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# Large Intestine

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**Functional anatomy of large intestine:**

Large intestine is seen between ileocecal valve and anus.

**Parts of large intestine:**

Large intestine consists of the following Parts.

1. Caecum with appendix
2. Ascending colon
3. Transverse colon
4. Descending colon
5. Sigmoid colon or pelvic colon
6. Rectum
7. Anal canal

**Structure of wall of large intestine:**

Wall of large intestine consists of four types of structures like any part of the gut.

1. **Serous layer:** The formation of this layer occurs by peritoneum.
2. **Muscular layer:** The distribution of smooth muscles of large intestine occurs in two layers such as the outer longitudinal layer and inner circular layer. The arrangement of the longitudinal muscle fibres of large intestine takes place in the form of three long bands termed as taenia coli. The length of taenia coli is less compare to the length of large intestine. Due to this, the large intestine consists of series of pouches known as haustra.
3. **Sub mucosa layer:** The development of this layer doesn't takes place in large intestine.
4. **Mucus layer:** The crypts of lieberkuhn are observed in mucosa of large intestine. But the villi, which are observed in mucus membrane of small intestine, are absent in the large intestine. Only mucus secreting glands are seen in the mucosa of large intestine.

**Secretions of large intestine:**

Large intestinal juice appears as a watery fluid with pH of 8.0.

**Composition of large intestinal juice:**

Large intestine consists of 99.5% of water and 0.5% of solids (fig 1). Digestive enzymes are not present. Concentration of bicarbonate is more in large intestinal juice.

**Functions of large intestinal juice:**

**Neutralization of acids:**

The formation of strong acids occurs by bacterial action in large intestine and there strong acids are neutralized by the alkaline nature of large intestinal juice. The alkalinity of this juice occurs because of the presence of large quantity of bicarbonate.

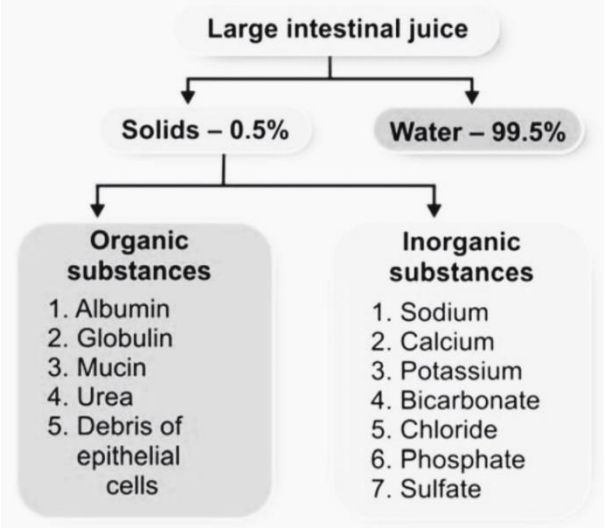
**Lubrication activity:**

Mucin observed in the secretion of large intestine lubricates the mucosa of large intestine as well as bowel contents. So that, the movement of bowel is enhanced. Mucin also helpful in protecting mucous membrane of large intestine by large intestine obstructing the damage caused by mechanical injury or chemical substances.

Fig 1. **Composition of large intestinal juice:**

**Functions of large intestine:**

1. **Absorptive function:** Large intestine plays a major role in the absorption of various compounds namely
    - Alcohol
    - Drugs like anesthetic agents, sedatives and steroids.
    - Electrolytes
    - Organic substances like glucose
    - Water
2. **Excretory function:** Large intestine plays a major role in excreting heavy metals such as arsenic, bismuth, lead and Mercury through faeces.
3. **Formation of faeces:** After the absorption of nutrients, water and other compounds, the unwanted compounds in the large intestine play a role in forming faeces. This is excreted out from the body.
4. **Secretory function:** Large intestine is capable of secreting mucin and inorganic substances such as bicarbonates and chlorides.



5. **Synthetic function:** Bacterial flora of large intestine is capable of synthesising folic acid, vitaminB12 and vitamin K. By this function, large intestine plays a major role in blood clotting mechanism as well as erythropoietic activity.

**Dietary fiber:**

Dietary fiber or Roughage is a group of food particles and the passage of these food particles occurs through stomach and small intestine without the process of digestion and arrive the large intestine without any changes. The digestion and absorption of other nutritive compounds occur before reaching large intestine. The main characteristic feature of large intestine dietary fiber is that the hydrolysis of this dietary does not occur. So, this dietary fiber is capable of escaping digestion in small intestine and passing into large intestine. It arranges substrate for microflora of large intestine and enhances the bacterial mass. The anaerobic bacteria again is capable of degrading the fermentable components of the fiber. So, in large intestine the breakage of some of the components of fiber occurs and absorption of these divided components of fiber takes place. The excretion of remaining components happens through faeces.

**Components of dietary fiber:**

Examples for major components of dietary fiber are cellulose, hemicellulose, lignin, gums, D-glucans and pectin. The breakdown of cellulose, hemicellulose and pectin occurs partially whereas other components are not digested. Dietary fiber also consists of antioxidants, minerals and other chemicals that are utilised for health.

**Sources of dietary fiber:**

Sources of dietary fiber are bread, cereals, frits, vegetables and wheat grain (especially it's outer layer).

**Significance of dietary fiber:**

Diet with high dietary fiber exhibits health benefits since dietary fiber

- Consists of substances namely antioxidants and other useful substances.
- Delays emptying of stomach
- Enhances formation of bulk and soft faeces and eases defecation

When high dietary food is consumed, other foods which may cause some diseases may be reduced in quantity or cometely removed from diet. Diet with high fiber content has low energy and it may be helpful in decreasing the body weight. Some components of dietary fiber also decrease blood cholesterol level and thereby reduce the risk for coronary heart disease and gall stones. Dietary fiber is essential either for treating or for preventing bowel syndrome and constipation. Dietary fiber is also helpful in treating some of the disorders namely cancer, diabetes and ulcer etc.

**Applied physiology:**

**Appendicitis:**

Inflammation of appendix is termed as appendicitis. Appendix is a small, worm like appendage, projecting from caecum of ascending colon. It is located on the lower right side of the abdomen. Appendix does not play any role in humans. But it leads to the occurrence of major problems when diseased. The development of appendicitis occurs at any age. Whatever it may be, it is very common between 10 and 30 years of age.

**Causes:**

The causes of appendicitis is not clear. It may happen because of either bacterial or viral infection. It also happens particularly during blockage of connection between appendix and large intestine by faeces, foreign body or tumour.

**Features:**

1. Abdominal swelling
2. Constipation or diarrhoea
3. Difficulty in passing gas
4. Loss of appetite
5. Main symptom of appendicitis is the pain, which begins around the umbilicus and then spreads to the lower side of the abdomen. It shows more severity within 6 to 12 hours
6. Nausea
7. Vomition

Without an immediate treatment, the appendix may rupture and the inflammation will immediately spread to the whole body and leading to more complicated. Sometimes even death may happens. Therefore, the treatment of appendicitis is taken into consideration as an emergency. Normal standard treatment for appendicitis is appendectomy (i.e, surgical removal of appendix)

**Constipation:**

Failure of removal of faeces, which gives discomfort is termed as constipation. It occurs because of lack of movements essential for defecation. Because of the absence of mass movement in colon, faeces retain in the large intestine for a long time and leads to …..of absorption of fluid. So, the faeces become hard as well as dry.

**Causes:**

1. **Dietary causes:** Lack of either fiber or lack of liquids in diet leads to the occurrence of constipation.
2. **Diseases:** Constipation is seen in various types of diseases
3. **Drugs:** The drugs such as anticonvulsants, antidepressants, antihypertensive drugs( such as calcium channel blockers) antiparkinson drugs, diuretics and pain relievers(narcotics) are responsible for causing constipation.
4. Dysfunction of myenteric plexus in large intestine- megacolon. Megacolon is the condition manifested by distention as well as hypertrophy of colon and is associated with constipation. It occurs by the absence or damage of ganglionic cells in myenteric plexus, which leads to the occurrence of dysfunction of myenteric plexus. It results in the accumulation of large quantity of faeces in the colon. The distention of the colon occurs upto a diameter of 4 to 5 inch. It also leads to the occurrence of hypertrophy of colon. Congenital development of megacolon is termed as hirschsprung disease.
5. **Irregular bowel movement:** Irregular bowel habit is the most factor for causing constipation. It leads to the occurrence of Constipation by inhibiting the normal defecation reflexes.
6. **Spasm of sigmoid colon:** Spasm in the sigmoid colon (spastic colon) obstructs it’s motility and leads to the occurrence of Constipation.

**Diarrhoea:**

Diarrhoea is the frequent and profuse discharge of intestinal contents particularly in loose and fluid form. It happens because of the enhanced movements of intestine. It may be either acute or chronic.

**Causes:** Generally if digested food the absorption of large portion of fluid occurs and only a semi solid stools retains. In diarrhoea, the absorption of fluid happens sufficiently and leads to the occurrence of watery bowel discharge. Acute diarrhoea may be caused by temporary problems such as infection. Chronic diarrhoea occurs due to the disorders of intestinal mucosa. Thus, the general causes of diarrhoea are:

1. **Dietary abuse:** Diarrhoea occurs because of the consumption of contaminated water or food, artificial sweeteners found in food, spicy food etc.
2. **Food intolerance:** Acute diarrhoea occurs primarily by indigestion of food substances, especially lactose, a sugar present in milk and milk products. Normally milk and milk products along with lactose may not be digested in an easy manner.
3. **Infections by**
    - Bacteria namely Escherichia coli, shigella and salmonella etc..
    - Parasites like entamoeba hystolytica and giardia lambia etc.
    - Viruses such as hepatitis virus and rota virus.
4. **Intestinal diseases:** Chronic diarrhoea is seen particularly during inflammation of intestine, abnormal motility of the intestine and irritable bowel syndrome (IBS).
5. **Reactions to medicines:** Examples-
    - Antibiotics
    - Antacids containing magnesium
    - Antihypertensive drugs
    - Laxatives

**Features:**

Severe diarrhoea leads to occurrence of loss of excess water as well as electrolytes. This results in the formation of dehydration and electrolyte balance. Chronic diarrhoea leads to the occurrence of hypokalemia as well as metabolic acidosis. Other features of diarrhoea are abdominal pain, bloating ( condition in which the subject feels the abdomen full and tight due to excess intestinal gas) and nausea.

**Ulcerative colitis:**

Ulcerative colitis is an inflammatory bowel disease (IBD), manifested by the inflammation and ulcerative aberration's in the wall of large intestine. It is also termed as colitis or proctitis. Generally rectum and lower part of the colon are commonly affected. In a rare conditions, the entire colon is affected. Ulcerative colitis is observed at any age. Normally it affects people between 15 and 30 years. Rarely it affects 50 and 70 years old people.

Attributions

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