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DEPARTMENT: ANATOMY

COURSE: ANA 204

**ASSIGNMENT:**  Describe the microanatomy of the small and large intestine. Note you’re expected to state the functions, segments, layers, general, features and epithelium of each part of the small intestine and large intestine.

**ANSWER:**

**Small intestine**

The gastrointestinal(GI) tract is a tube that goes from the mouth to the anus. The esophagus carries food from the mouth and throat to the stomach. The stomach receives food from the esophagus, starts the digestive process and empties partly digested food into the small intestine. The small intestine continues digestion and absorbs nutrient. The large intestine absorbs water from partly digested food, forms it into stool and stores it until it is passed out of the body in bowel movement.

**MICRO ANATOMY OF THE SMALL INTESTINE.**

The small intestine is a part of the gastrointestinal tract where digestion and absorption takes place. The small intestine is a tubular structure within the abdominal cavity that carries the food in continuation with the stomach up to the colon from where the large intestine carries it to the rectum and out of the body via the anus. The main function of this organ is to aid in digestion.

**FUNCTIONS OF THE SMALL INTESTINE.**

1. **Final stages of food digestion:** the main functions of the small intestine are to break down, or digest, food and to absorb nutrients, such as electrolytes, vitamins and minerals.
2. **Absorption of food and water:** the small intestine is the most important absorbing organ in the GI tract. About 90%of nutrients absorption takes place in the small intestine.

**Segments of the small intestine;** it extends from the pylorus of the stomach to the ileocaecal junction, where it meets the large intestine at the ileocaecal valve. Anatomically, the small bowels can be divided into three parts;

1. **Duodenum:** The most proximal portion of the small intestine is a duodenum. It runs from the pylorus of the stomach to the duodenojejunal junction. The duodenum can beb divided into four parts; superior, inferior and ascending. Together these parts form a ‘c’ shape, that is around 25cm, which wraps around the head of the pancreas. It is a short section that receives secretions from the pancreas and liver via the pancreatic and common bile ducts. The duodenum functions to mix food with the bile and pancreatic enzymes to continue the digestion of carbohydrates, fats and proteins. The duodenum is supplied by the branches of the celiac trunk and superior mesenteric artery (SMA).
2. **Jejunum:** considered to be roughly 40% of the small gut in man, but not closer to 90% in animals. The jejunum constitutes about two fifths of the proximal small intestine and the ileum makes the distal three fifths. No clear demarcations noted between the jejunum and ileum, however, there are some features which distinguish the jejunum from the ileum. The jejunum has a thicker wall and a wider lumen than the ileum and mainly occupies the left upper and central abdomen. Mesenteric fat is less abundant in the mesentery of the jejunum and vessels in the mesentery are therefore well seen.
3. **ILEUM:** it is the longest part of the small intestine measuring about 1.8meters (6ft) in length. It is thicker more vascular and has more developed folds than the jejunum. The ileum joins the cecum, the first portion of the large intestine at the ileocecal sphincter (or valve). The jejunum and the ileum are tethered to the posterior abdominal wall by the mesentery.
4. **MESENTERY:** the mesentery is a double fold of the peritoneum attached to the posterior abdominal wall. It is fan shaped with a root of about 15cm extending obliquely from the left L2 transverse process level to the right sacroiliac joint and crossing the third part of the duodenum aorta and inferior vena cava(IVC) and right ureter and a 4 to 6 meter periphery which covers the entire length of the jejunum and ileum. Between the 2 leaves of the mesentery are the mesenteric vessels and lymph nodes.

**LAYERS OF THE SMALL INTESTINE**

1. Mucosa
2. Submucosa
3. Muscularis propia
4. Serosa

**GENERAL FEATURES OF THE SMALL INTESTINE**

1. Circular fold
2. Intestinal villi
3. Microvilli
4. Peyer’s patch
5. Brunner gland

**EPITHELIUM LAYER OF THE SMALL INTESTINE**

1.Mucosa –simple columnar epithelium which consists primarily of absorptive cells(enterocytes) with scattered goblets cells and occasional enteroendocrine cells.

**LARGE INTESTINE**

**MICROANATOMY OF 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 feces, and eliminate feces from the body.

The anatomy of the large intestine includes the cecum (along with appendix) and the colon; in some descriptions (and the author agrees), it also includes the anorectum(rectum and anal rectum).

The large intestine which is the terminal part of the gastrointestinal (GI) tract is so called because its lumen (diameter) is larger not because its length is greater than that of the small intestine (duodenum, jejunum, ileum); in fact, small intestine is no longer than the large intestine. The large intestine develops partly from the midgut(from cecum to distal transverse colon), the hindgut(from distal transverse colon to dentate line in anorectum) and protodeum( below the dentate line).

**FEATURES OF THE LARGE INTESTINE**

In an average adult, the large intestine is about 1.5m long and 5cm wide. It consists of the caecumappendixcolon and rectum and has an average diameter of about 6cm.

**Note :** the ileocaecal valve controls the entry of material from the last part of the small intestine called the ileum.

The human appendix has no known function and is thought to be a remnant from a previous time in human evolution.

**FUNCTIONS OF THE LARGE INTESTINE.**

The 4 major functions of the large intestine are;

1. Reabsorption of water and mineral ions such as sodium and chloride
2. Formation and temporary storage of faeces.
3. Maintaining a resident population of over 500species of bacteria.
4. Bacterial fermentation of indigestible materials.

**LAYERS OF THE LARGE INTESTINE**

The four layers of the large intestine from the lumen outward are;

1. Mucosa: the inner most layer of the large intestine. It is smooth, lacking the villi found in the small intestine. Many mucus glands secrete mucus into the hollow lumen of the large intestine.
2. Submucosa:
3. Muscular layer
4. Serosa

The muscular layer is made up of two layers of smooth muscle, the inner, the circular layer and the outer longitudinal layer. These layers contribute to the motility of the large intestine.

**SEGMENT OF THE LARGE INTESTINE:**

1. Cecum
2. Colon
3. Rectum
4. Anal canal

**EPITHELIUM LAYER OF THE LARGE INTESTINE.**

The intestinal eputhelium is the single layer that form the luminal surface(lining) of the large intestine of the gastrointestinal tract. Composed of the simple columnar epithelial cells.