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Question:-

What Are Intestines?

The muscular tube that stretches from the lower end of the stomach to the anus is called intestine. It is also known as the bowel or bowels. Further, the intestine is divided into the small intestine and large intestine. Although both these intestines are interconnected, they can be differentiated in many ways. In this article, we discuss about the difference between the small intestine and large intestine.

The Small Intestine?

The small intestine is made up of three segments, which form a passage from your stomach (the opening between your stomach and small intestine is called the pylorus) to your large intestine:

THE STRUCTURE

The coiled tube of the small intestine is subdivided into three regions. From proximal (at the stomach) to distal, these are the duodenum, jejunum, and ileum

1. The Duodenum:- is short section is the part of the small intestine that takes in semi-digested food from your stomach through the pylorus, and continues the digestion process. The duodenum also uses bile from your gallbladder, liver, and pancreas to help digest food.

2. The Jejunum:- The middle section of the small intestine carries food through rapidly, with wave-like muscle contractions, towards the ileum.

3. The Ileum:- This last section is the longest part of your small intestine. The ileum is where most of the nutrients from your food are absorbed before emptying into the large intestine.

By the time food reaches your small intestine, it has already been broken up and mashed into liquid by your stomach. Each day, your small intestine receives between one and three gallons (or six to twelve liters) of this liquid. The small intestine carries out most of the digestive process, absorbing almost all of the nutrients you get from foods into your bloodstream. The walls of the small intestine make digestive juices, or enzymes, that work together with enzymes from the liver and pancreas to do this.

HISTOLOGY OF THE INTESTINES

The wall of the small intestine is composed of the same four layers typically present in the alimentary system. However, three features of the mucosa and submucosa are unique. These features, which increase the absorptive surface area of the small intestine more than 600-fold, include circular folds, villi, and microvilli. These adaptations are most abundant in the proximal two-thirds of the small intestine, where the majority of absorption occurs.

The Circular folds:-

Also called a plica circular, a "**circular fold**" is a deep ridge in the mucosa and submucosa. Beginning near the proximal part of the duodenum and ending near the middle of the ileum, these folds facilitate absorption. Their shape causes the chyme to spiral, rather than move in a straight line, through the small intestine. Spiralling slows the movement of chyme and provides the time needed for nutrients to be fully absorbed.

The Villi:-

Within the circular folds are small (0.5–1 mm long) hair like vascularized projections called "**villi**" (singular = villus) that give the mucosa a furry texture. There are about 20 to

40 villi per square millimeter, increasing the surface area of the epithelium tremendously. The mucosal epithelium, primarily composed of absorptive cells, covers the villi. In addition to muscle and connective tissue to support its structure, each villus contains a capillary bed composed of one arteriole and one venule, as well as a lymphatic capillary called a "**lacteal**". The breakdown products of carbohydrates and proteins (sugars and amino acids) can enter the bloodstream directly, but lipid breakdown products are absorbed by the lacteals and transported to the bloodstream via the lymphatic system.

The Microvilli

As their name suggests, "**microvilli**" (singular = microvillus) are much smaller ($1\ \mu\text{m}$) than villi. They are cylindrical apical surface extensions of the plasma membrane of the mucosa's epithelial cells, and are supported by microfilaments within those cells. Although their small size makes it difficult to see each microvillus, their combined microscopic appearance suggests a mass of bristles, which is termed the "**brush border**". Fixed to the surface of the microvilli membranes are enzymes that finish digesting carbohydrates and proteins. There are an estimated 200 million microvilli per square millimeter of small intestine, greatly expanding the surface area of the plasma membrane and thus greatly enhancing absorption.

THE LARGE INTESTINE:-

The large intestine is the terminal part of the alimentary canal. The primary function of this organ is to finish absorption of nutrients and water, synthesize certain vitamins, form faeces, and eliminate faeces from the body.

THE STRUCTURE:-

The large intestine runs from the appendix to the anus. It frames the small intestine on three sides. Despite its being about one-half as long as the small intestine, it is called large because it is more than twice the diameter of the small intestine, about 3 inches.

THE SUBDIVISIONS:-

The large intestine is subdivided into four main regions: the cecum, the colon, the rectum, and the anus. The ileocecal valve, located at the opening between the ileum and the large intestine, controls the flow of chyme from the small intestine to the large intestine.

The Cecum

The first part of the large intestine is the cecum, a sac-like structure that is suspended inferior to the ileocecal valve. It is about 6 cm (2.4 in) long, receives the contents of the ileum, and continues the absorption of water and salts. The appendix (or vermiform appendix) is a winding tube that attaches to the cecum. Although the 7.6-cm (3-in) long appendix contains lymphoid tissue, suggesting an immunologic function, this organ is generally considered vestigial. However, at least one recent report postulates a survival advantage conferred by the appendix: In diarrheal illness, the appendix may serve as a bacterial reservoir to repopulate the enteric bacteria for those surviving the initial phases of the illness. Moreover, its twisted anatomy provides a haven for the accumulation and multiplication of enteric bacteria. The mesoappendix, the mesentery of the appendix, tethers it to the mesentery of the ileum.

The Colon

The cecum blends seamlessly with the colon. Upon entering the colon, the food residue first travels up the ascending colon on the right side of the abdomen.

The colon consists of four parts:

- a. Ascending colon: -Using muscle contractions, this part of the colon pushes any undigested debris up from the cecum to a location just under the right lower end of the liver.

b. Transverse colon:- Food moves through this second portion of the colon, across your front (or anterior) abdominal wall, traveling from left to right just under your stomach.

c. Descending colon:-The third portion of colon pushes its contents from just near the "**spleen**", down to the lower left side of your abdomen.

d. Sigmoid colon:- The final S-shaped length of the colon, curves inward among the coils of your small intestine, then empties into the rectum.

e. Rectum:-The final section of digestive tract measures from 1 to 1.6 inches (or 2.5 to 4 cm). Leftover waste collects there, expanding the rectum, until you go to the bathroom. At that time, it is ready to be emptied through your anus

The Anal Canal

Finally, food residue reaches the last part of the large intestine, the anal canal, which is located in the perineum, completely outside of the abdominopelvic cavity. This 3.8–5 cm (1.5–2 in) long structure opens to the exterior of the body at the anus. The anal canal includes two sphincters. The internal anal sphincter is made of smooth muscle, and its contractions are involuntary. The external anal sphincter is made of skeletal muscle, which is under voluntary control. Except when defecating, both usually remain closed.

THE HISTOLOGY OF THE INTESTINES AND ANAL CANAL

There are several notable differences between the walls of the large and small intestines. Example, few enzyme-secreting cells are found in the wall of the large intestine, and there are no circular folds or villi. Other than in the anal canal, the mucosa of the colon is simple columnar epithelium made mostly of enterocytes (absorptive cells) and goblet cells. In addition, the wall of the large intestine has far more intestinal

glands, which contain a vast population of enterocytes and goblet cells. These goblet cells secrete mucus that eases the movement of faeces and protects the intestine from the effects of the acids and gases produced by enteric bacteria. The enterocytes absorb water and salts as well as vitamins produced by your intestinal bacteria.