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Histopathology Techniques

Histopathology Techniques and Museum

 MLS 408

 Question

1. In a tabular form only, compare and contrast sections of the Gastrointestinal tract.

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|  Answer |
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| Sections of the GIT | Oral cavity | Esophagus | Stomach | Small intestine | Large intestine  | Appendix |
| Serosa | The oral cavity is divided in a vestibule, the area "outside" the teeth, and an oral cavity proper. The entire oral cavity is lined by a stratified squamous epithelium. The epithelial lining is divided into two broad types:Masticatory epithelium covers the surfaces involved in the processing of food (tongue, gingivae and hard palate). The epithelium is keratinized to different degrees depending on the extent of physical forces exerted on it.Lining epithelium, i.e. non-keratinised stratified squamous epithelium, covers the remaining surfaces of the oral cavity. | The esophagus is lined by stratified squamous epithelium without glands. In fish, the esophagus is often lined with columnar epithelium, and in amphibians, sharks and rays, the esophageal epithelium is ciliated, helping to wash food along, in addition to the action of muscular peristalsis.The tunica adventitia is the shifting outer fascial layer that allows for free mobility of the esophagus while swallowing. It surrounds the esophagus and fills the spaces between the esophagus and surrounding organs such as the trachea, bronchi, and pleural. The following are located here:Large supply vesselsLymphatic vesselsNerve fascicles of the vagus nerve and the esophageal sympathetic plexusThe esophagus has no serosa which makes it unique to the rest of the gastrointestinal tract. | Lined by simple columnar epithelium,Gastric folds and gastric fluids which are 5 in number:pineal cells,chief cells,mucous secreting cells,oxyintic cells,zymogenic cells. Serosa consists of a secretory epithelial layer and a thin connective tissue layer that reduce the friction from muscle movements. | The outermost layer of the intestine, the serosa, is a smooth membrane consisting of a thin layer of cells that secrete serous fluid, and a thin layer of connective tissue. In the small intestine, the epithelium (particularly the ileum) is specialized for absorption, with villi and microvillii increasing surface area. 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 serosa is a thin layer of simple squamous epithelial tissue that secretes watery serous fluid to lubricate the surface of the large intestine, protecting it from friction between abdominal organs and the surrounding muscles and bones of the lower torso. | The appendix is contained within the visceral peritoneum that forms the serosa, and its exterior layer is longitudinal and derived from the taenia coli; the deeper, interior muscle layer is circular. Beneath these layers lies the submucosal layer, which contains lymphoepithelial tissue. Outside of the muscular layers there is a subserosa containing loose connective tissue, vasculature and nerves. The outermost located peritoneum consists of a thin lining of mesothelial cells |
| Muscularis | The oral mucosa has no muscularis mucosae, and clearly identifying the boundary between it and the underlying tissues is difficult. | Muscularis mucosae consists of scattered bundles of longitudinal muscle fibers and is thickest in the esophagus,where it consists of relatively conspicuous bundles of longitudinal muscle fibers.  The muscularis mucosae is thinner in the rest of the tract. | Contains loose connective tissues,blood vessels and the muscularis in the stomach differs from that of other GI organs in that it has three layers of muscle instead of two. Under these muscle layers is the adventitia—layers of connective tissue that are continuous with the omenta. The stomach has a third layer of muscularis externa: the inner oblique layer. This helps churn the chyme in the stomach. | The muscularis in the small intestine is made up of a double layer of smooth muscle: an inner circular layer and an outer longitudinal layer. The contractions of these layers promote mechanical digestion, expose more of the food to digestive chemicals, and move the food along the canal. Consists of two smooth muscle layers; the outer longitudinal layer and inner circular layer. The myenteric plexus lies between them. | Considerably amount of fat and muscularis mucosae has two layers and extends into the intestinal villi, where the smooth muscle cells form a longitudinal bundle in the centre of the villi. The appearance of the muscularis externa is different from that of the small intestine. The muscularis layer surrounds the submucosa and contains many layers of visceral muscle cells that contract and move the large intestine. Continuous contraction of smooth muscle bands in the muscularis produces lumpy, pouch-like structures known as haustra in the large intestine.  | There is often fatty tissue in the submucosa although it has no function in digestion the appendix is a significant component of the MALT with abundant lymphocytes and lymphoid follicles in its laminar propria and submucosa |
| Sub Mucosa | The submucosa underlying the lamina propria of the oral cavity is variable. At times the lamina propria and submucosa are substantively so similar that they merge imperceptibly. The submucosa will be distinguished from the lamina propria only by the presence of minor salivary glands in a loose textured tissue. A submucosa may or may not be present deep in the dense layer of the lamina propria, depending on the region of the oral cavity. If present, the submucosa usually contains loose connective tissue and may also contain adipose tissue or salivary glands well as overlying bone or muscle within the oral cavity. | The submucosa loosely connects the mucous membrane and the muscular coat.  This layer also contains the larger blood vessels, the submucosal (Meissner) nerve plexus, and esophageal glands. | The submucosa is a dense, irregular layer of connective tissue with large blood vessels, lymphatics, and nerves that supports the mucosa. | The 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. Connective tissue layer, which contains blood vessels, lymphatics and the submucosal plexus. | The mixture of irregular connective and adipose tissue, numerous blood vessels, and several excellent examples of ganglion cells and nerves of the submucosal plexus. the mucosa is a layer of blood vessels, nerves and connective tissue known as the submucosa, which supports the other layers of the large intestine.  | Rich lymphoid tissue in the submucosa that may disrupt the muscularis mucosa, obliterate the lumen and distort the crypt architecture (lymphoid tissue atrophies with age). |
|  Mucosa | The oral cavity is lined by a mucous membrane (the oral mucosa) consisting of a stratified squamous epithelium, which may or may not be keratinized, and an underlying connective tissue layer, the lamina propria. The surface is kept moist with mucus produced by the major and numerous minor salivary glands. The oral mucosa is well supplied with nerve endings and, on the dorsal surface of the tongue, special sensory endings for taste. | Epithelium is protective (stratified squamous, non-keratinized). Lamina propria is unspecialized.Is lined by epithelium which is stratified, squamous, and non-keratinizing, for protective purposes. The 1/3 distal part from the stomach of the esophagus is lined by skeletal muscles and the 2/3 proximal part is lined by smooth muscle. | The epithelium is simple columnar, and is organized into gastric pits and glands to deal with secretion | The 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. The Mucosa of the small intestine has various structural features which considerably increase the luminal surface and consequently support the main function of the small intestine which is the absorption of degraded components of the food. Simple columnar epithelium contains intestinal glands microvilli and the mucosa of the small intestine is lined by a simple columnar epithelium which consists primarily of absorptive cells (enterocytes), with scattered goblet cells and occasional enteroendocrine cells. In crypts, the epithelium also includes Paneth cells and stem cells. The epithelium of the villi is made up of tall columnar absorptive cells called enterocytes, and goblet cells, which secrete mucin, for lubrication of the intestinal contents, and protection of the epithelium. | The surface of the mucosa is relatively smooth as there are no plicae circulares or intestinal villi.Crypts of Lieberkuhn are present and usually longer and straighter than those of the small intestine. The muscularis mucosa again forms two layers. It is lined by absorptive columnar epithelium with goblet cells and some enteroendocrine cells and transverse colon and sigmoid colon have a serosa. The wall of the large intestine is lined with simple columnar epithelium. Instead of having the evaginations of the small intestine (villi), the large intestine has invaginations (the intestinal glands). | Abundant lymphocytes and lymphoid follicles.The inner lining, facing the lumen of the appendix, is covered by a glandular epithelium with intestinal glands that extend into the deeper layers of the mucosa. The glands are lined with simple columnar epithelium and a high number of mucin producing goblet cells.. |

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The GI tract is essentially a tube extending from the oral cavity to the anus.  This tube is organized into a series of four distinct layers which are fairly consistent throughout its length. The GI tract contains four layers: the innermost layer is the mucosa, underneath this is the submucosa, followed by the muscularis propria and finally, the outermost layer - the adventitia. The structure of these layers varies, in different regions of the digestive system, depending on their function.

The four layers in more detail:

\* Mucosa --  innermost layer (closest to the lumen), the soft, squishy lining of the tract, consisting of epithelium, lamina propria, and muscularis mucosae. A lining epithelium, including glandular tissue, an underlying layer of loose connective tissue called the lamina propria, which provides vascular support for the epithelium, and often contains mucosal glands. Products of digestion pass into these capillaries. Lymphoid follicles, and plasma cells are also often found here. Finally, a thin double layer of smooth muscle is often present - the muscularis mucosa for local movement of the mucosa. It is the inner most layer which secretes mucus. It is composed of three layers:

\* Muscularis mucosa- It is a thin layer of smooth muscles.

\* Lamina propria- It is a layer of connective tissue. It is unusually cellular so it is compared to most connective tissues.

\* Epithelium- innermost layer and is responsible for most digestive, absorptive, and secretory processes.

\* Submucosa -- connective tissue supporting (outside, deep to) the mucosa. loose connective tissue layer, with larger blood vessels, lymphatics, nerves, and can contain mucous secreting glands.

\* Muscularis externa -- muscular wall of the tract, surrounding (outside, deep to) the submucosa. There are usually two layers; the inner layer is circular, and the outer layer is longitudinal. These layers of smooth muscle are used for peristalsis (rhythmic waves of contraction), to move food down through the gut.

\* Adventitia / serosa -- outermost layer (deepest, farthest from the lumen) is called either adventitia (in regions where the tube passes through the body wall) or serosa (in regions where the tube passes through body cavities). Adventia layer (or serosa) is the outermost layer of loose connective tissue - covered by the visceral peritoneum. Contains blood vessels, lymphatics and nerves