

physiology :

- Cells in each bundle are connected together by gap junctions .
- The bicarbonate concentration in the pancreatic fluid is higher during high flow rates.
- During high flow rates of pancreatic fluid (typically following ingestion of meals), bicarbonate concentration in the pancreatic fluid increases while chloride concentration decreases.
- slow waves & spike potentials: normal - Electrical activity - ANS (more) & ENS
- tonic contractions & rhythmic contractions = food = large num of transmitters : the ENS
- Cells of Cajal + the ENS = synchronization
- After meal the increase in absorption = increase in blood flow = next 2-4 hours
- parasympathetic system has no direct effect on vessels
- Swallowing : Voluntary (tongue) , Involuntary (peristaltic of pharynx & esophagus) .
- CCK cholecystikinin: (secreted by jejunum) the release is stimulated by fat in chyme.
- Propulsive contraction is rhythmic shortening of longitudinal layer.
- Gastrin, CCK, serotonin enhance intestinal motility.
- Secretin and glucagon inhibit intestinal motility.
- segmentation contractions = Mixing movements= circular smooth muscle.
- In the third phase lasts for 5-15 minutes all slow waves are followed by contractions.
- Motilin = the most important factor in controlling the inter-digestive migrating contractions.
- Proteins (ptyalin, lingual lipase and mucin) are synthesized at ER (endoplasmic reticulum)exocytosis .
- Amylase that breaks polysaccharide into maltose
- HCl does not usually digest any thing, but it is important in the conversion of the proteolytic enzyme pepsinogen into Pepsin .
- In the defective production of intrinsic factor such as in gastric mucosal atrophy, pernicious anemia with failure of RBC maturation may occur.
- Gastrin has also trophic effect on gastric mucosa to maintain growth of mucosal cells.
- Gastrin >>CCK-B receptor>> parietal cells>>secrete HCl
- Histamine >> H2 receptor>>increasing c-AMP>>= increase HCl .
- Cimetidine blocks H2 receptors
- Somatostatin >>SS receptors >>decrease cAMP >>decrease HCl .
- Cephalic phase: thinking about, smelling, tasting, chewing .
- Gastric phase: Acts when food reaches the stomach.
- Caffeine and alcohol also stimulate acid secretions even no food is present in the stomach.
- COLONIC SECRETION: Mostly mucus secretion.
- Enzymes: secreted from acinar cells and water and bicarbonate are secreted by duct cells.
- Pancreatic amylase: secreted in an active form to convert polysaccharide in disaccharide.
- Pancreatic insufficiency (characterized by decreased enzyme secretion) is manifested as steatorrhea.

- effects of CCK is contraction of the gallbladder and relaxation of sphincter of Oddi .
- Ptyalin: Salivary alpha-amylase , activity of this enzyme is at neutral pH and is inactive at acidic pH .
- Absorption of glucose & Galactose is taking place with the help of Na⁺ linked carrier .
- Fructose: enters by facilitated diffusion.
- *Na⁺ independent carriers: for basic and neutral amino acids.
- Proline and hydroxyproline & Phenylalanine and methionine = Na⁺ dependent carriers
- NO brush border enzymes for lipid digestion and there is NO carrier system = simple diffusion .
- lipid >> bile salt - intestine >> micelles >> simple diffusion >> chylomicrons>>exocytosis >>lacteals
- B12 requires the intrinsic factor secreted by the oxyntic cells of the stomach.
- Lipid soluble vitamins (Vit. A, D, E, K) .
- The abundance of creatine permits more storage of energy
- glycolysis = anaerobic energy = hypoxia= high activity = accumulation of lactic acid .
- “Respiratory Quotient” (RQ) (CO₂ produced/O₂ consumed) .
- The RQ when mixed food stuff is used = 0.82.
- Basal conditions: awake , no exercise , no food , restful night , no excitement .
- The heat produced is calculated as the amount of heat/m² surface body/hour. .
- The absence of proteins from the diet for a long time = **Kwashiorkor**.
- brain >> amygdala and prefrontal cortex >> "**psychic** blindness" .
- hypothalamus >>feeding center and satiety center >>(hyperphagia) .
- plenty glucose >> cause satiety ---- increase ATP << stop feeding .
- leptin >> reduce feeding behaviors .
- glucose-dependent insulinotropic polypeptide = GIP (gastric inhibitory peptide) .
- Obesity is defined as an increase in the amount of adipose tissue by more than 20% of the ideal body weight.
- The overnutrition of a child will result in new formation of fat cells.
- Other causes of obesity - Lack of exercise- Disorders of the endocrine system such as in hypothyroidism.
- **INANITION: cachexia** , Destruction of hypothalamic centers by thrombosis .
- third phase = depletion of almost all fat stores >> depletion of proteins >> death .
- Human enzymes can attack only alpha linkages of the polymers of glucose .
- the increase of feeding behaviors is well correlated with the increase in Activity of thermoregulatory centers in hypothalamus.