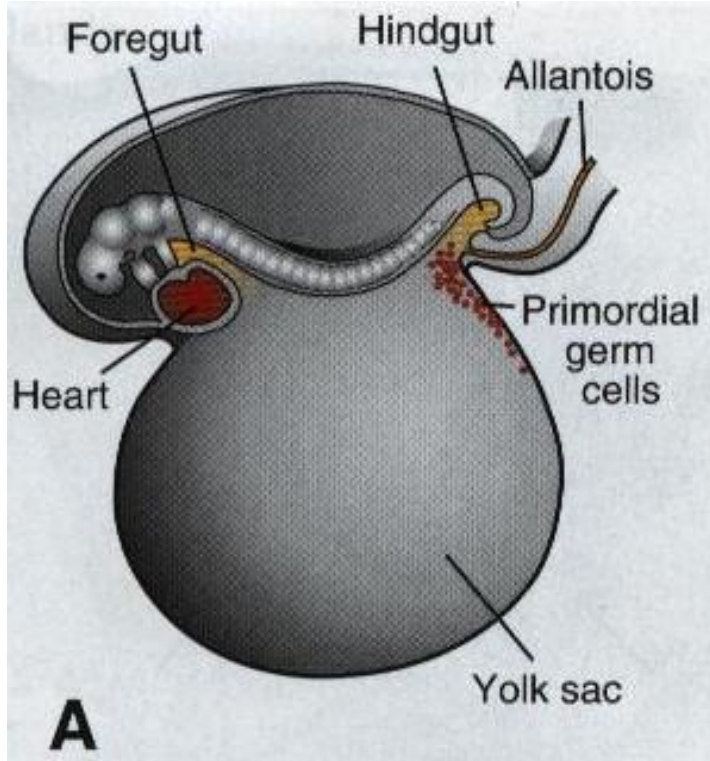


Development of Hindgut

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- The Developing hindgut is supplied by the **inferior mesenteric artery**.
- The junction between the segment of transverse colon derived from the **midgut** and that originated from the **hindgut** is indicated by the **change in blood supply**.
- The expanded terminal end of the hindgut is the **cloaca**, the primitive **anorectal canal**.

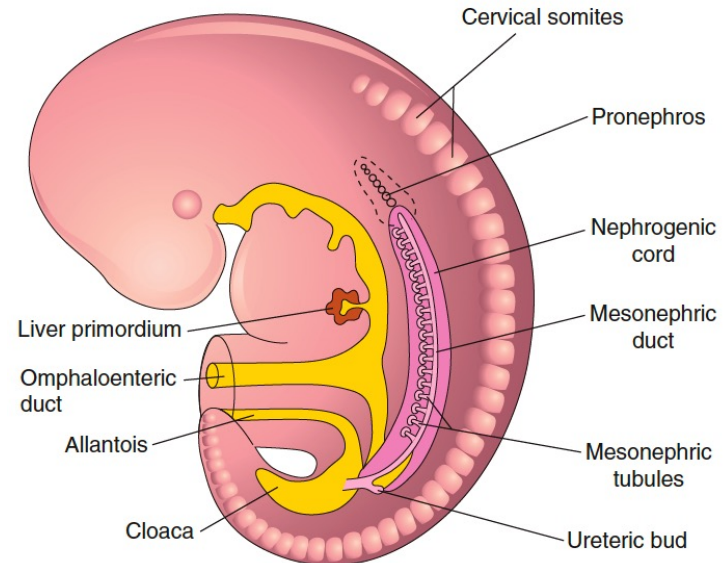
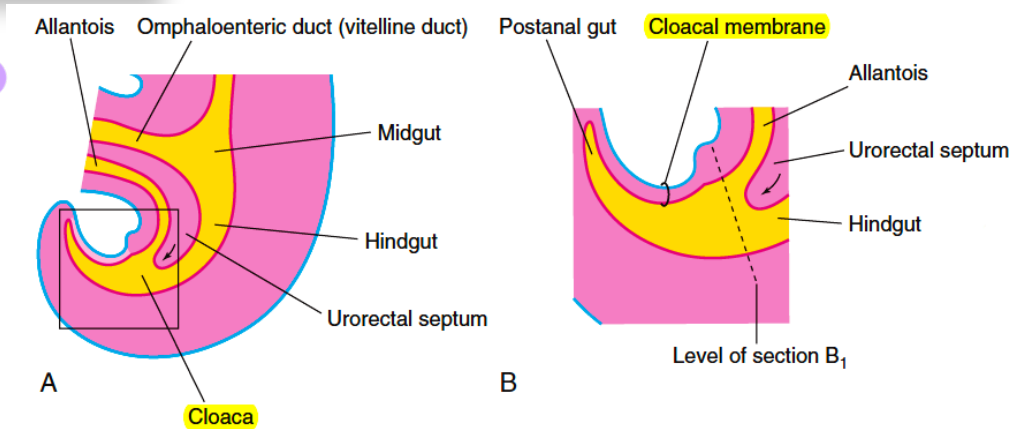




Cloaca

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- The **Cloaca** is an **endoderm-lined chamber** that is in contact with the surface **ectoderm** at the **cloacal membrane**.
- The **cloacal membrane** is composed of the **endoderm** of the cloaca and **ectoderm** of the **anal pit**.
- The **Cloaca** receives three openings:
 - **The Allantois ventrally.**
 - **2 Mesonephric ducts one on each side.**

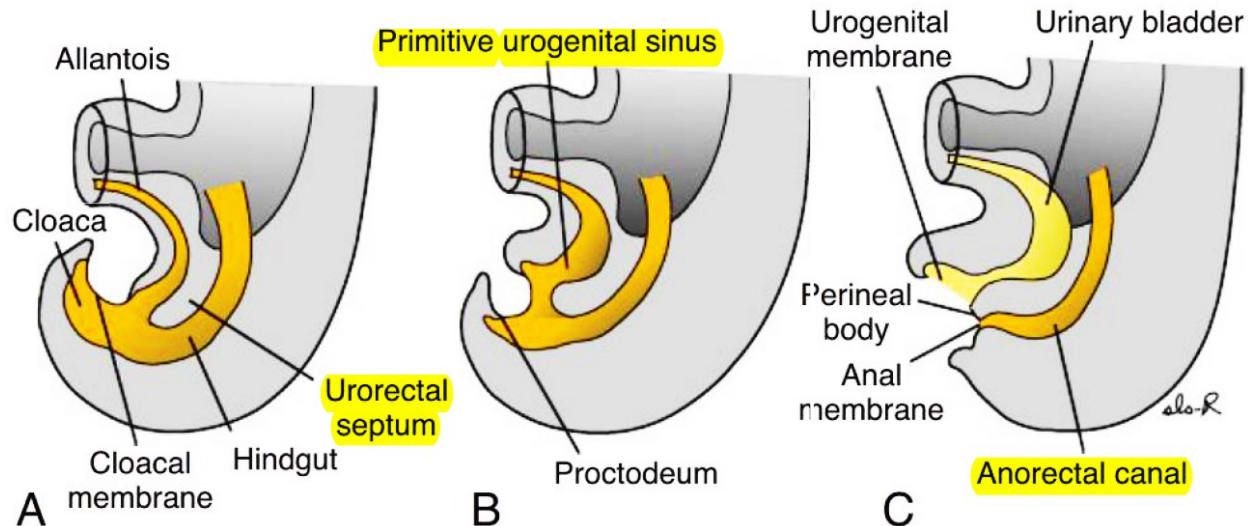


Partitioning of Cloaca

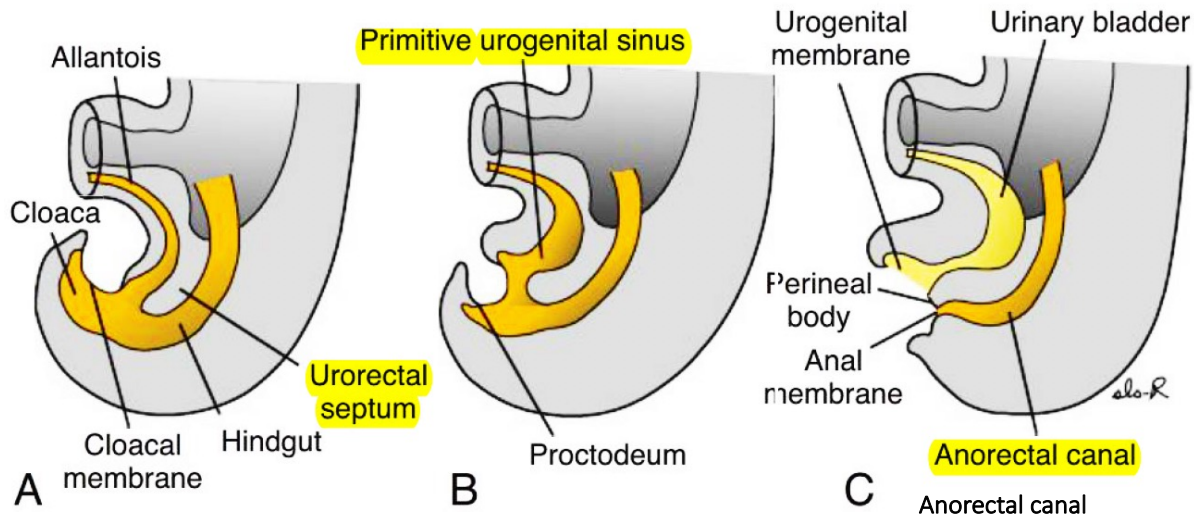
- Occurs during 4th to 7th weeks.
- The **cloaca** is divided into ventral and dorsal parts by mesenchyme—the **urorectal septum**—that develops in the angle between the **allantois** and **hindgut**:

1. **Ventral part:** Primitive urogenital sinus

2. **Dorsal part:** Anorectal canal

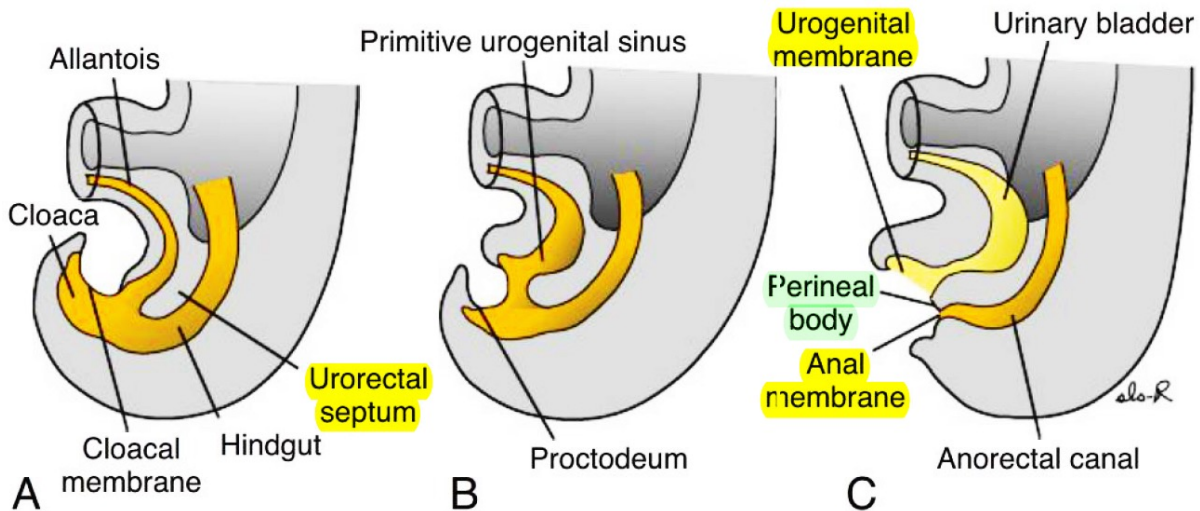


- After division of the cloaca, the **anorectal canal** becomes continuous with the hindgut to form the **Rectum** and **Anal canal**.



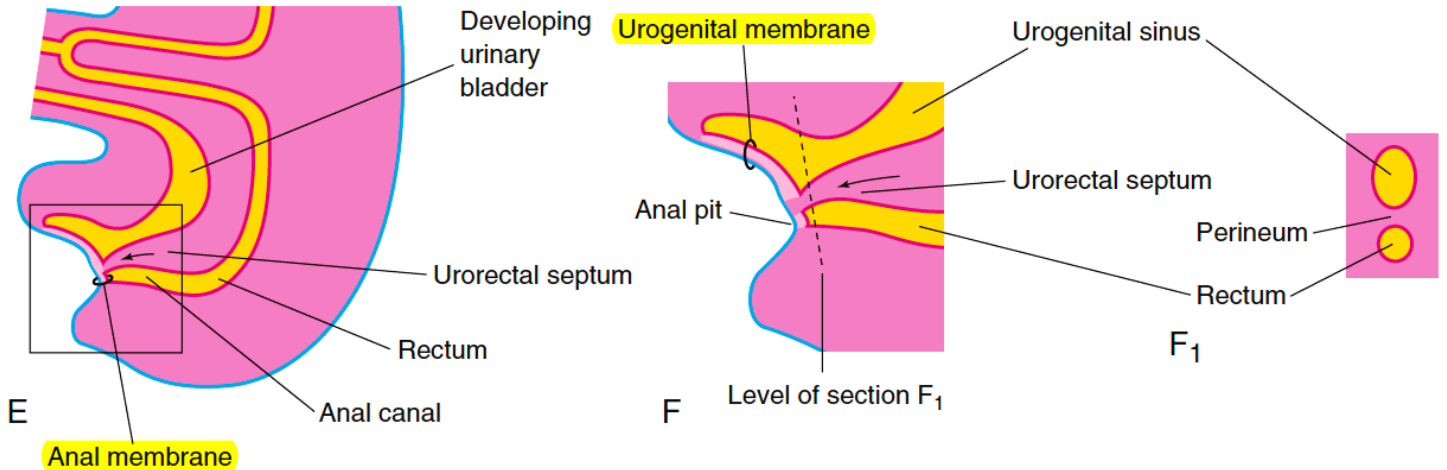
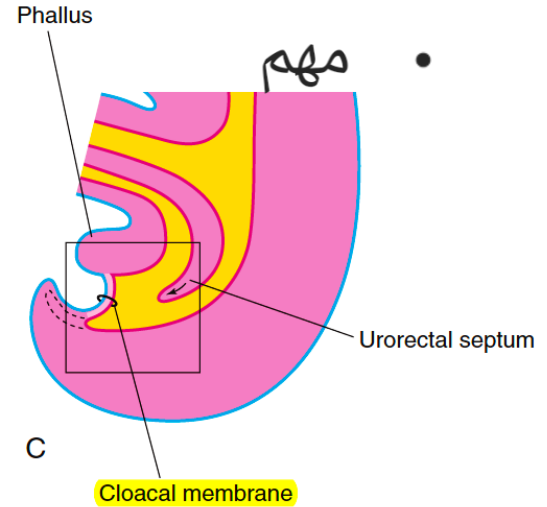
Partitioning of Cloaca

- By the 7th week, the **urorectal septum** has fused with the **cloacal membrane**.
- Dividing it into a **dorsal anal membrane** and a **larger ventral urogenital membrane**.
- The area of fusion of the urorectal septum with the cloacal membrane is represented in the adult by the **perineal body**.



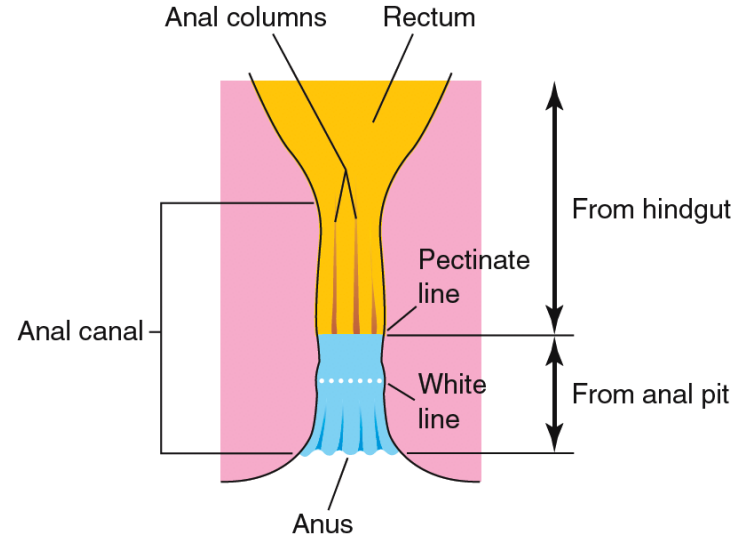
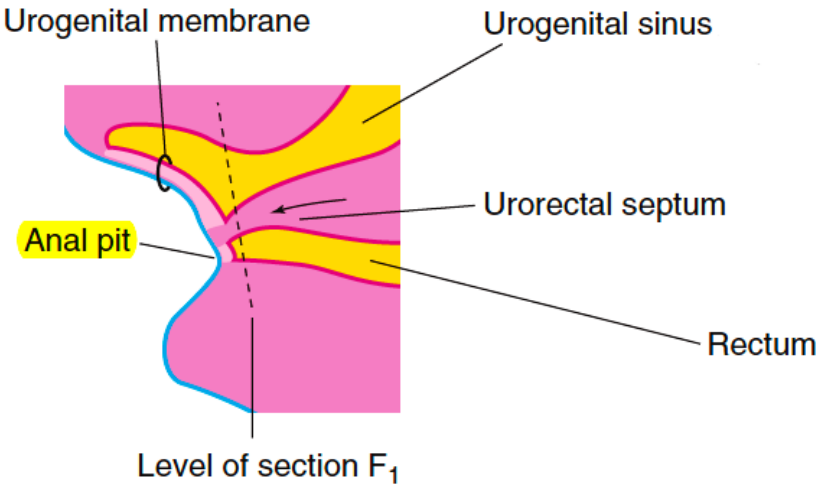
Cloacal membrane

- Urogenital membrane (anteriorly)
- Anal membrane (posteriorly)

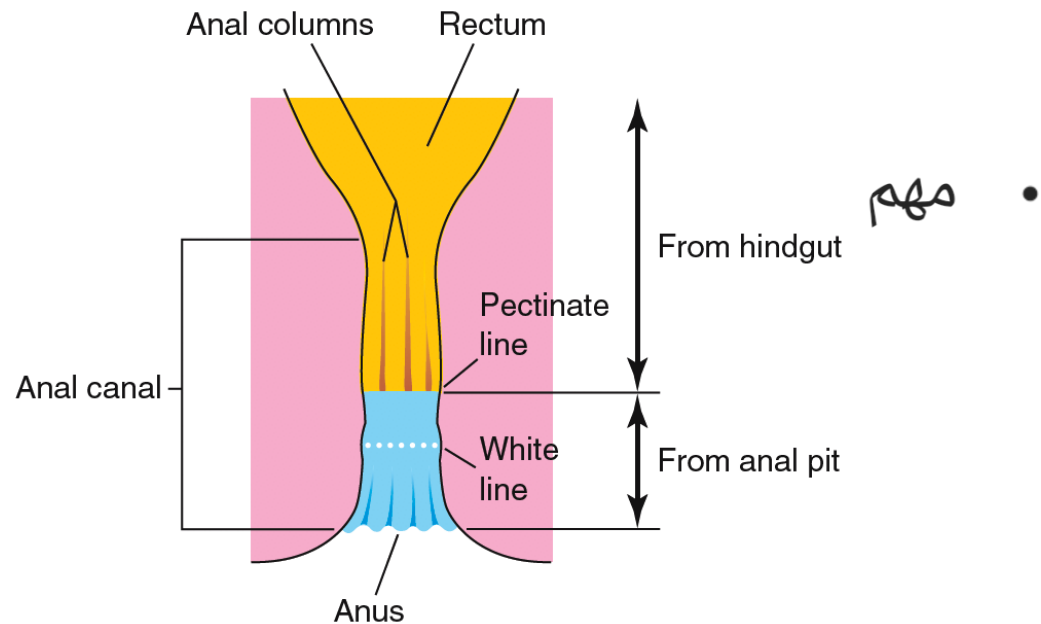


Rectum & Anal Canal

ago •



- The **Dorsal part** of cloaca (**anorectal canal**) forms the mucosa of **rectum and upper ½ of anal canal**.
- While their muscles are developed from the surrounding **mesoderm**.
- The **Lower ½ of anal canal** develops from **proctodeum (anal pit)**, which is an **ectodermal** depression below anal membrane.



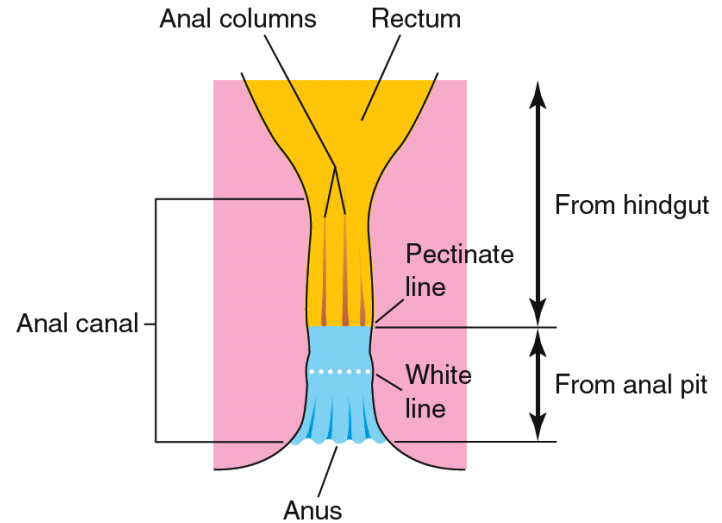
- The Anal membrane ruptures at the 9th week to allow continuity between the 2 parts of anal canal.
- The **Upper ½ of the anal mucosa is endodermal** while **lower ½ is ectodermal**.
- The Pectinate line indicates the junction of the epithelium derived from **ectoderm** of **anal pit** and **endoderm** of the **hindgut**.
- At pectinate line, the epithelium changes from columnar to nonkeratinized stratified squamous epithelium.

➤ The **cranial part** of the **anal canal** originates from **endoderm** and is therefore supplied by the **superior rectal artery**, a continuation of the **inferior mesenteric artery**, the artery of the **hindgut**.

- Its nerves are from the autonomic nervous system.

➤ The **caudal part** of the **anal canal** originates from **ectoderm**, it is supplied by the **inferior rectal arteries**, branches of the **internal pudendal arteries**.

- Innervated by the inferior rectal nerve and is **sensitive to pain, temperature, touch, and pressure**.



Congenital Anomalies

1. Imperforate Anus:

- Occurs when anal membrane fails to breakdown and ruptured.



Abnormal



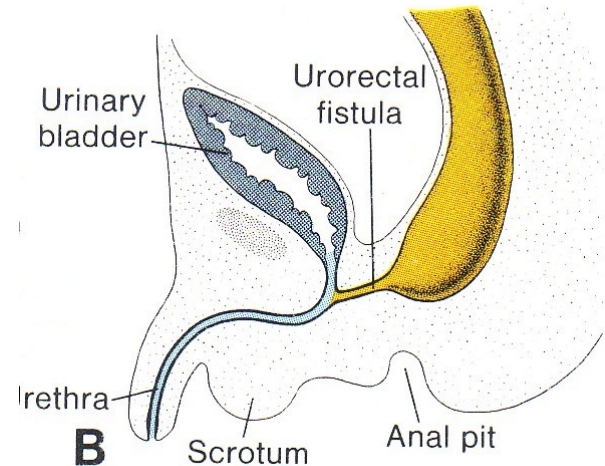
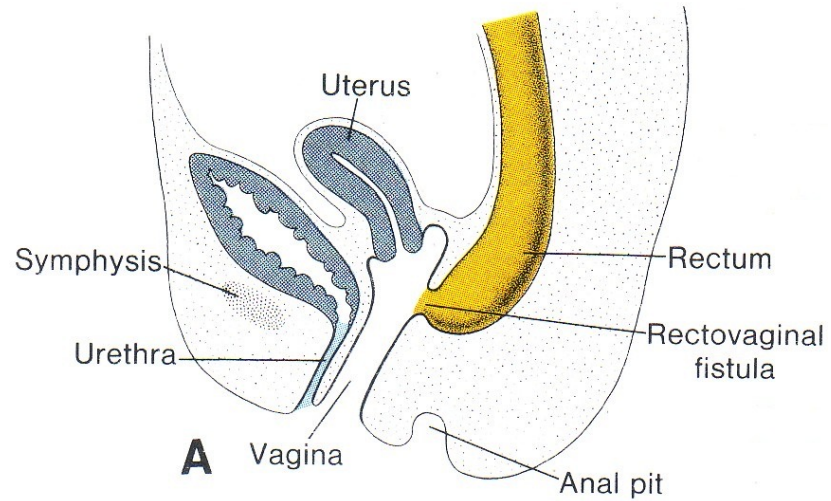
Normal



2. Rectovaginal fistula

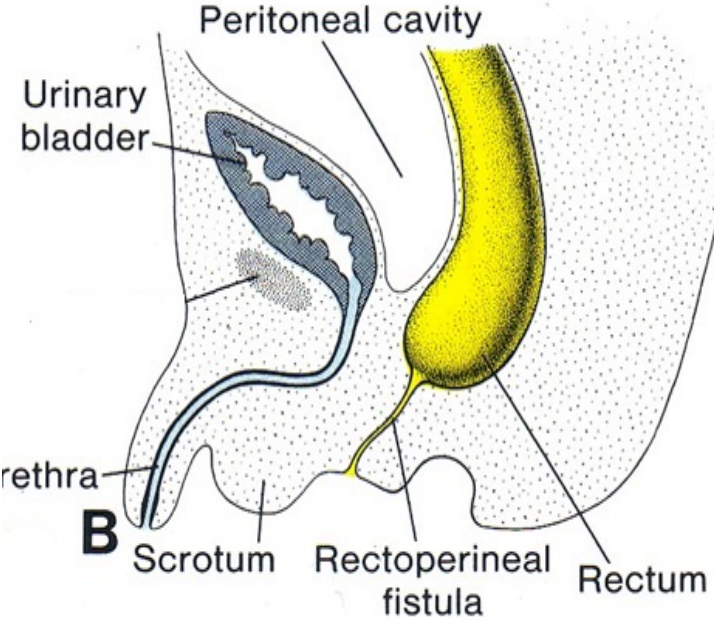
May be caused by abnormalities in formation of the cloaca and/or the urorectal septum.

For example, if the cloaca is too small or if the urorectal septum does not extend far enough caudally, then opening of the hindgut shifts anteriorly leading to an opening of the hindgut into the urethra or vagina.



3. Urorectal fistula

4. Rectoperineal fistula



Thank You



YouTube

References

- Before We are Born, Essentials of Embryology and Birth Defects, Keith L. Moore© 2016, Elsevier. Ninth Edition.
- Langman's Medical Embryology, T.W. Sadler© 2019, Walters Kluwer. Fourteenth Edition.
- Larsen's Human Embryology, Gary C. Schoenwolf © 2015, Elsevier. Fifth Edition.