GI system Cheat Sheet

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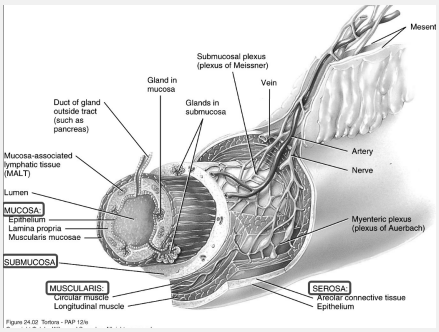
Digestive processes

1. ingestion
2. secretion
3. motility
4. digestion
5. absorption
6. defecation

visceral muscle contractions

oesophagus	peristaltic
stomach	peristaltic
small intestine	segmental, MMC
colon	segmentation, mass movement

layers of the GI tract



GI control

ENS	intrinsic set of nerves, neurons extending from esophagus to anus, 2 plexuses: myenteric (GI tract motility) & submucosal (controlling secretions)
ANS	extrinsic set of nerves; parasympathetic stimulation increases secretion & activity by stimulating ENS
	sympathetic stimulation decreases secretions & activity by inhibiting ENS

regulation of acid secretion

atropine

> muscarinic antagonist

NSAID'S & PG'S

> PGE2 acid, misoprostol = PGE2 analogue

Proglumide

> gastrin receptor antagonist

H2 receptor antagonists

> cimetidine, ranitidine, famotidine

PPI'S - protein pump inhibitors

> omeprazole, pantoprazole, rabeprazole, esomeprazole

accessory organs

salivary glands	three sets: parotid, sublingual & submandibular
pancreas	endocrine - insulin & glucagon, exocrine - digestive enzymes & bicarbonate
liver	excretion of bile pigments (bilirubin & bilverdin), bile salts e.g. deoxychoilic acid emulsification of fats

major structures

oesophagus

small intestine - duodenum, jejunum, ileum

large intestine - ascending colon, transverse colon, descending colon, sigmoid colon, rectum, anus

hormonal control

gastrin

> promotes gastric juice secretion, increases gastric motility, promotes growth of gastric mucosa

secretin

> stimulates secretion of pancreatic juice & bile that are rich in bicarbonate ions

hormonal control (cont)

cholecystokinin

> stimulates secretion of pancreatic juice rich in digestive enzymes, causes bile ejection from gallbladder & opening of sphincter of hepatopancreatic ampulla (sphincter of Oddi), induces satiety

saliva

mostly water (99.5%)

0.5% solutes - ions, dissolved gases, urea, nitric acid, mucus, immunoglobulin A, lysozyme & salivary amylase (acts on starch) & muramidase (anti-bacterial)

submandibular & sublingual glands produce mucin rich saliva

paratoid glands produce salivary amylase

salivated is controlled by ANS, parasympathetic stimulation promotes secretion of moderate amount of saliva, sympathetic stimulation decreases salivation

small intestine

circular fols called the plicae circulares are permanent ridges of mucosa & submucosa that encourage turbulent flow of chyme

two muscle layers, has **serosa** not adventitia

absorptive cell - digests & absorbs nutrients

goblet cell - secretes mucus

enteroendocrine cell -secretes hormones secretine, cholecystokin or GIP

paneth cell - secretes lysozyme & is capable of phagocytosis

major valves - sphincters

oesophagus - upper oesophageal sphincter
- pharynx & oesophagus

oesophagus - lower oesophageal sphincter
- oesophagus & stomach

stomach - cardiac sphincter (LOS)
- oesophagus & stomach

stomach - pyloric sphincter
- stomach & duodenum

small intestine
- sphincter of Oddi

large intestine - illeocaecal sphincter
- ileum & caecum

large intestine - internal anal sphincter
- involuntary smooth muscle

large intestine - external anal sphincter
- voluntary skeletal muscle

large intestine

approx. 5 feet in length

starts with ileocecal valve & has four parts: the cecum, colon (ascending, descending, transverse, sigmoid), rectum & anal canal

no circular folds/villi

mucosa = mostly absorptive epithelium mainly for water

microvilli are plentiful

interspersed goblet cells produce mucous but no digestive enzymes secreted

gastric glands & cell types

surface mucous cell	secretes mucus
mucous neck cell	secretes mucus
parietal cell	secretes HCl & intrinsic factor

gastric glands & cell types (cont)

chief cell	secretes pepsinogen & gastric lipase
G cell	secretes gastrin hormone

pancreas

lies posterior to greater curvature of stomach

pancreatic juice secreted into pancreatic duct & accessory duct & to small intestine

pancreatic duct joins common bile duct & enters duodenum ay hepatopancreatic ampulla

pancreatic juice = 1200 -1500 ml daily, composed of mostly water, sodium bicarb-onate (buffers acidic stomach chyme), enzymes (pancreatic amylase, proteolytic enzymes - trypsin secreted as trypsinogen, chymotrypsin, carboxypeptidase, elastase), pancreatic lipase, ribonuclease & deoxyr-ibonuclease

histology: 99% of cells are acini, exocrine, secrete pancreatic juice (fluid + digestive enzymes)
1% of cells are pancreatic islets (islets of Langerhans), endocrine, secrete hormones glucagon, insulin, somatostatin, & pancreatic polypeptide

GI histology notes

oesophagus	collapsible, muscular tube that lies posterior to the trachea & connects pharynx to stomach, has **adventitia**
stomach (internal anatomy)	**rugae of mucosa** , oblique, circular & longitudinal layers of muscle

GI tract functions

mouth	bite, chew, swallow
pharynx & oesophagus	transport
stomach	mechanical disruption; absorption of water & alcohol
small intestine	chemical & mechanical digestion & absorption
large intestine	absorb electrolytes & vit B, K
rectum & anus	defecation

digestion phases

cephalic phase - stimulates gastric secretion & motility

gastric phase - neural & hormonal mechanisms

intestinal phase - neural & hormonal mechanisms

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