Name: David Daniella Christabel

Matric Number: 18/MHS03/002

Department: Anatomy

College: Medicine And Health Sciences

Course Code: Ana 204

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

SMALL INTESTINE

The small intestine is the part of the gastrointestinal tract where much of the digestion and absorption of nutrients and minerals from food takes place. The average length of the small intestine in an adult human male is 6.9m (22 feet, 6inches), and in the adult female 7.1m (23 feet, 4inches). It can vary greatly , from as short as 4.6m (15 feet) to as long as 9.8m (32 feet).

Sections Of The Small Intestine

The small intestine is approximately 2.5-3cm in diameter, and is divided into three sections:

- Duodenum: is the first section of the small intestine and is the shortest part of the small intestine . It is where most chemical digestion using enzymes takes place
- Jejunum: this is the middle section of the small intestine. It has a lining which is designed to absorb carbohydrates and proteins. The transport of nutrients across epithelial cells through the jejunum includes the passive transport of amino acids, small peptides, vitamins, and much longer than in the duodenum or ileum.
- Ileum: this is the final section of the small intestine. The function of the ileum is mainly to absorb vitamin B12, bile salts, and any products of digestion that were not absorbed by the jejunum.

Histology/Epithelium Of The Small Intestine

The epithelium of the small intestine lines the luminal surface. The intestinal epithelium is the single cell layer that form the luminal surface (lining) of both the small and large intestine (colon) of the gastrointestinal tract. Composed of simple columnar epithelial cells, it serves two main functions: absorbing useful substances into the body and restricting the entry of harmful substances. As part of it’s protective role, the intestinal epithelium forms an important component of the intestinal mucosal barrier.

The small intestine wall has four major layers: the outermost serosa, muscular, submucosa, and innermost mucosa.

- Serosa is a smooth membrane consisting of a thin layer of cells that secrete serous fluid, and a thin layer of connective tissue. Serous fluid is a lubricating fluid that reduces friction from the movement of the muscularis.
- Muscularis is a region of muscle adjacent to the submucosa membrane. It is responsible for gut movement (also called peristalsis). It usually has two distinct layers of smooth muscle: circular and longitudinal.
- Submucosa is the layer of dense irregular connective tissue or loose connective tissue that supports the mucosa; it also joins the mucosa to the bulk of underlying smooth muscle.
- Mucosa is the innermost tissue layer of the small intestines and is a mucous membrane that secretes digestive enzymes and hormones. The intestinal villi are part of the mucosa.`
- Adventitia: is comprised of loosely arranged fibroblasts and collagen, with the vessels and nerves passing through it. The majority of the small intestine adventitia is covered by mesothelium and is commonly called the serosa.

The three sections of the small intestine look similar to each other at a microscopic level, but there are some important differences. The jejunum and ileum has Peyer's patches in the mucosa, but the duodenum and jejunum do not.

Functions Of The Small Intestine

- Digestive: the small intestine is where most chemical digestion takes place. Most digestive enzymes in the small intestine are secreted by the pancreas and enter the small intestine via the pancreatic duct.
- Absorption: digested food is now able to pass into the blood vessels in the wall of the intestine through either diffusion or active transport. The small intestine is the site where most of the nutrients from ingested food are absorbed.
- Immunological: the small intestine supports the body's immune system. The presence of gut flora appears to contribute positively to the host's immunity system.

General Features Of The Small Intestine

The inner wall or mucosa of the small intestine is lined with simple columnar epithelial tissue. Structurally, mucosa is covered in wrinkles or folds called plicae circulates, which are considered permanent features in the wall of the organ.

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, synthesise certain vitamins, form fees, and eliminate feaces from the body.

General Features

The large intestine runs from the appendix to the anus. 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.

Segments Of The Large Intestine

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.

- 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 (2.4in) long, receives the contents of the ileum, and continues the absorption of water and salts.
- 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. At the inferior surface of the liver, the colon bends to form the right colic flexure (hepatic flexure) and becomes the transverse colon.
- Rectum: food residue leaving the sigmoid colon enters the rectum in the pelvis, near the third sacral vertebra. The final 20.3 cm(8in) of the alimentary canal, the rectum extends anterior to the sacrum and coccyx.
- Anal Canal: the anal canal is located in the perineum, completely outside of the abdominopelvic cavity and is 3.8-5cm (1.5-2in)

Histology/Epithelium Of The Large Intestine

The mucosa of the colon is simple columnar epithelium made mostly of enterocytes (absorptive cells) and goblet cells. 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 faces 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.

Functions Of The Large Intestine

- Absorption
- Feces

- Digestion
- Formation
- Defecation

General Features

These are unique to the large intestine: teniae coli, haustra, and epiploic appendages. The teniae coli are three bands of smooth muscle that make up the longitudinal muscle layer of the muscularis of the large intestine, except at its terminal end. Tonic contractions of the teniae coli bunch up the colon into a succession of pouches called haustra which are responsible for the wrinkled appearance of the colon.