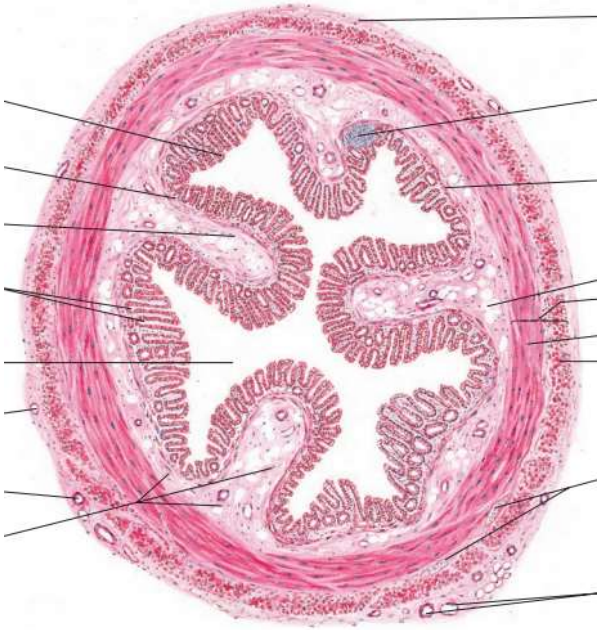

بسم الله الرحمن الرحيم

Gastrointestinal Tract (GIT) Module

2nd Year MBBS(LGIS)

Histology of Large Intestine



Presenter: Dr. Maria Tasleem
(Assistant Professor)

Date: 15-03-25

Prof. Umar's Model of Teaching Strategy

Self Directed Learning Assessment Program

Objectives :To cultivate critical thinking, analytical reasoning, and problem-solving competencies.

To instill a culture of self-directed learning, fostering lifelong learning habits and autonomy.

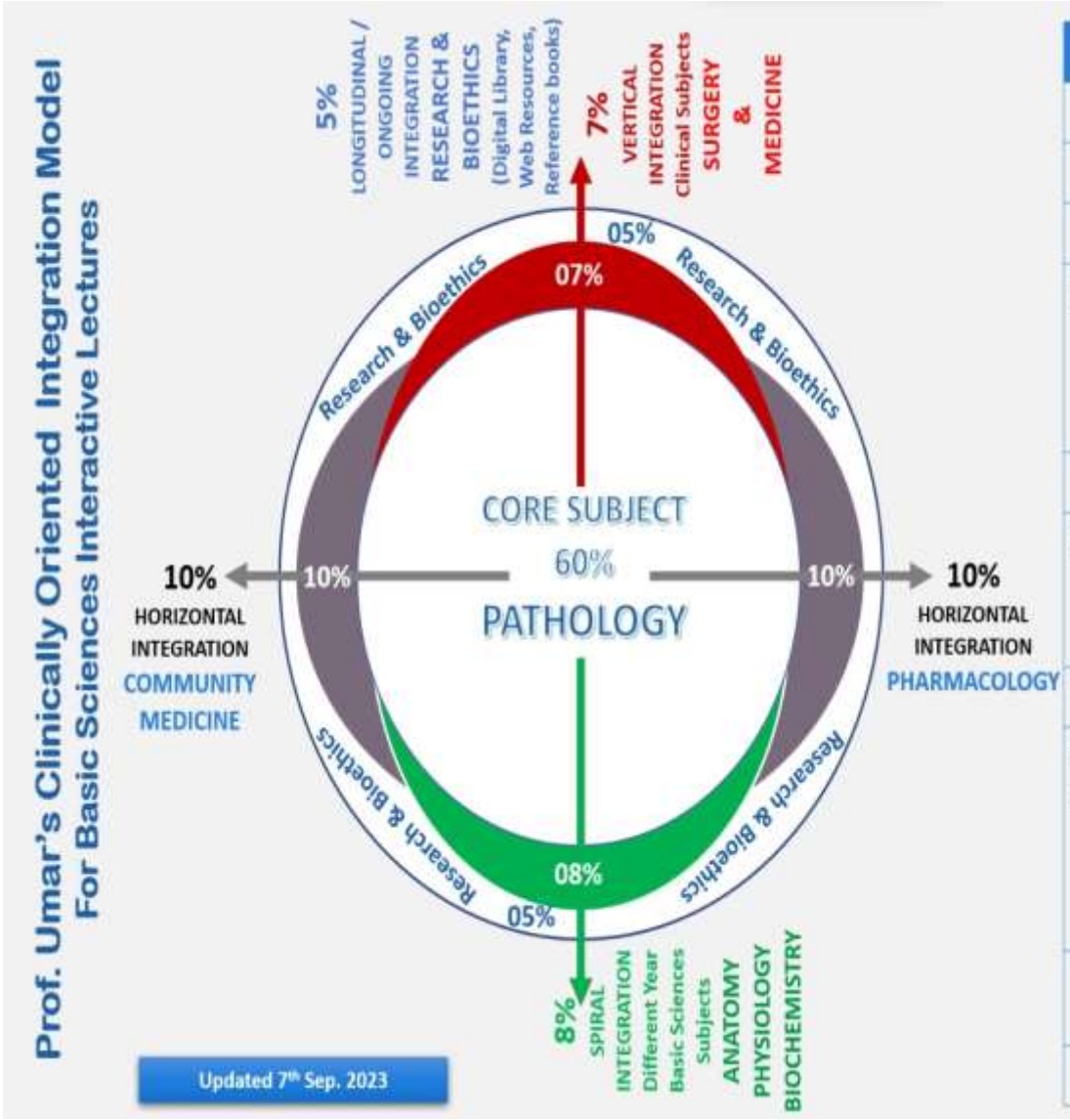
How to Assess?

➢Ten randomly selected students will be evaluated within the first 10 minutes of the lecture through 10 multiple-choice questions (MCQs) based on the PowerPoint presentation shared on Students Official WhatsApp group, one day before the teaching session.

➢The number of MCQs from the components of the lecture will follow the guidelines outlined in the Prof. Umar model of Integrated Lecture.

Component of LGIS	Core Knowledge	Horizontal Integration	Vertical Integration	Spiral Integration
No. of MCQs	6-7	1-2	1	1

Professor Umar Model of Integrated Lecture



Model 3rd Year Pathology LGIS (≈30 slides)	
Core Subject – 60% (≈ 18-20 slides)	
Pathology (≈ 18-20 slides)	
Horizontal Integration – 20% (≈ 5-6 slides)	
Same Year Subjects	• Pharmacology (10%) (≈ 2-3 slides) • Community Medicine (10%) (≈ 2-3 slides)
Vertical Integration – 07% (≈ 2-3 slides)	
Clinical Subjects	• Medicine (3-5%) (≈ 1-2 slides) • Surgery (3-5%) (≈ 1-2 slides)
Spiral Integration – 08% (≈ 2-3 slides)	
Different Year Basic Sciences Subjects	• Anatomy (1-3%) (≈ 1-2 slides) • Physiology (1-3%) (≈ 1-2 slides) • Biochemistry (1-3%) (≈ 1-2 slides)
Longitudinal / Ongoing Integration – 05% (≈ 1-2 slides)	
Research & Bioethics (≈ 1-2 slides)	

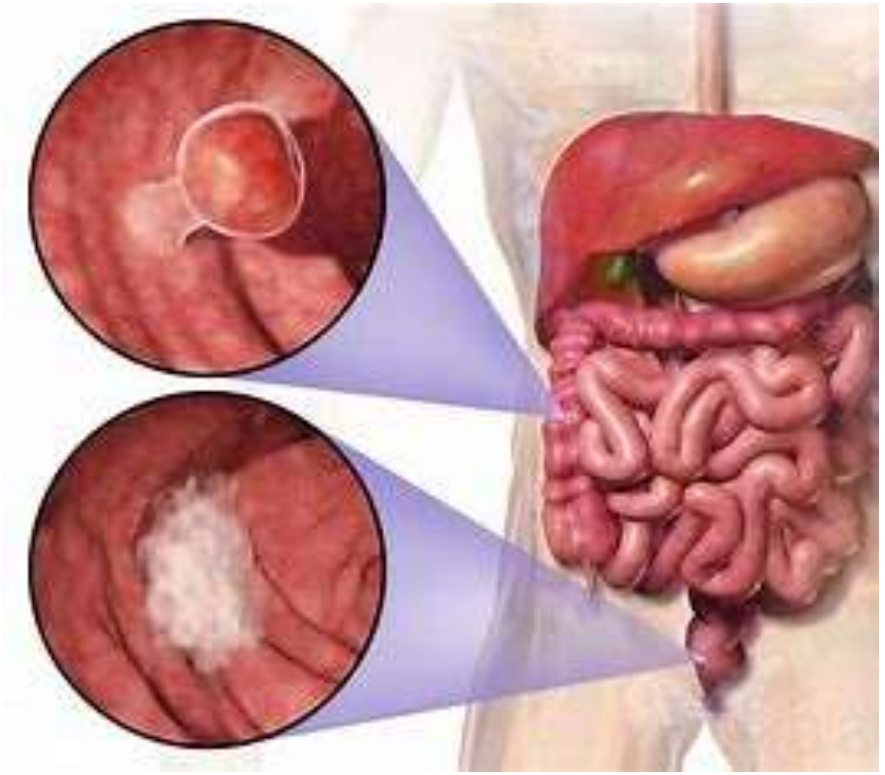
Learning Objectives

At the end of this session students should be able to

- Describe histological features of large intestine.
- Discuss cells lining the epithelium
- Explain concept of teniae coli
- Differentiate histological structure of the large intestine from the small intestine.
- Describe histological features of appendix,cecum, rectum and anal canal
- Discuss clinical conditions
- Understand curative and preventive heath care measures.

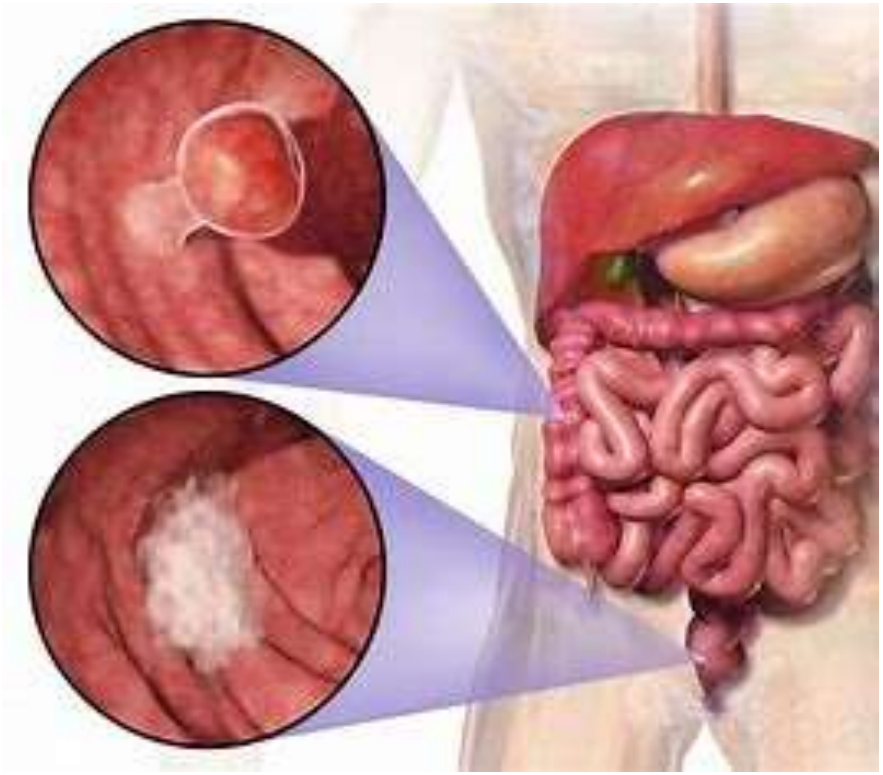
Interactive Session

A 62-year-old male presents to his primary care physician with complaints of **changes in bowel habits, including alternating diarrhea** and **constipation, abdominal pain**, and **blood in his stool.**



Interactive Session

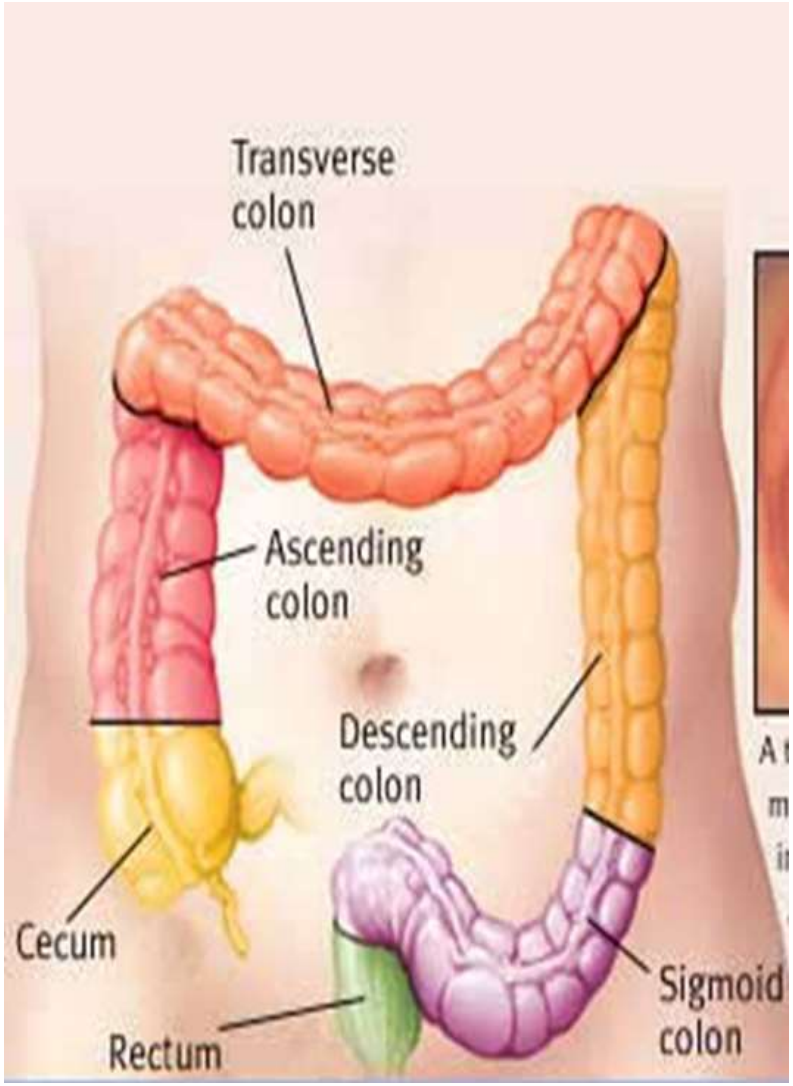
Upon further examination, the physician detects a palpable mass in the patient's abdomen and orders a **colonoscopy**, which **reveals a polyp** in the descending colon. Biopsy confirms polyp as an **adenomatous polyp**. What is the significance of this finding?



Core Knowledge

Large Intestine

- Has caecum, appendix, colon, rectum and anal canal.
- Absorption of water
- Formation of fecal mass
- Production of mucus



Core Knowledge

Histological Layers

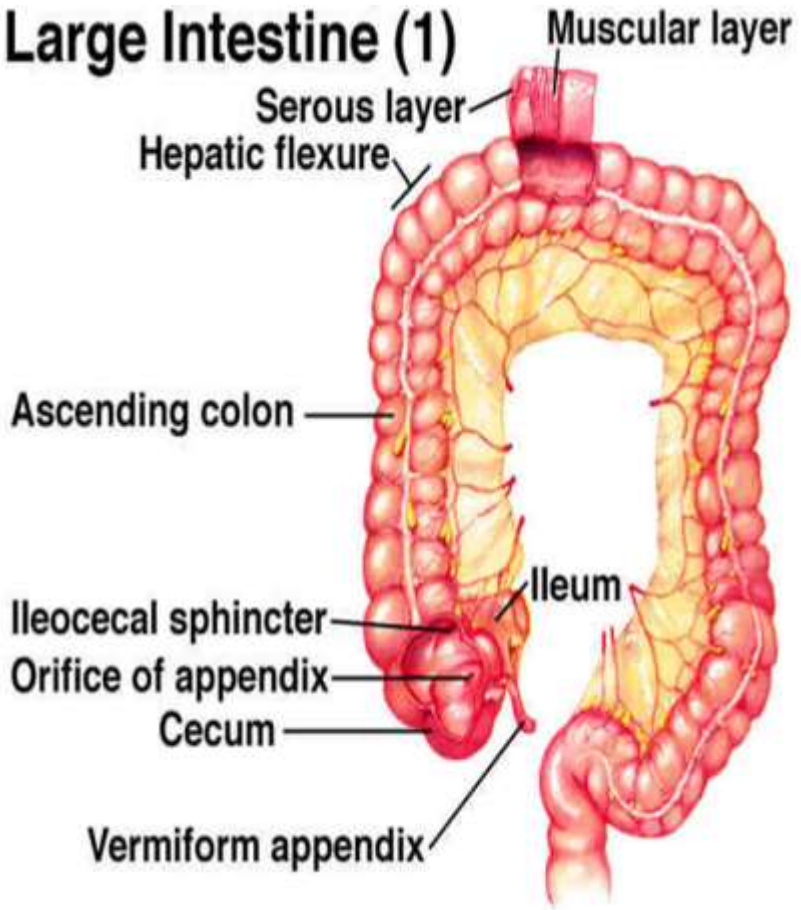
- Mucosa
- Sub mucosa
- Muscularis externa
- Serosa/adventitia

But

- No villi
- No plicae circulares

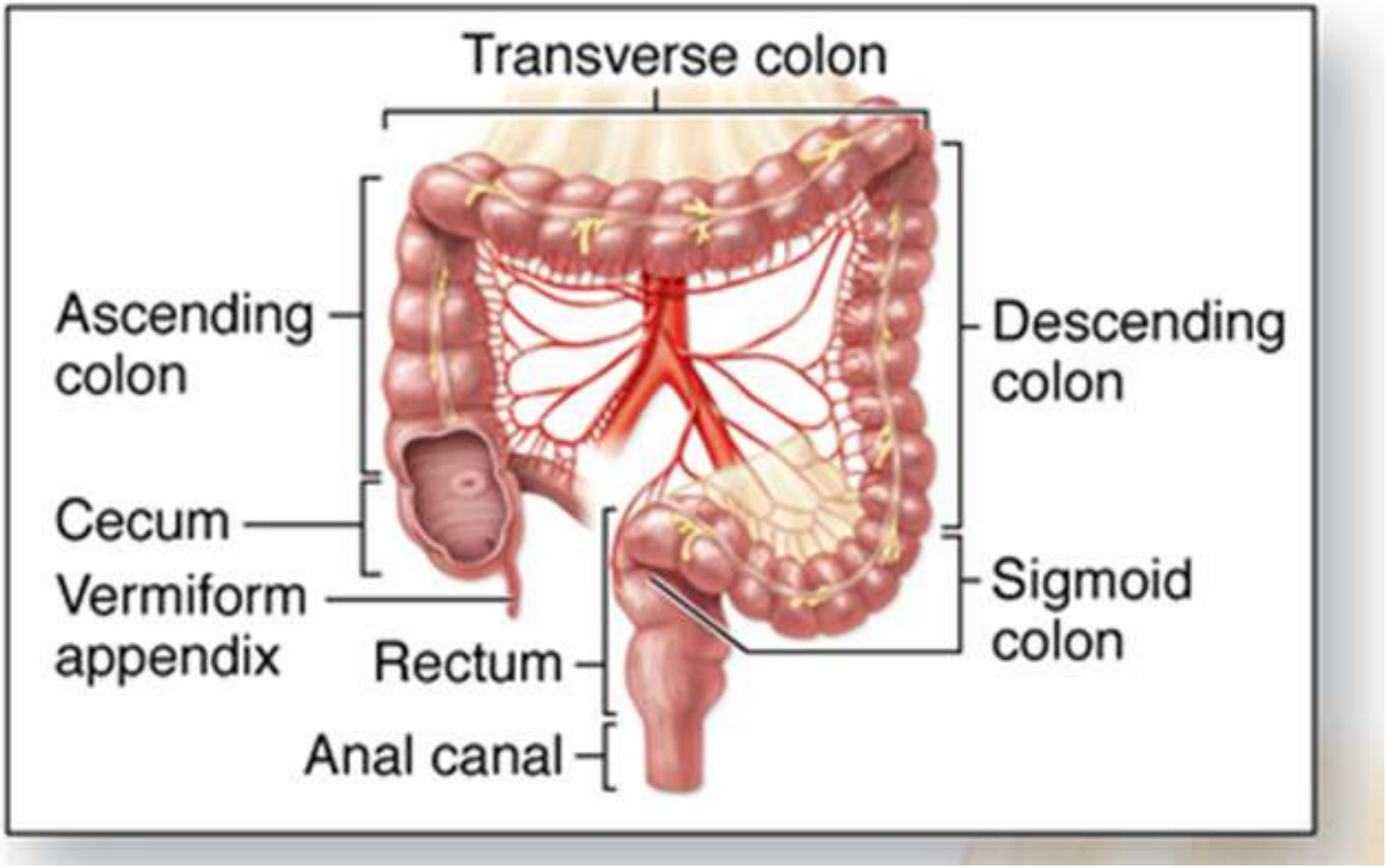
Special features include

- Teniae coli
- Haustrations
- Appendices epiploicae



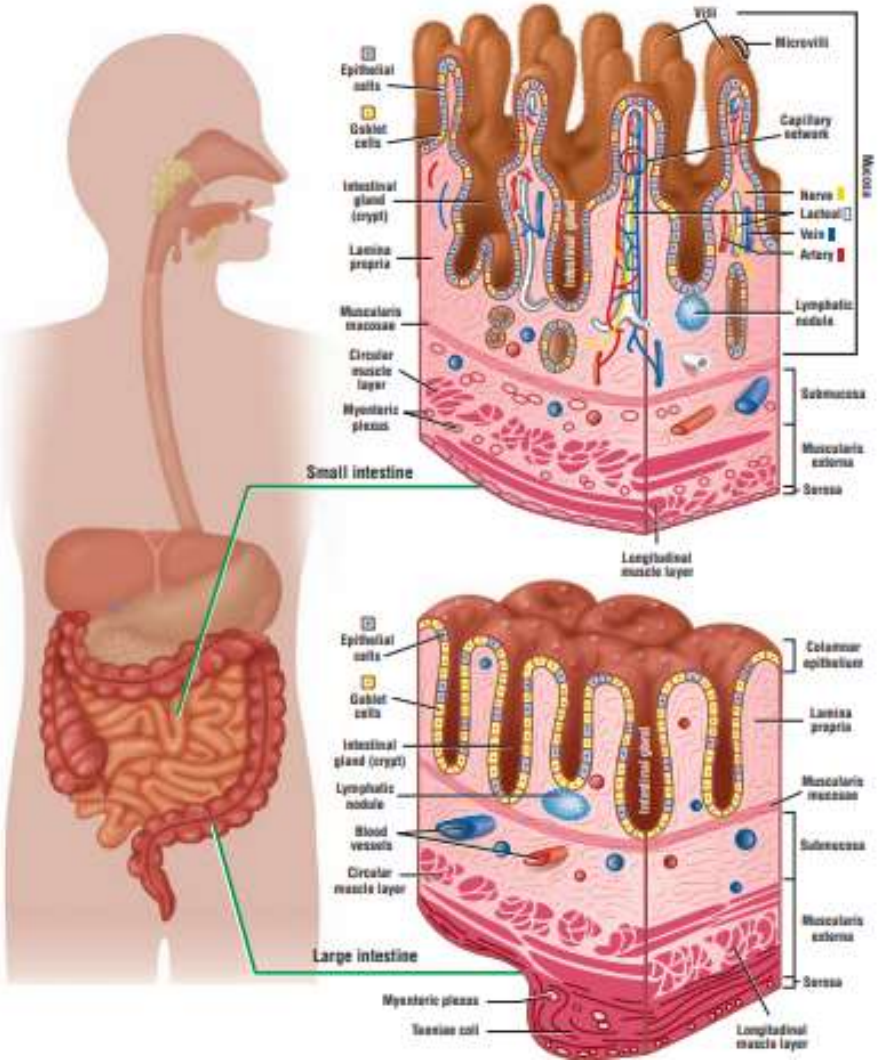
Core Knowledge

Large Intestine-Gross Features



Core Knowledge

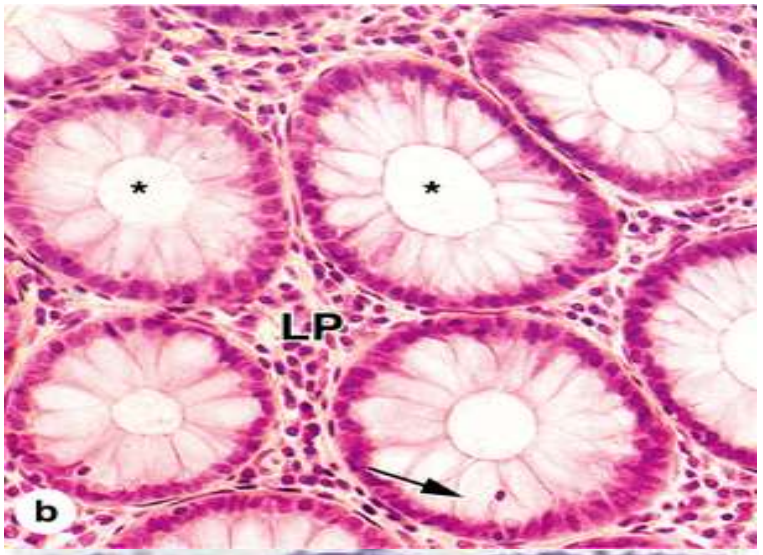
Large Intestine-Histological Layers

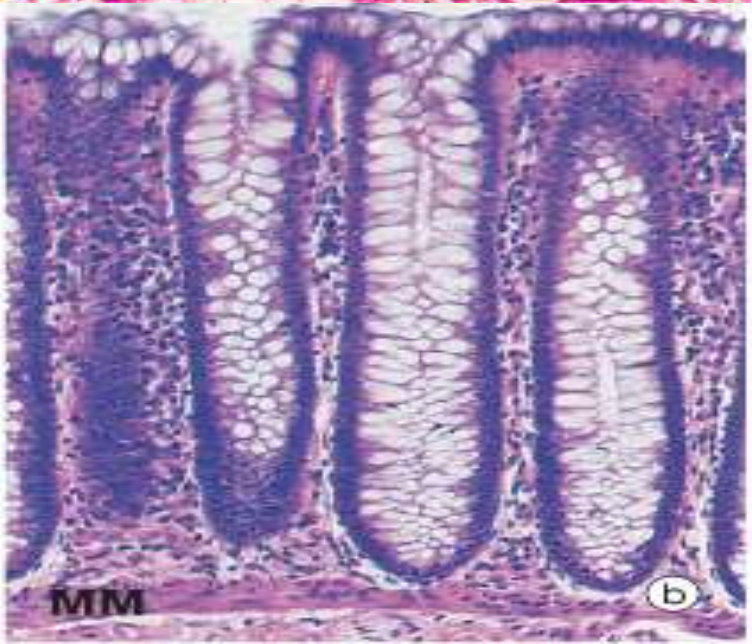


Core Knowledge

Colon

- **NO** villi / plica circulares
- Mucosa
  - Epithelium –coloncytes
  - Intestinal gland- 0.5mm deep, lined by columnar cells, goblet cells, enteroendocrine & stem cells





Core Knowledge

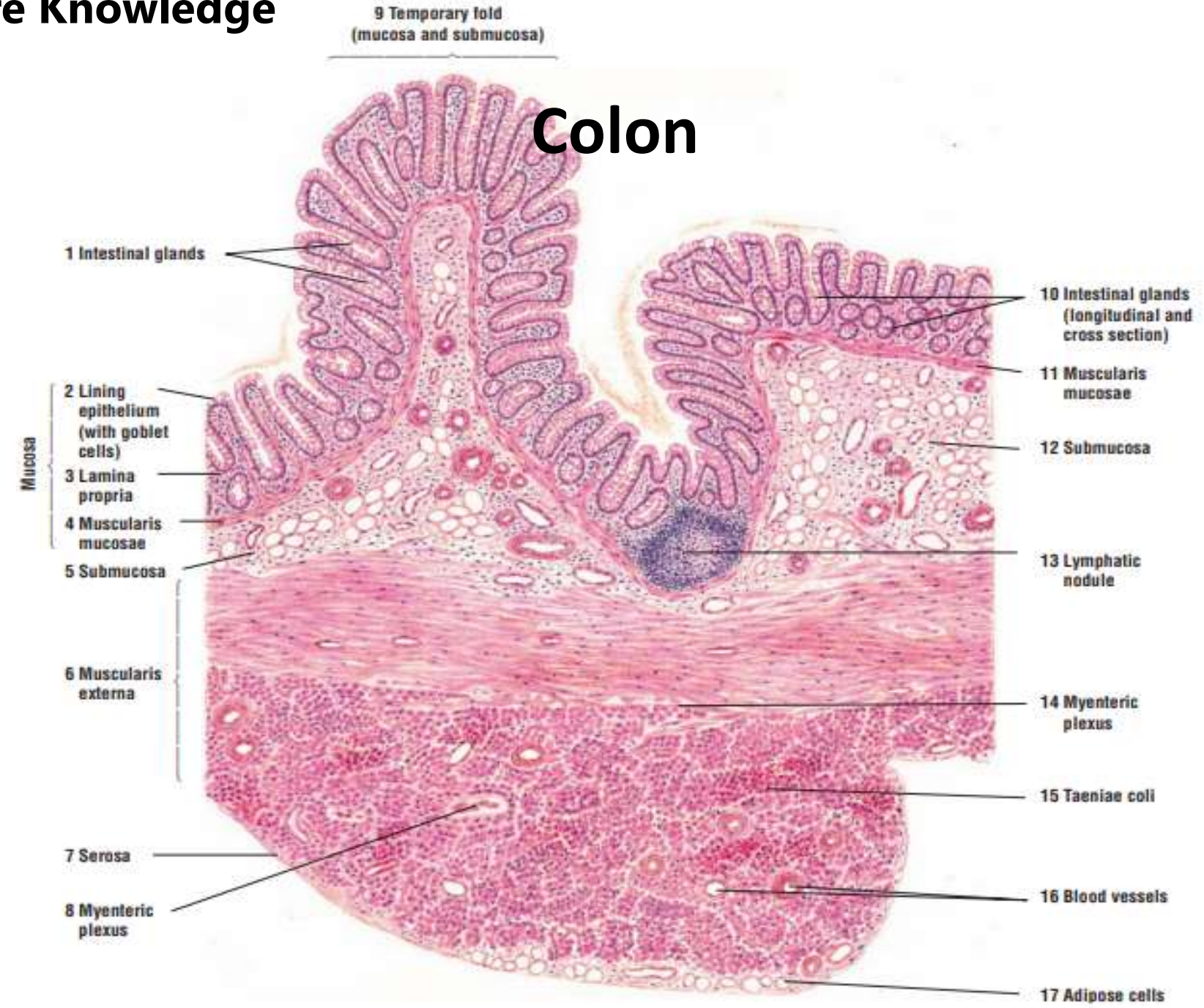
Colon

- Lamina propria- rich in lymphatic tissue, BV, lymphocytes, plasma cells, collagen
- Muscularis mucosae- prominent

- Submucosa
- Muscularis externa
  - Inner circular
  - Outer longitudinal – **teniae coli**
- Serosa / Adventitia

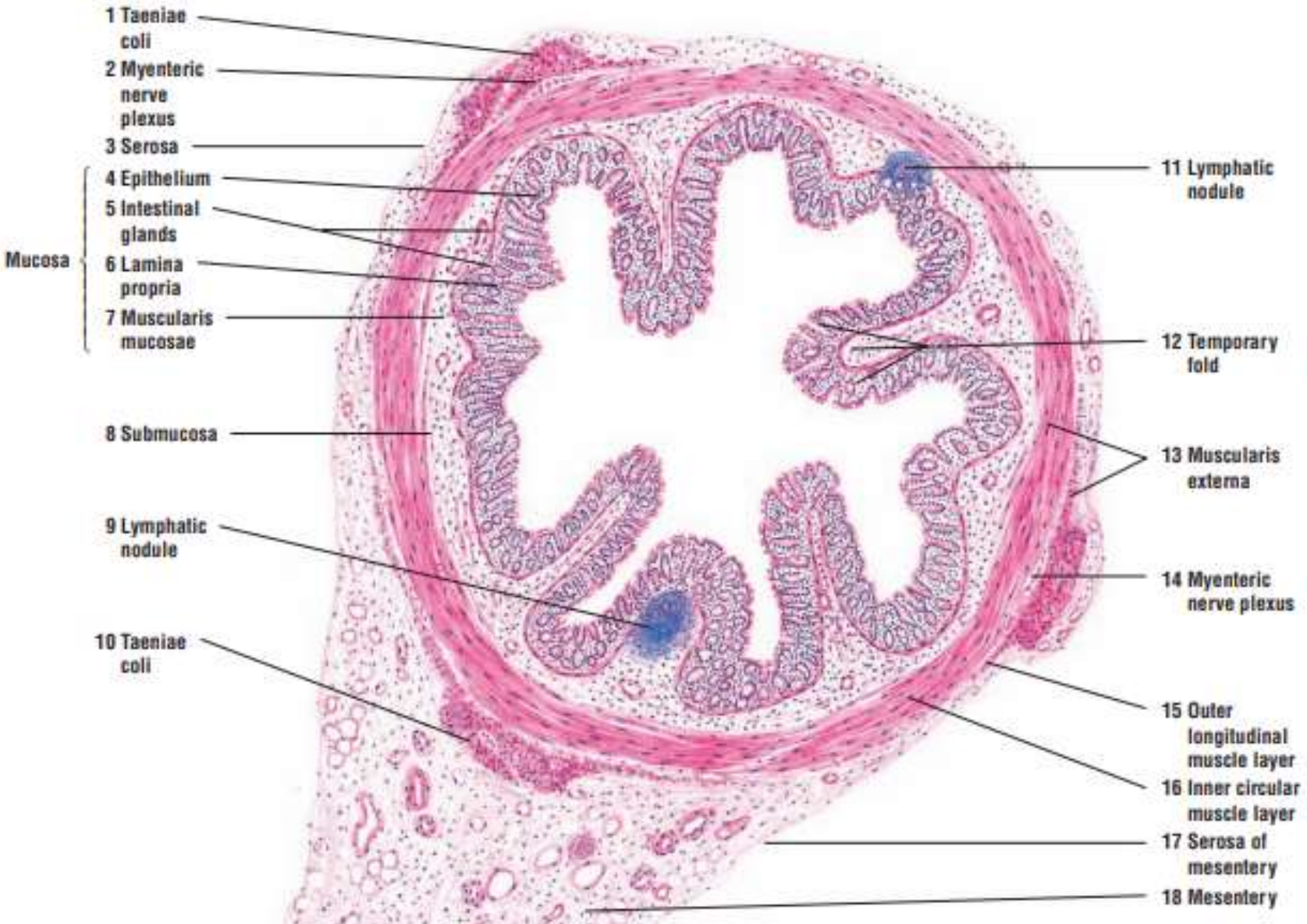
Core Knowledge

Colon



Core Knowledge

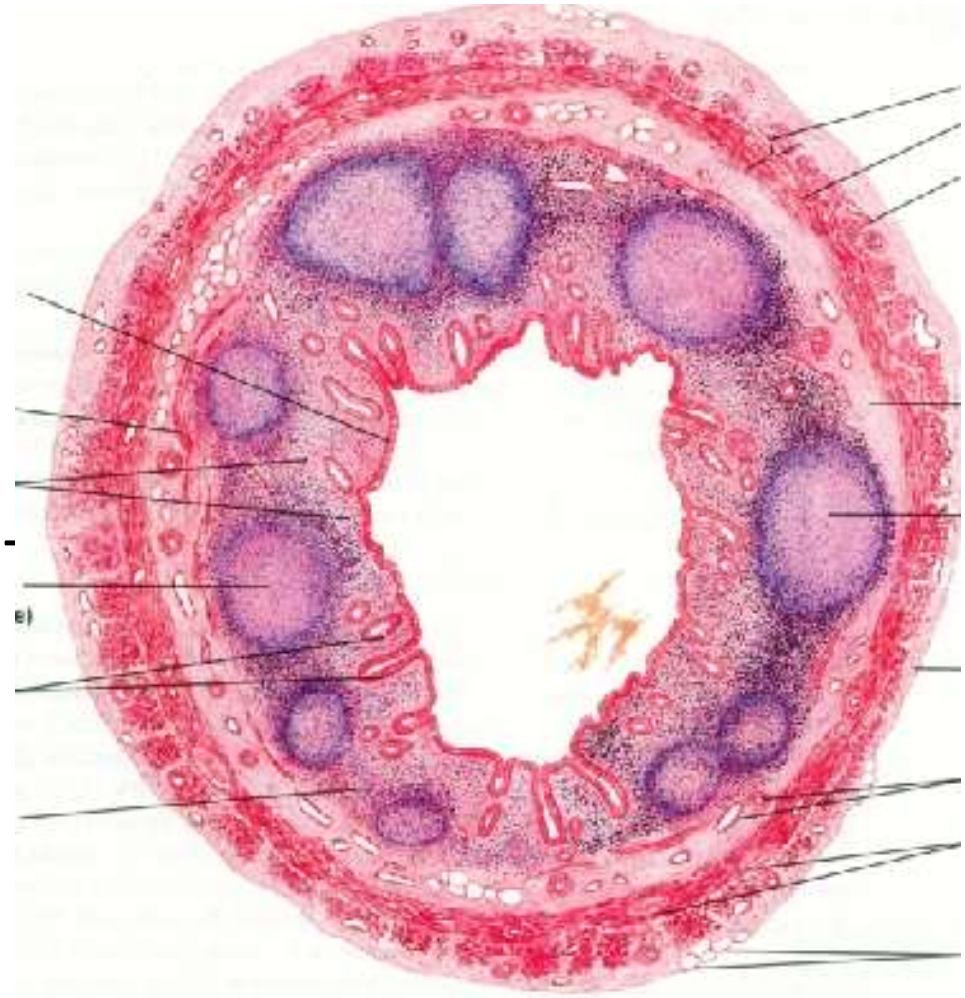
Colon



Core Knowledge

Appendix

- Irregular lumen
- Few short intestinal glands
- Epithelium
  - Columnar cells
  - Goblet cells- few
  - Enteroendocrine cells- few
- Lamina propria
  - Diffuse lymphocytic infiltration
  - Lymphatic nodules



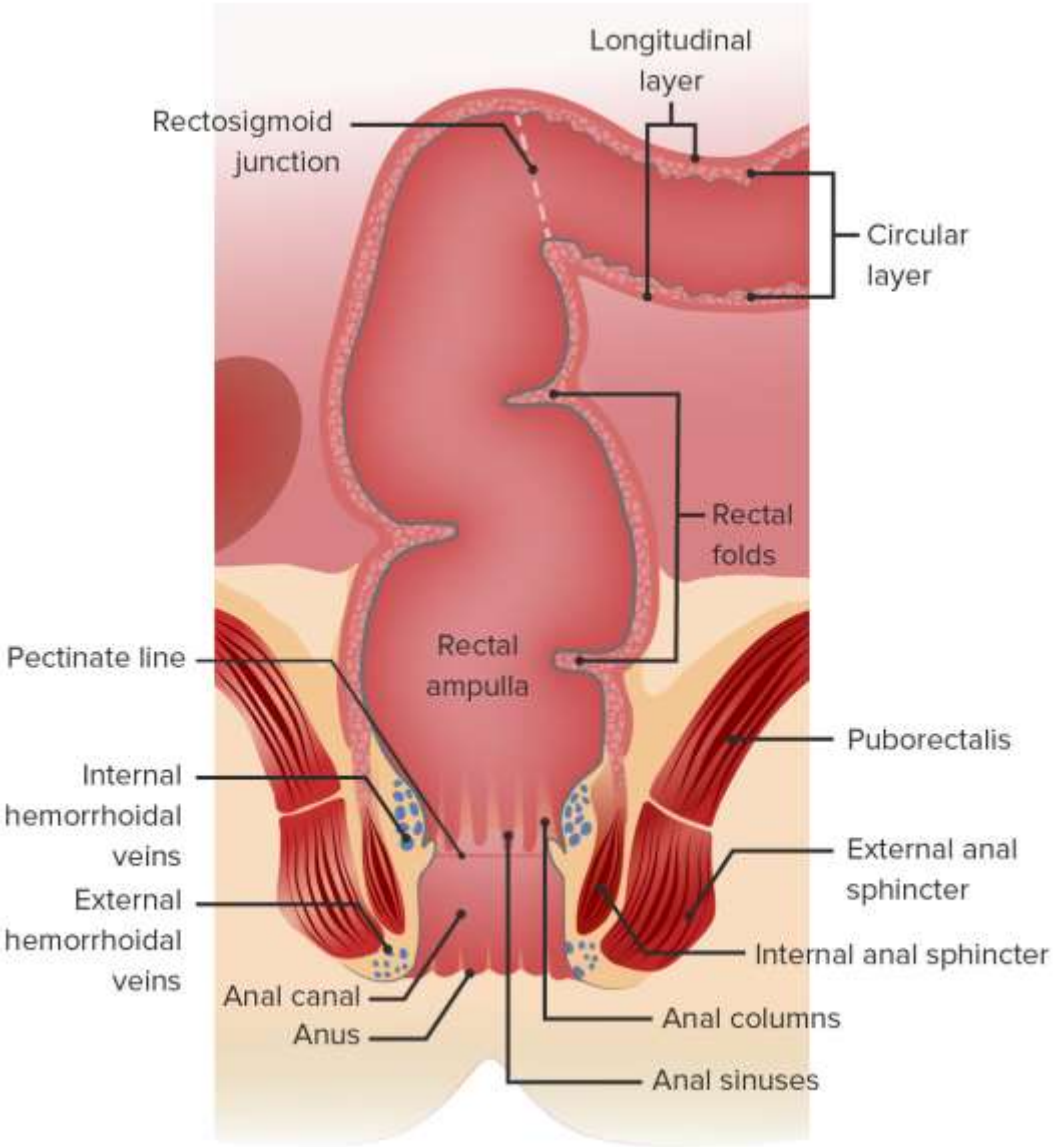
Core Knowledge

Appendix

- Muscularis mucosae- disrupted
- Submucosa- lymphatic tissue
- Muscularis externa- two layers
- Serosa

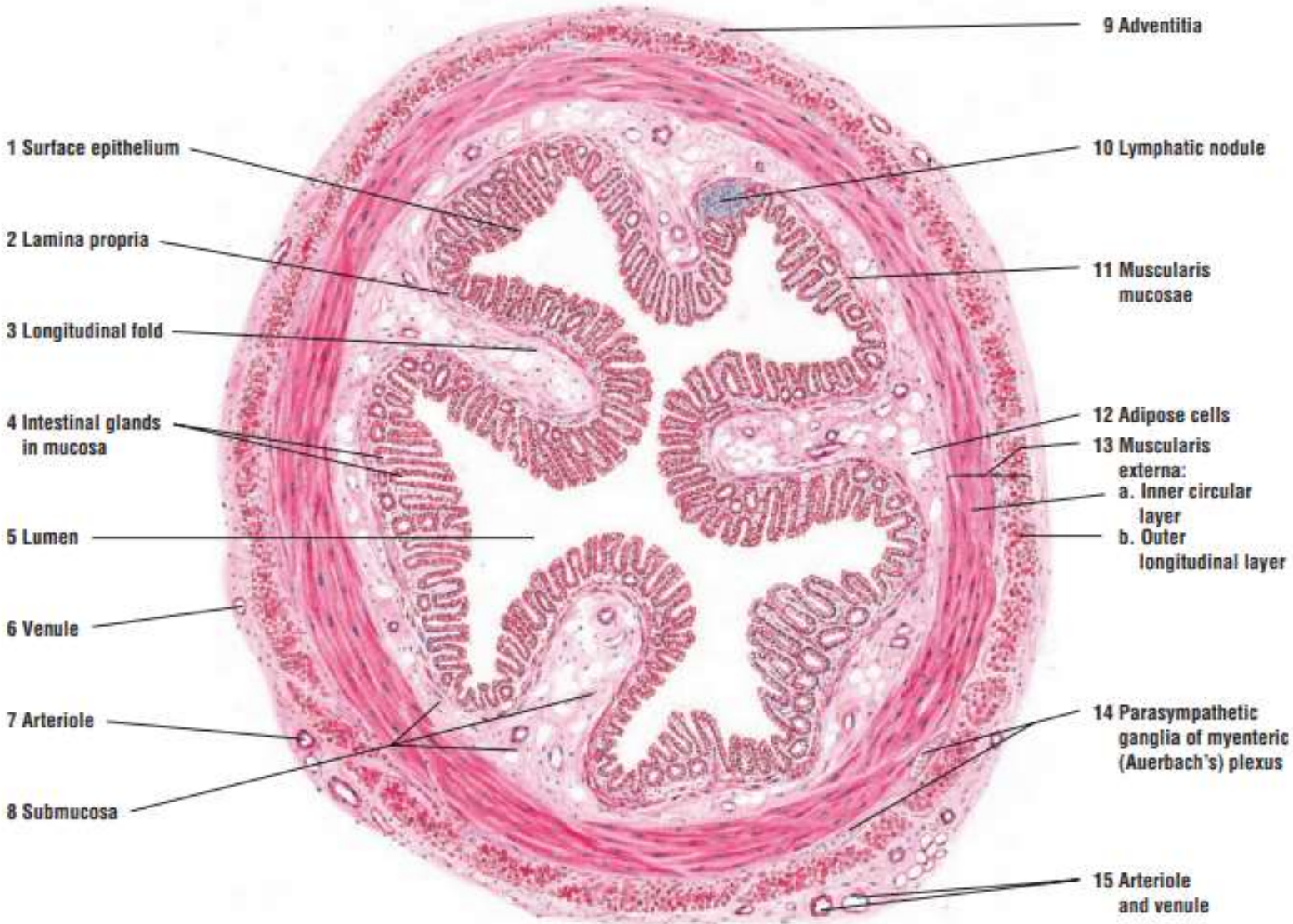
Core Knowledge

Rectum



Core Knowledge

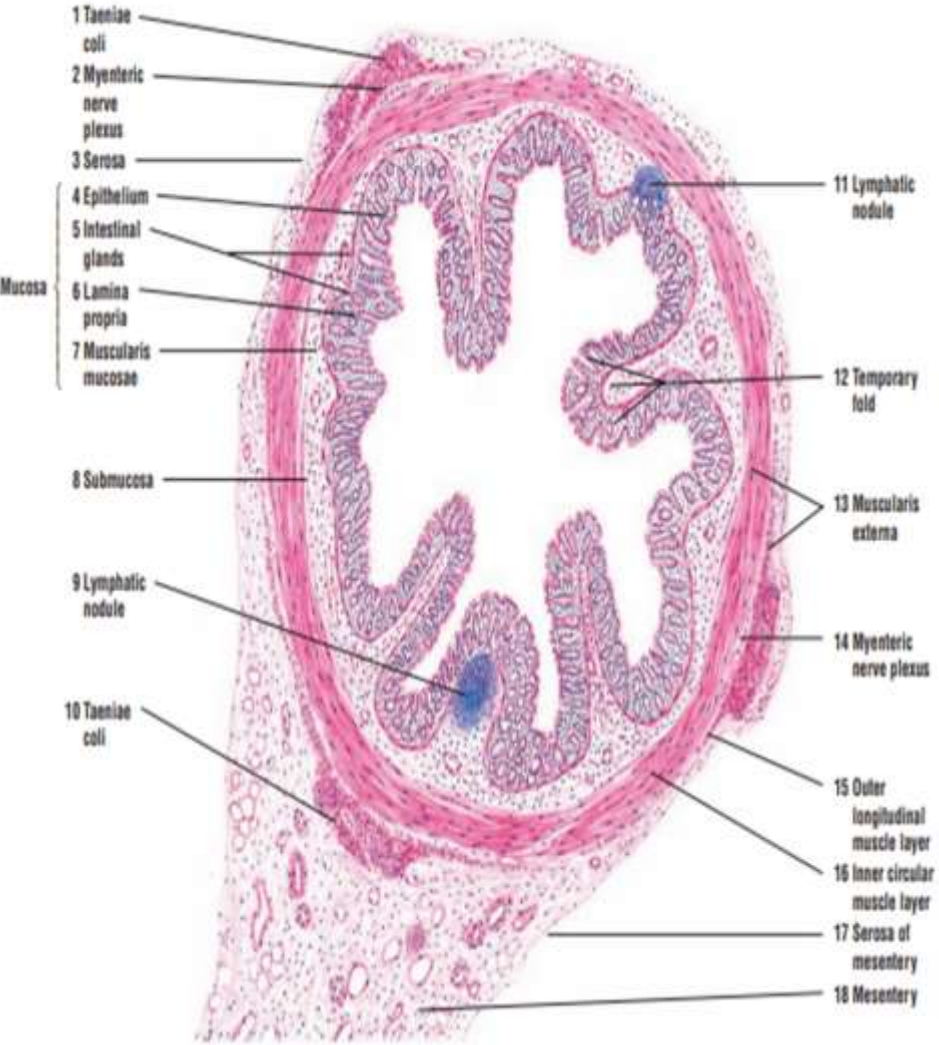
Rectum



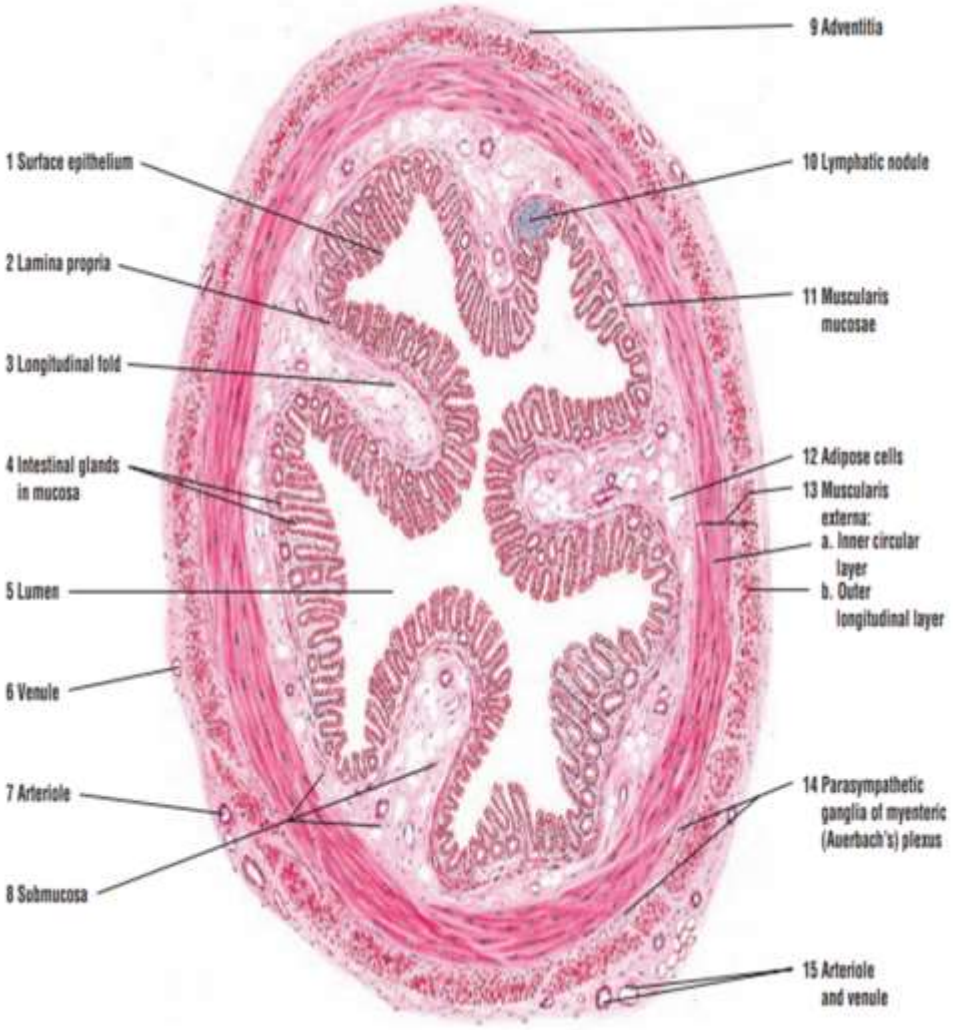
Core Knowledge

Comparison

Colon

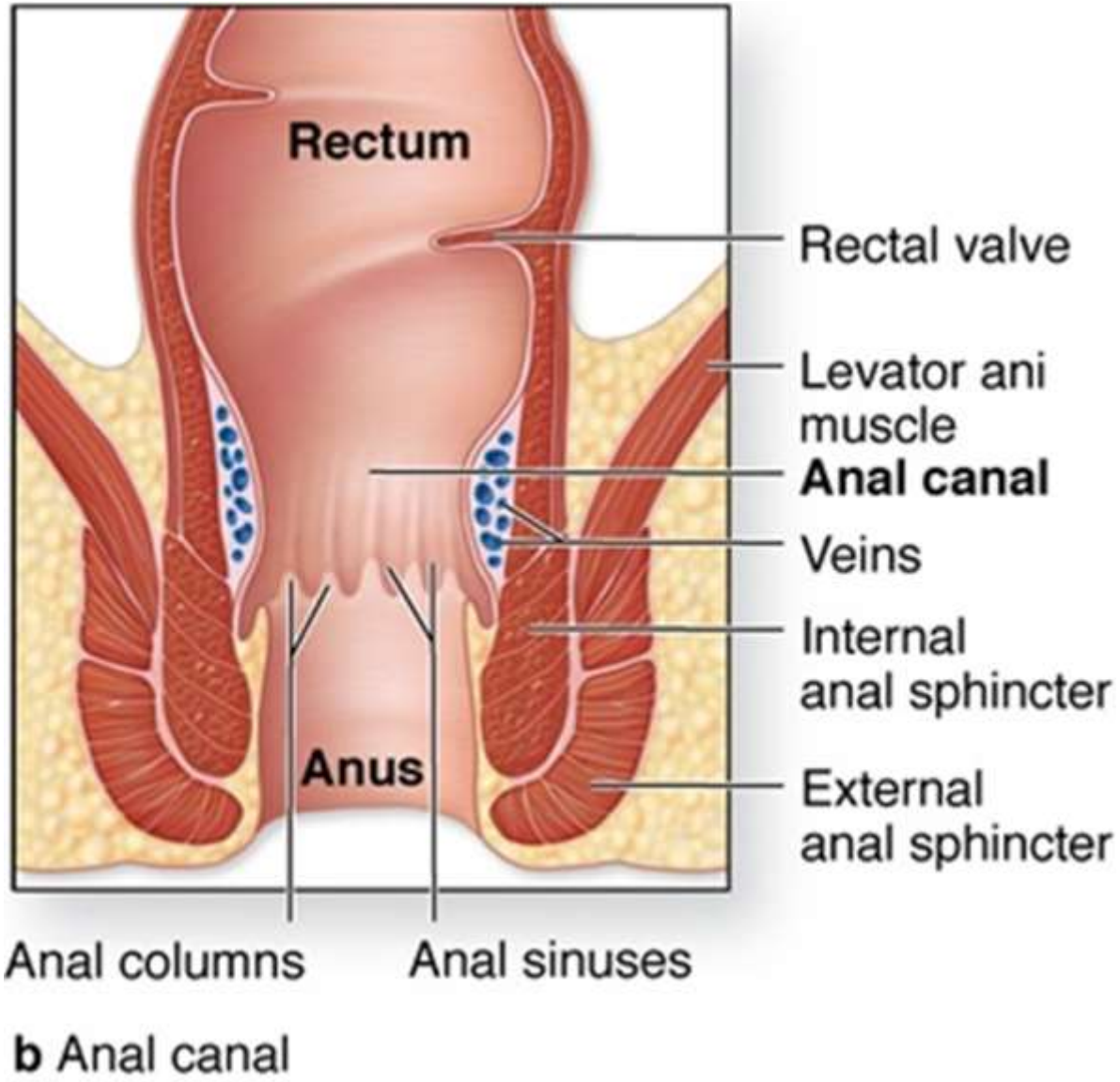


Rectum



Core Knowledge

Anal Canal

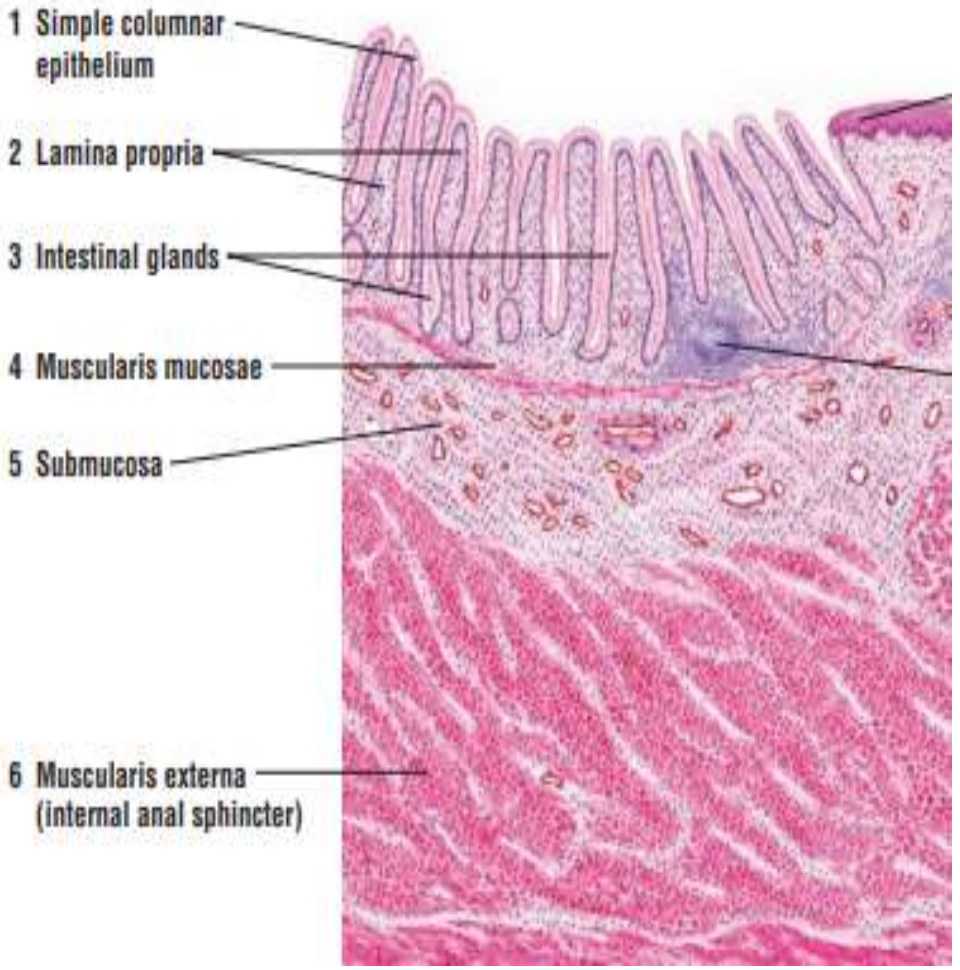


b Anal canal

Core Knowledge

Anal canal (Upper 1/3)

- Epithelium:
  - Simple columnar with goblet cells
- Lamina propria:
  - Intestinal glands -short
- Muscularis mucosa:
  - Inner circular
  - Outer longitudnal

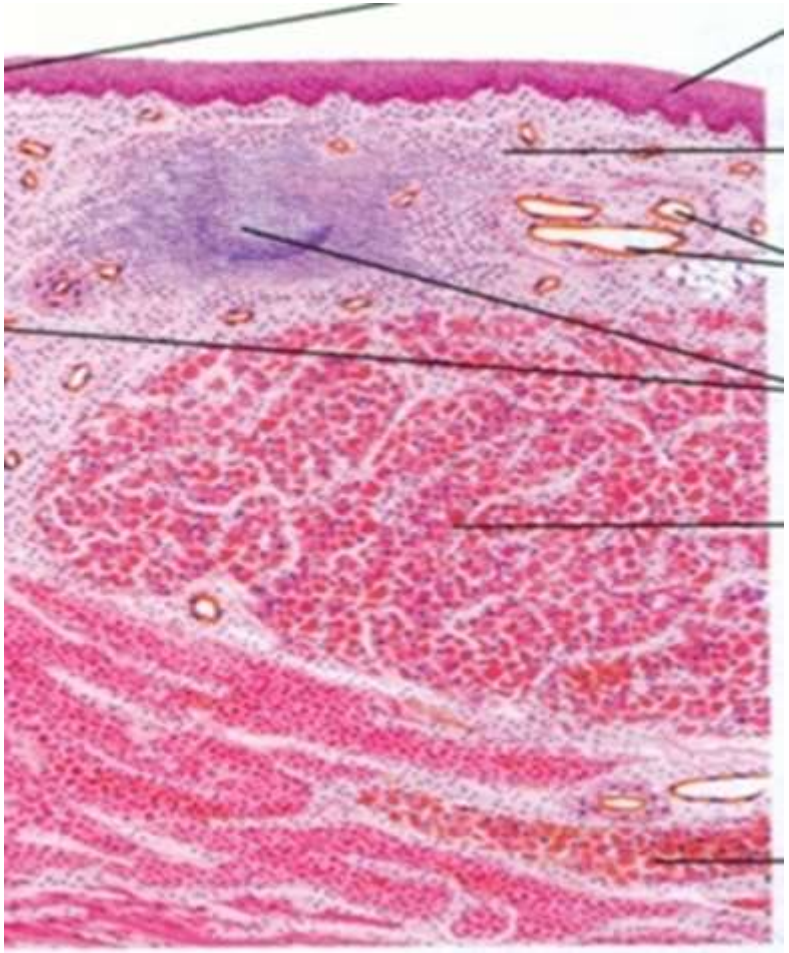


Anal canal (Upper 1/3)

- Submusoa:
  - Loose CT
  - Branched tubular glands lined with mucous cells
  - Numerous thin walled veins- Internal hemorrhoidal veins (Piles)
- Muscularis externa
  - Inner circular – internal anal sphincter
  - Outer longitudinal
  - Outermost – skeletal muscle – external anal sphincter
- Adventitia

Anal Canal (Middle 1/3)

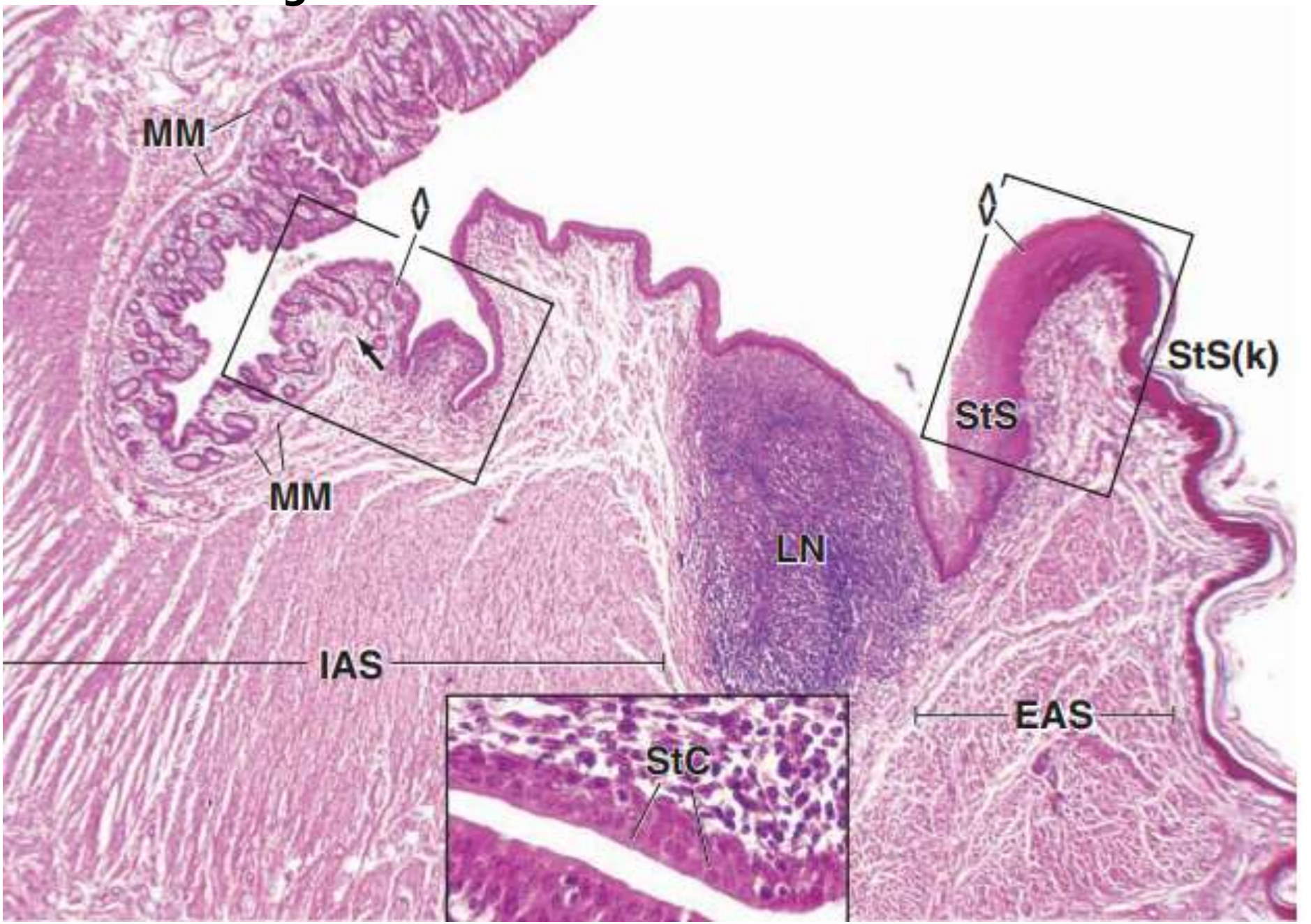
- Epithelium:
  - Stratified squamous non-keratinized
- Lamina propria:
  - Crypts absentt
- Muscularis mucosae:
  - Broken –gradually indistinct
- Submucosa



Anal Canal (Lower 1/3)

- Epithelium:
  - Stratified squamous keratinized
  - Sweat glands
  - Sebaceous glands
- Lamina propria & Submucosa:
  - No distinction
- Muscularis mucosa:
  - Absent

Core Knowledge



Horizontal Integration

Bio-physiological aspects of Large Intestine

Principal functions are

- Reabsorption of water and electrolytes
- Elimination of undigested food and waste

Vertical Integration

Colorectal Cancer

- Adenocarcinoma of colon
- Very common in old age

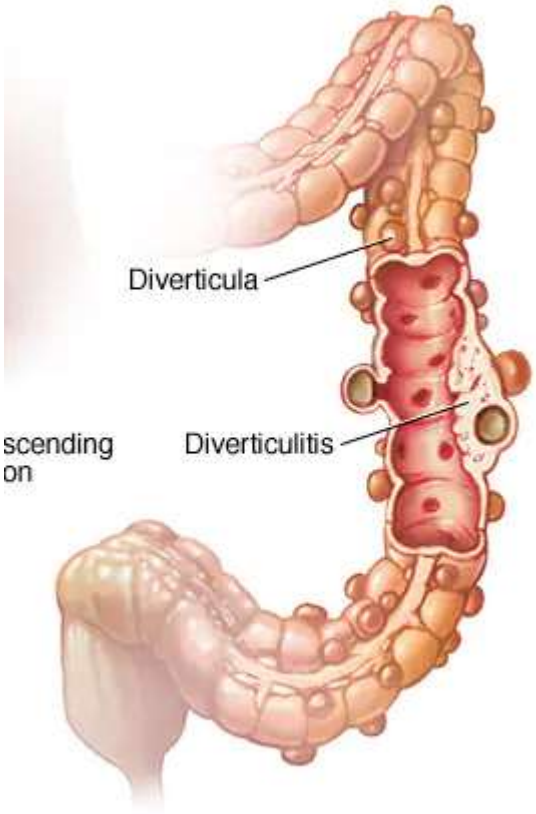
Causes

- Low fiber intake
- Ulcerative colitis/ other diseases of gut
- Family history

Vertical Integration

Diverticulosis

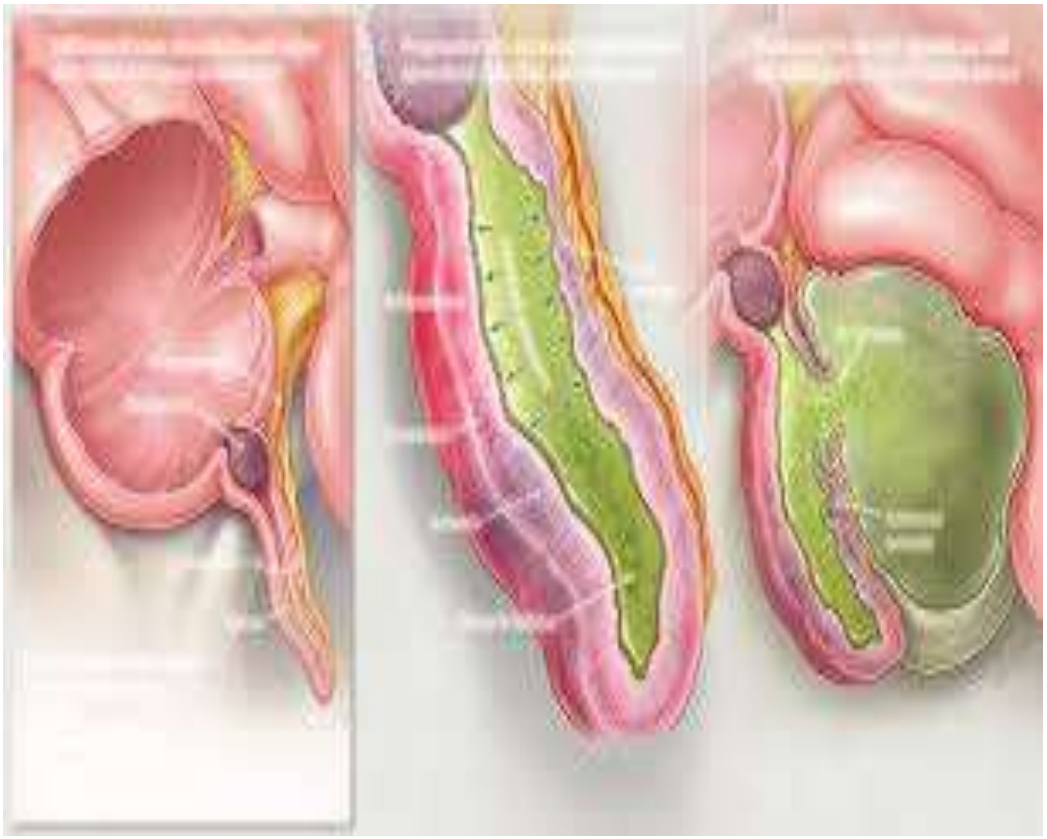
- Herniation or outpocketing of mucosa and submucosa
- Structural defects in the colon wall or constipation
- Can lead to diverticulitis



Vertical Integration

Appendicitis

- Infection & inflammation of appendix
- Lymphoid follicle enlarges
- Wall rupture



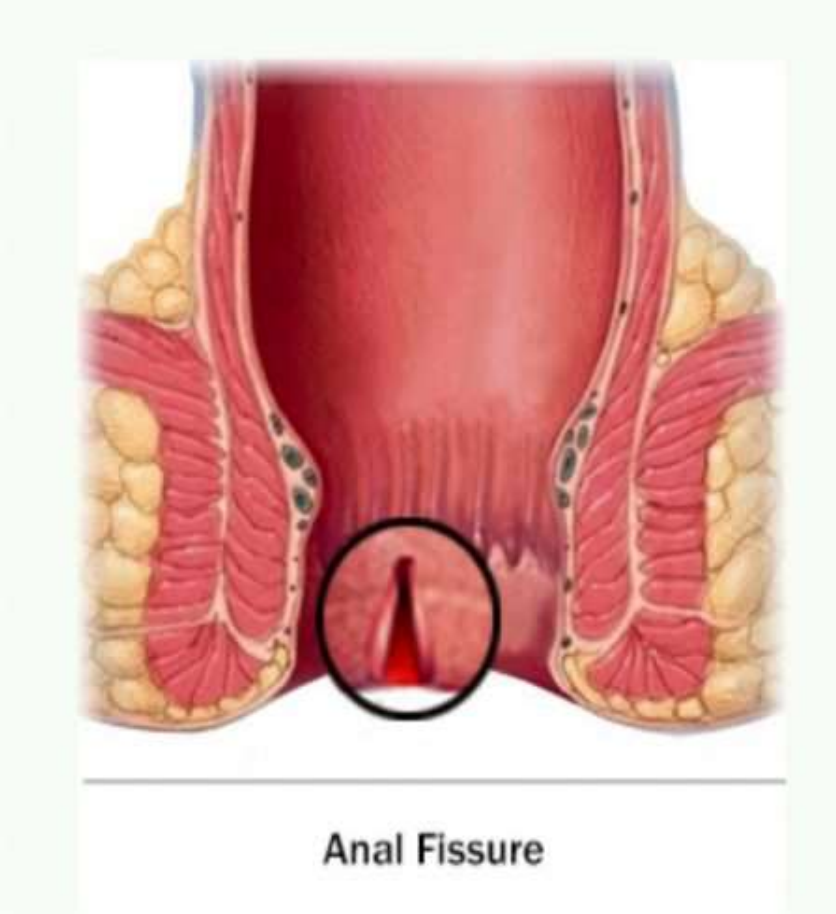
Vertical Integration

Anal Fissure

- A tear in the lining of anus or anal canal

<u>Causes</u>

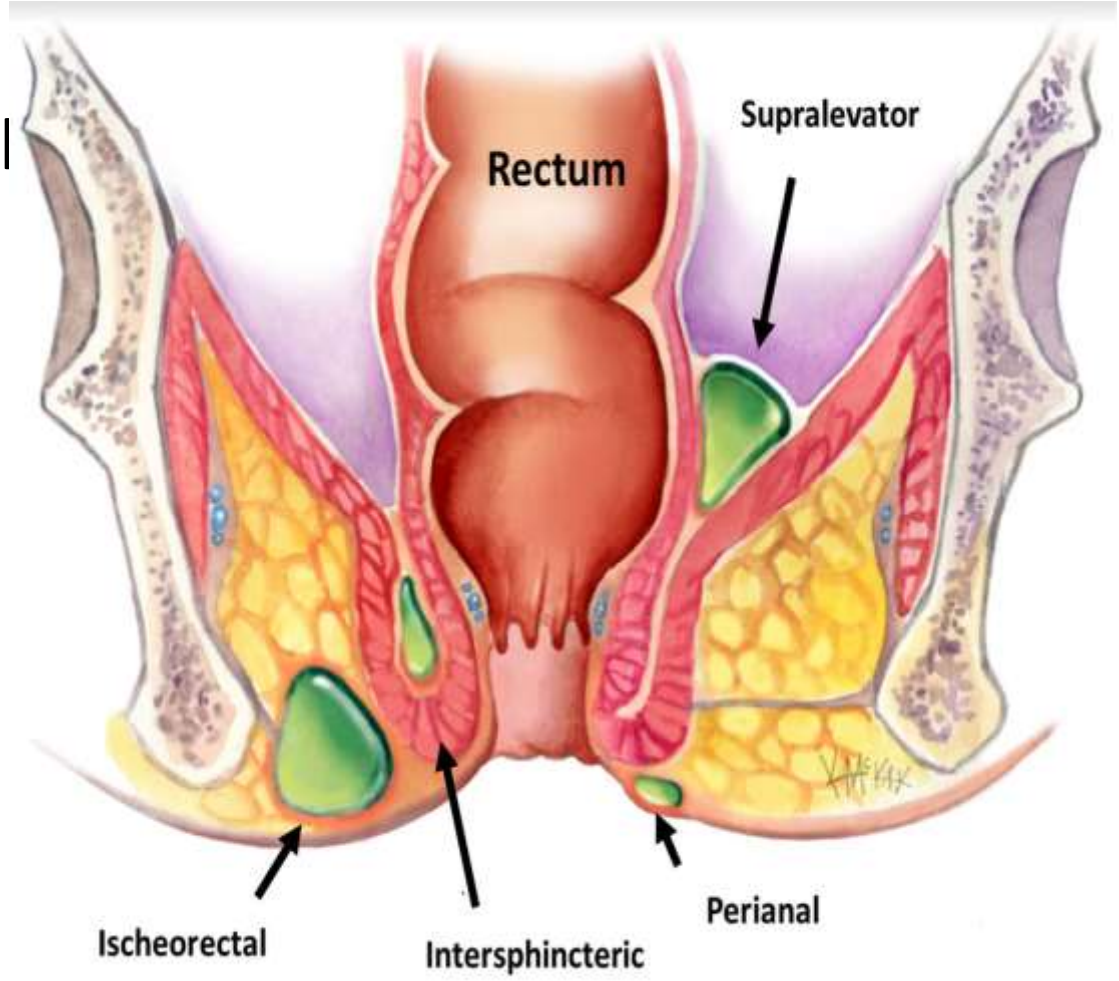
- Hard stools
- Long lasting diarrhea
- Constipation and straining during bowel movements



Vertical Integration

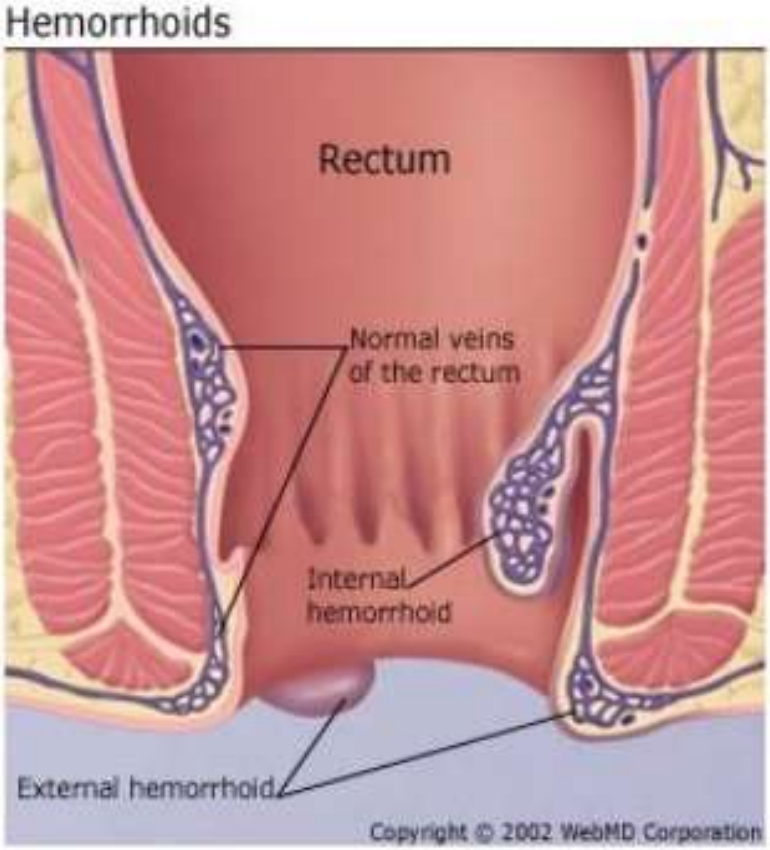
Anal Abscess

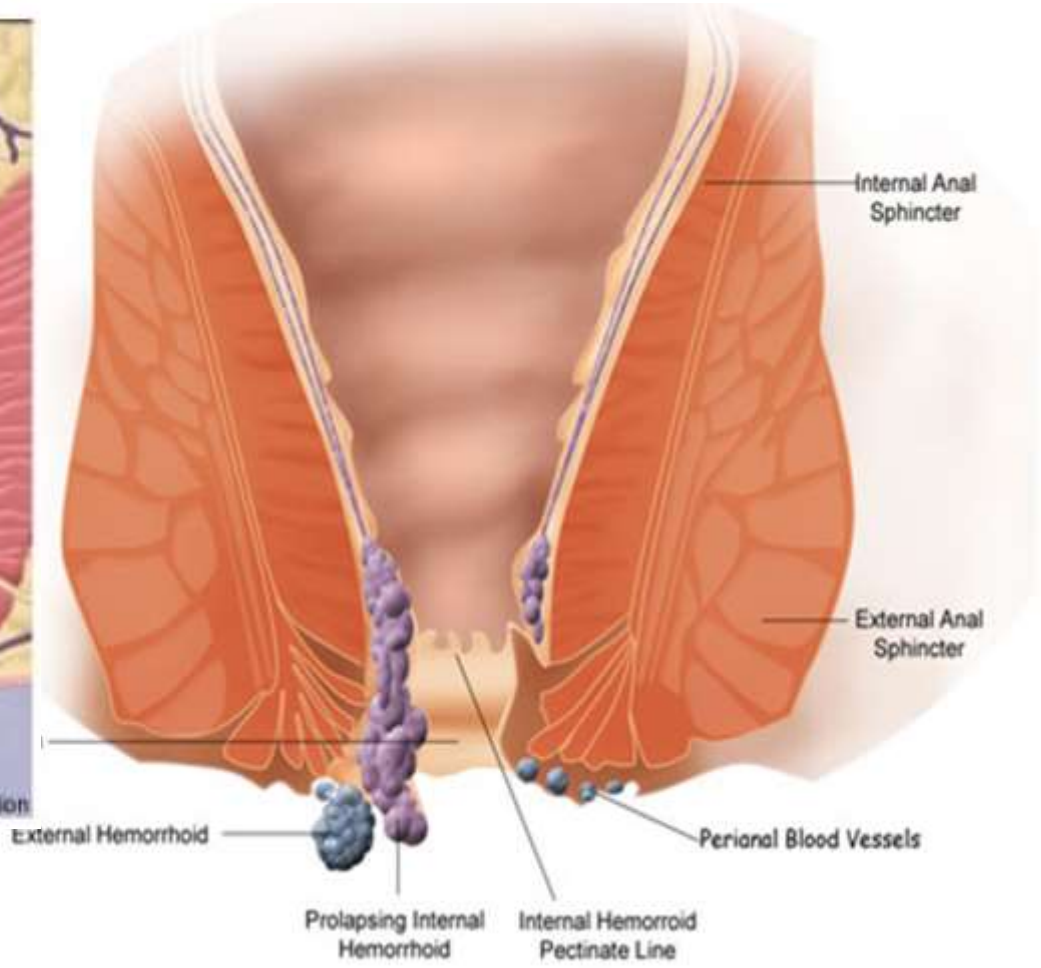
- Mostly due to infection of small anal glands
- Surgical incision and drainage
- Can lead to anal fistulas



Vertical Integration

Hemorrhoids





Management of Colorectal Cancer

- Detailed **medical history** and **physical examination**
- **Refer** the patient to specialists such as **oncologists**, colorectal surgeons
- Provide **supportive care** and help manage symptoms associated with colonic cancer and its treatment.
- Schedule **regular follow-up** visits to monitor the progression of disease
- **Offer counseling** and support services to address the emotional and psychological challenges

Ethical Considerations

- From an ethical standpoint, the scenario raises considerations regarding **patient autonomy**, **informed consent**, and **confidentiality**
- The physician must ensure that patient fully understands the diagnosis, treatment options, and potential implications
- Additionally, the physician must respect patient's privacy and confidentiality throughout the diagnostic and treatment process

Role of AI in Coloractal Management

- AI can potentially aid in **enhancing diagnostic accuracy and efficiency.**
- AI-powered decision support systems can also help clinicians in **selecting appropriate treatment modalities**
- AI-driven predictive models may help **anticipate the risk of disease occurrence** in susceptible populations

Herniation of crypts in hyperplastic polyp and sessile serrated adenoma: a prospective study

K Hu, S Shen, L Zhang

PMID: 29416927

Presence of colonic crypts in submucosa is termed as herniation of crypts. The histological presence of this herniation is strongly suggestive of adenomatous polyp and hence is a means to differentiate adenomatous polyp from hyperplastic polyp.

Learning Resources

- Junqueira’s Basic Histology 14th Edition, Chapter 16, pages 316-319
- Histology , A text and Atlas by Michael H.Ross 7th Edition, Chapter 18, pages 594-599
- DiFiore's Atlas of Histology with Functional Correlations 11th Edition, Chapter 14, pages 302-309
- Google images

THANK YOU