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MLS 408

Histopathology techniques and Museum assignment

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QUESTION:

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

The gastrointestinal tract (digestive tract, alimentary canal, digestion tract, GItract, GIT) is an organ system within humans and other animals which takes in food, digests it to extract and absorb energy and nutrients, and expels the remaining waste as feces. The mouth, esophagus, stomach and intestines are part of the gastrointestinal tract. *Gastrointestinal* is an adjective meaning of or pertaining to the stomach and intestines. A tract is a collection of related anatomic structures or a series of connected body organs.

All bilaterians have a gastrointestinal tract, also called a gut or an alimentary canal. This is a tube that transfers food to the organs of digestion. In large bilaterians, the gastrointestinal tract also has an exit, the anus, by which the animal disposes of feces (solid wastes). Some small bilaterians have no anus and dispose of solid wastes by other means (for example, through the mouth). The human gastrointestinal tract consists of the esophagus, stomach, and intestines, and is divided into the upper and lower gastrointestinal tracts. The GI tract includes all structures between the mouth and the anus, forming a continuous passageway that includes the main organs of digestion, namely, the stomach, small intestine, and large intestine. However, the complete human digestive system is made up of the gastrointestinal tract plus the accessory organs of digestion (the tongue, salivary glands, pancreas, liver and gallbladder). The tract may also be divided into foregut, midgut, and hindgut, reflecting the embryological origin of each segment. The whole human GI tract is about nine metres (30 feet) long at autopsy. It is considerably shorter in the living body because the intestines, which are tubes of smooth muscle tissue, maintain constant muscle tone in a halfway-tense state but can relax in spots to allow for local distention and peristalsis. The gastrointestinal tract contains trillions of microbes, with some 4,000 different strains of bacteria having diverse roles in maintenance of immune health and metabolism. Cells of the GI tract release hormones to help regulate the digestive process. These digestive hormones, including gastrin, secretin, cholecystokinin, and ghrelin, are mediated through either intracrine or autocrine mechanisms, indicating that the cells releasing these hormones are conserved structures throughout evolution.

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|  | structure | function |
| Mucosa: | 3 layers  Epithelium(stratifies squamous in mouth, pharynx, esophagus, simple columnar elsewhere)  Lamina propria (connective tissue)  Muscularis mucosa(smooth muscle)  Mucosa has gastric glands(stomach)  Villi,micrvilli in small intestine  Lymph nodules, intestinal glands(crypts) and goblet cells( small and large intestine) | Secretion  Absorption  Protection  Reception of stimuli  Hormone secretion |
| Submucosa: | Connective tissue with blood and lymph nodules and nerve  Brunners glands in duodenum  Payer’s patches-lymph nodules | Services mucosa with blood, lymph nodes, nerves  Secretes mucus in duodenum |
| Muscularis: | 2 smooth muscle layers  Outer longitudinal and inner circular | Mechanical digestion forms sphincters(valves) |

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| Serosa: | Visceral peritoneal membrane  Continuous with mesentery, mescolon , omenta , parietal peritoneum | Carries blood vessels, lymphatic vessels, lymph nodes, store fat, secretes fluid, connects digestive organs |

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| Organ | Major functions |
| Mouth and accessory organs | Ingestion: food is voluntarily placed into the oral cavity  Mechanical breakdown: mastification (chewing by teeth and mixing by tongue)  Digestion: salivary glands in saliva, produced by salivary glands, begins chemical breakdown of starch |
| Pharynx and esophagus | Prepulsion: peristaltic waves moves food bolus to stomach, thus accomplishing involuntary (pharyngeal-esophageal) phase of digestion |
| Stomach | Mechanical breakdown : peristaltic waves mix food with gastric juice and propel it into the duodenum  Digestion: pepsin begins the digestion of proteins  Absorption; absorbs a few fat-soluble substances like alcohol, some drugs etc |
| Small intestine and associated accessory organs (liver, gall bladder, pancreas) | Mechanical breakdown; segmentation by smooth muscle of the small intestine continually breaks down with digestive juices and along with short distance peristaltic waves, moves food along tract, allowing sufficient time for digestion and absorption .    Digestion: digestive enzymes delivered from pancreas and brush border enzymes attached to microvillus membranes complete digestion of all classes of foods.  Absorption: breakdown products of carbohydrates, protein, fat and nucleic acid digestion, plus vitamins, electrolytes and water are absorbed by active and passive mechanisms |
| Large intestine | Digestion: some remaining food residues are digested by bacteria(which also produces vitamin K  Absorption: absorbs most remaining water, electrolytes (largely NACL) and vitamins produced by bacteria  Prepulsion: propels feces forward |