Large intestine & defecation

Nerve supply:

Parasympathetic supply	Sympathetic supply	Somatic supply
• ***Vagus nerve*** → *supply proximal colon.* • ***Pelvic nerve (S2,3,4)*** → *Supply other parts.*	• *From* ***lesser splanchnic nerves***	• *From* ***pudendal nerve*** → *Supply the external anal sphincter.*

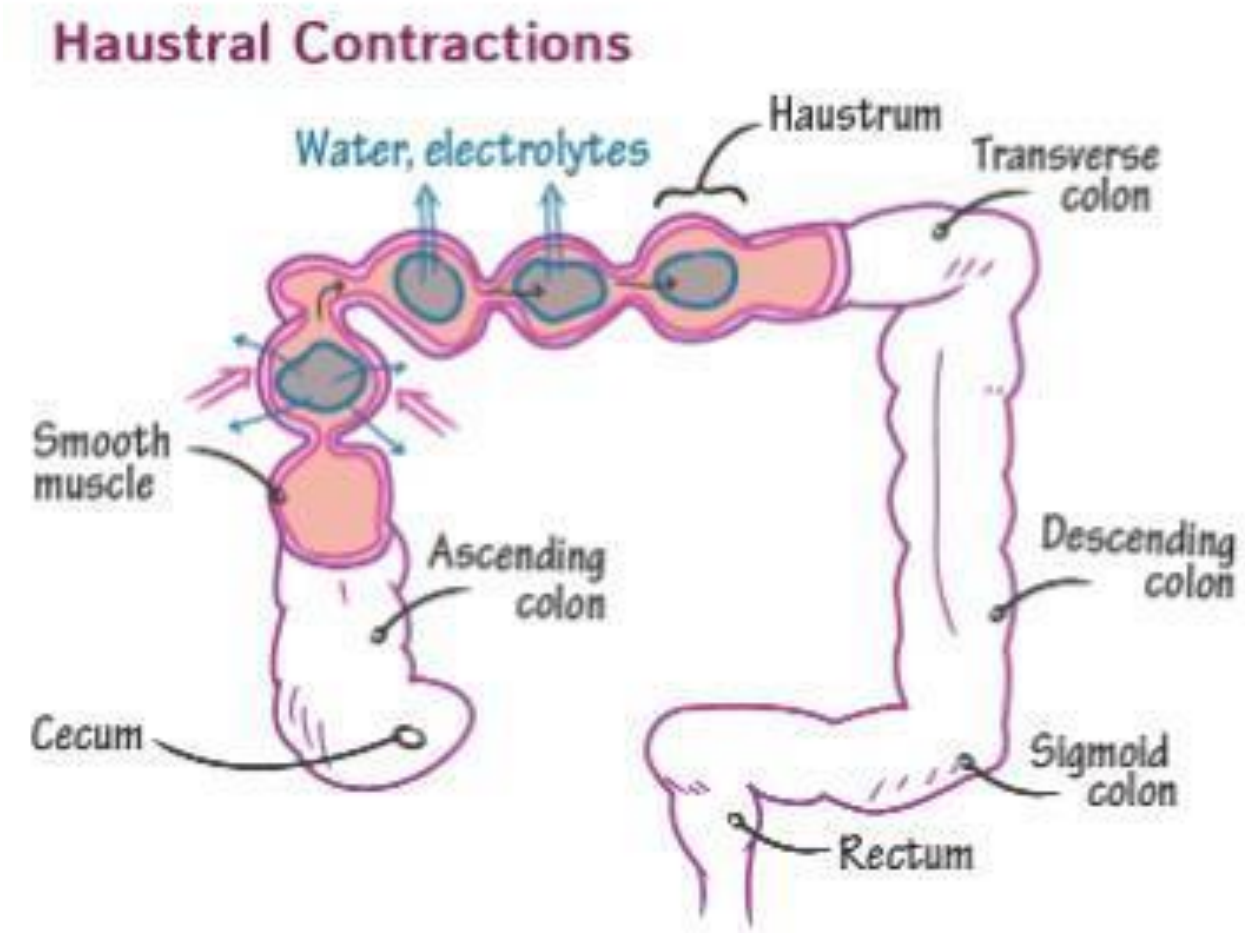
Functions of large intestine:

1) Absorption:	• ***Absorption*** *of water, glucose, electrolytes, amino acids and drugs,*
2) Secretion of:	• ***Secretion*** *of some GIT hormones as VIP and somatostatin.* • *Viscious alkaline secretion*
3) Excretion of:	• ***Excretion*** *of heavy metals.*
4) Synthesis of:	• *Vitamin K.* • *Some members of Vit B complex.*
5) Motor functions of large intestine	*a) Segmental (Haustral) contractions.* *b) Mass movements (Mass peristalsis).* *c) Fecal continence.*

- ***Movements of large intestine:***

1) Segmental contractions:

Called:	• *Haustral contraction.*
Controlled by:	• *Controlled by BER.*
Frequency	• *Their frequency in rectum > sigmoid.*
Functions:	• *Mix colonic contents.* • *Help absorption.* • *Produce minor forward propulsion of contents in cecum and ascending colon.* • ***8 → 15 hours** are required to move chyme from caecum through the colon.*



2) Mass peristalsis:

Description:	• ***Modified type*** *peristalsis.*
Importance:	• *They empty the colon rapidly into rectum, colon contents emptied by rate of* ***5 Cm/minute*** *due to mass movements.*
Occur:	• ***Once/twice*** *per day.*
Site:	• ***Middle*** *of the transverse colon.*
Initiated by: مهم نظري	*1) Distension of stomach and duodenum.* *2) Irritation of colon.* *3) Intense parasympathetic stimulation.* *4) Conditioned reflex.*

- **The gastrocolic reflex"**
  - *Is a mass contraction of the colon brought about reflexly* ***by the distension of the stomach.***
  - *The reflex consists of an* ***early neural phase*** *(within 10 minutes of eating), which is abolished by anticholinergic drugs, and* ***a late hormonal phase****, which coincides with the peak level of gastrin.*

Regulation of colonic motility

1- Nervous regulation:

a) The intrinsic nerve plexus:	b) The extrinsic nerves:
• ***Inhibits*** *colonic motility so its absence (as in Hirschspurng's disease) spasm of this segment with feces accumulation and colon* ***distension (Megacolon)*** *above.*	• *Parasympathetic stimulation* ***increases*** *motility* • *sympathetic stimulation* ***decreases*** *colonic motility.*

2- Hormonal regulation:

Hormones increase motility	Hormones decrease motility
• *Gastrin.* • *CCK.* • *Prostaglandins.*	• *Secretin.* • *Adrenaline.* • *Somatostatin.*

Defecation

- **Def:**
  - *It is the act of **emptying** the colon through anus to outside.*
  - *It is **a reflex** which can be controlled **voluntary**.* **MCQ**

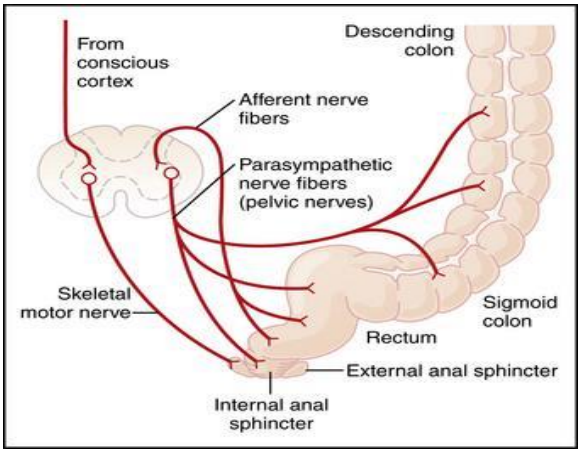
- **Mechanism:**

1- Intrinsic defecation reflex:

- ***Distension of rectum** with feces stimulates the **myenteric nerve plexus** which in turn sends efferent impulses to initiate **peristaltic waves** in the descending colon, sigmoid colon and rectum with **relaxation** of internal anal sphincter.*
- *This reflex is **weak**, the effective defecation requires the following extrinsic reflex.* **MCQ**

2- Parasympathetic defecation reflex:

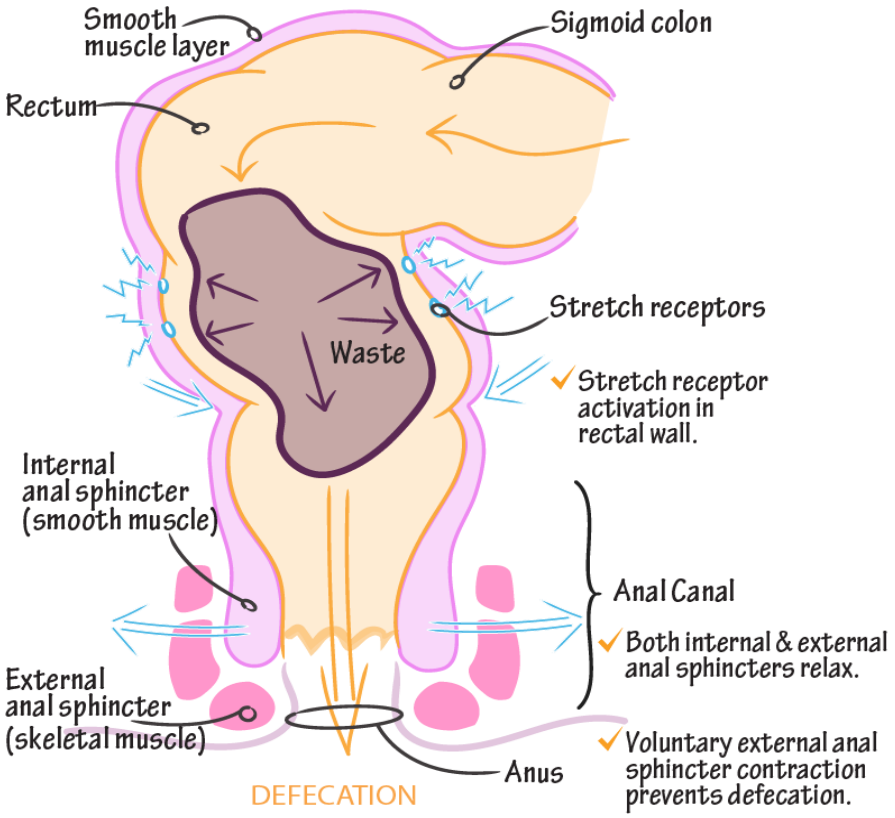
Stimulus	• *Distension of rectum with feces.*
Afferent	• *Pelvic nerve*
Centre	• *Sacral segment (S2,3,4) of spinal cord.* MCQ
Efferent	• *Pelvic nerve*
Effect	• *Stimulate **peristaltic contractions** in the descending colon, sigmoid colon and rectum.* • *With stimulation of relaxation of **internal anal sphincter.***



3- Voluntary control of defecation:

- *Distension of rectum with feces sends afferent impulses to the **cerebral cortex** giving the desire (urge) to defecate (first occurs when rectal pressure increases to about **18 mmHg**.).*

If the surrounding conditions are favorable	If the conditions are unfavourable
• **Process of defecation is stimulated & voluntary expulsion occurs by:** ➢ *Activation of **defecation center** by impulses from the cerebral cortex.* ➢ ***Voluntary relaxation** of external anal sphincter.* ➢ *Straining.*	• **Defecation is prevented i.e voluntary suppression occurs by:** ➢ *Inhibitory impulses from cerebral cortex to **defecation center** causing, relaxation of rectum & contraction of the internal anal sphincter.* ➢ ***Voluntary contraction** of the external anal sphincter.*



Fecal continence

- ***Definition:***
  - *It is the ability to control elimination of rectal contents during rest and during sudden increase intra-abdominal pressure (as during cough and sneezing).*

- ***Mechanisms:***

1) Tone of internal (IAS) &external anal sphincters (EAS):

- *Anal canal closure is maintained by resting anal pressure* ***(60 mmHg)*** *(80% by tone of IAS and 20% by EAS).*

2) Tone of puborectalis muscle: *it maintains ano-rectal angle.*

3) Anal sensation: *to pain, touch, temperature.*

4) Rectal sensation, compliance and motility:

- *Rectum is sensitive only to stretch.*
- *Rectum accommodate large fecal amount without high intrarectal pressure.*

5) Intact innervation of anorectal region.