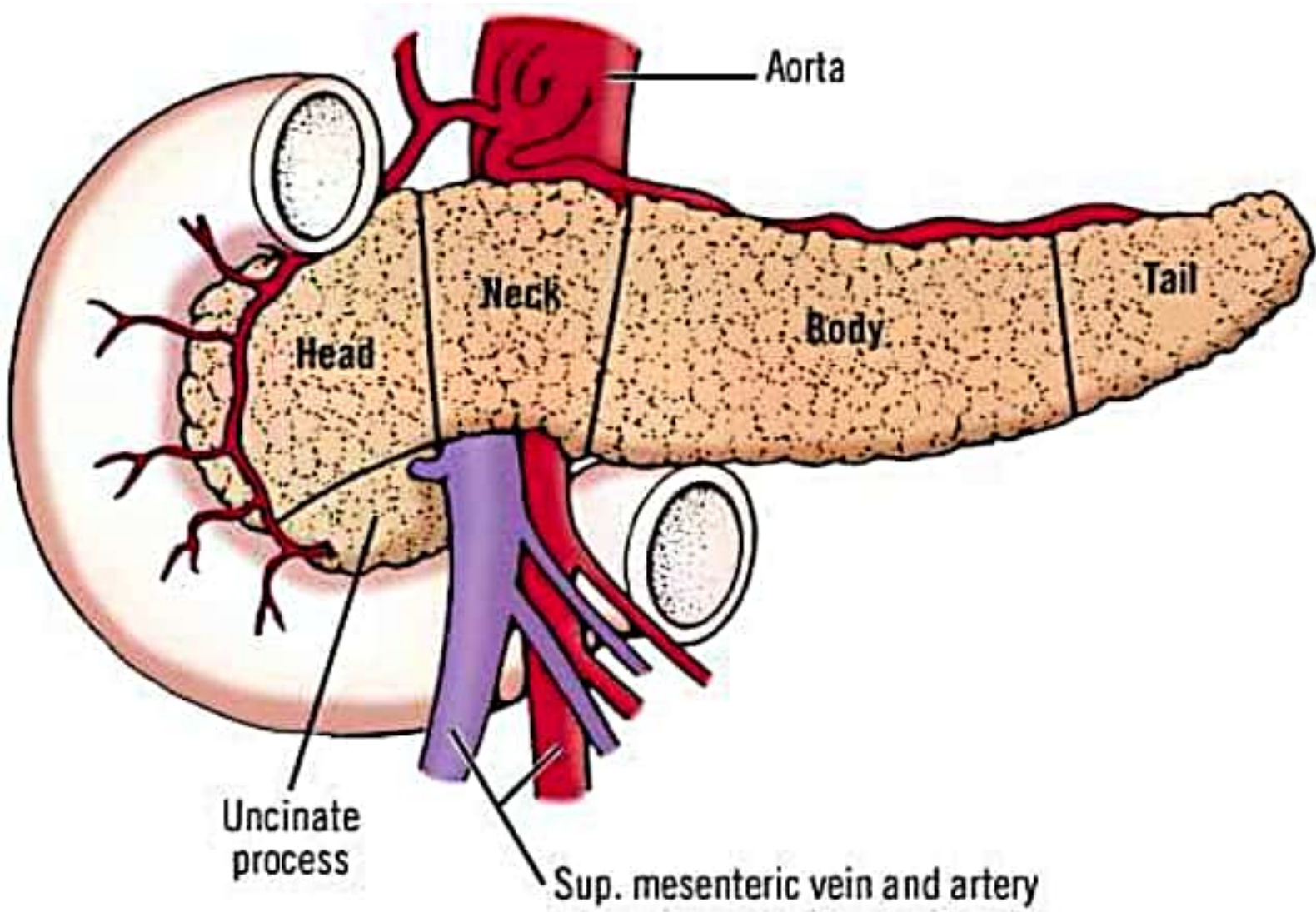


## DEFINITION

- The pancreas (pan= all , kreas = flesh) is a gland that is partly exocrine and partly endocrine. The exocrine part secretes the digestive pancreatic juice, and the endocrine part secretes hormones, eg. Insulin.
- It is soft, lobulated and elongated organ.

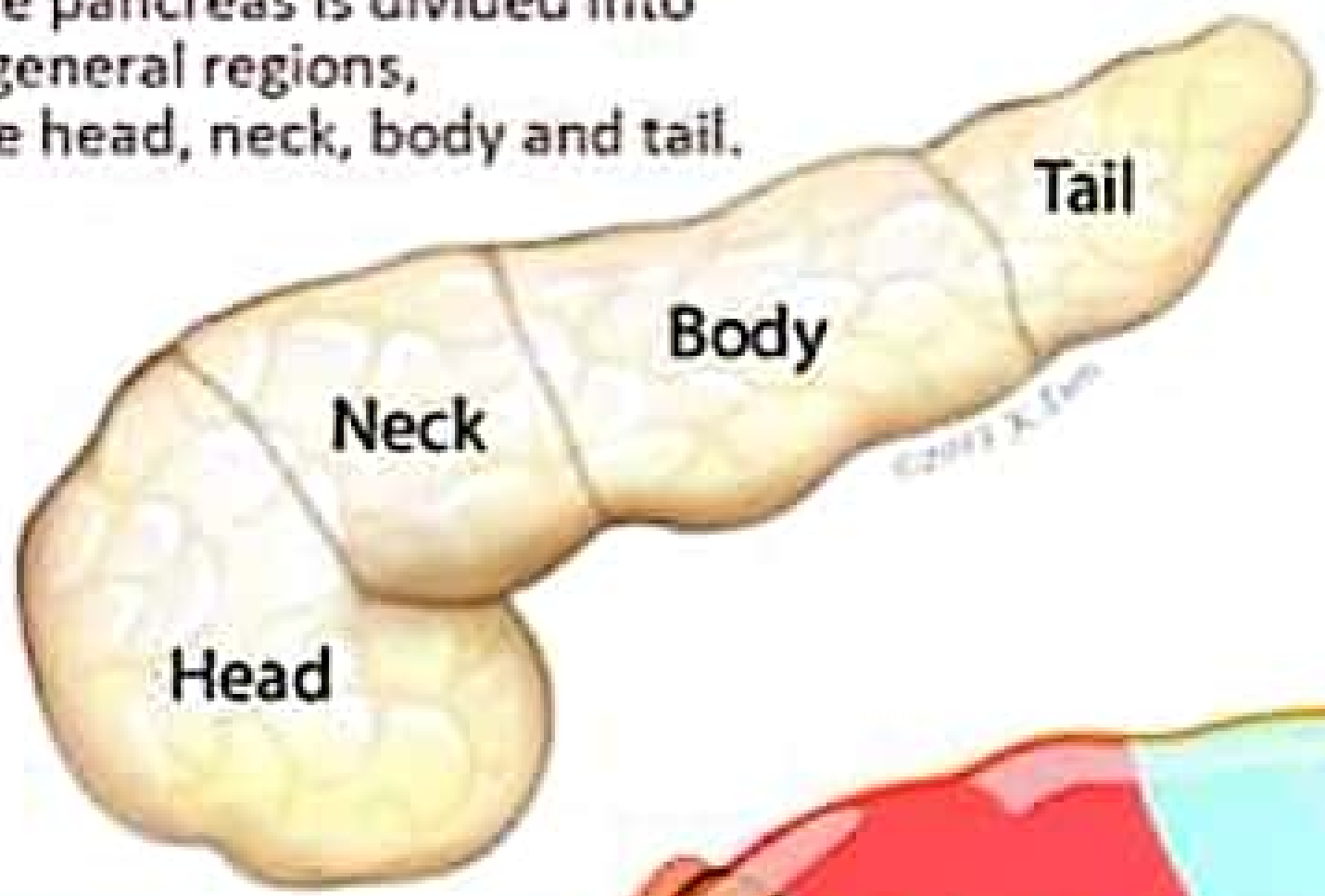
## DIVISION

- The pancreas is divided( from right to left ) into the head , the neck, the body and tail.
- The head is enlarged and lies within the concavity of the duodenum.
- The tail reaches the hilum of the spleen.
- The entire organ lies posterior to the stomach separated from it by the lesser sac.



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The pancreas is divided into 4 general regions, the head, neck, body and tail.



## Head of the pancreas

- Head is the enlarged flattened right end of the pancreas, situated within the curve of duodenum.
- The head has **three borders** : superior, inferior and right lateral.
- It has **two surfaces**: anterior and posterior
- It has **one process** called the uncinate process, which projects from the lower and left part of the head towards left.

# Head of the pancreas

## Three borders

**The superior border** is overlapped by the first part of the duodenum and is related to the superior pancreaticoduodenal artery.

**The inferior border** is related to the third part of the duodenum and to the inferior pancreaticoduodenal artery.

**The right lateral border** is related to the second part of the duodenum, the terminal part of the bile duct and the anastomosis between the two pancreaticoduodenal arteries.



## Ducts of the pancreas

- The exocrine pancreas is drained by two ducts,
- **1. The main pancreatic duct (duct of wirsung)**
- **2. the accessory pancreatic duct( duct of santorini)**

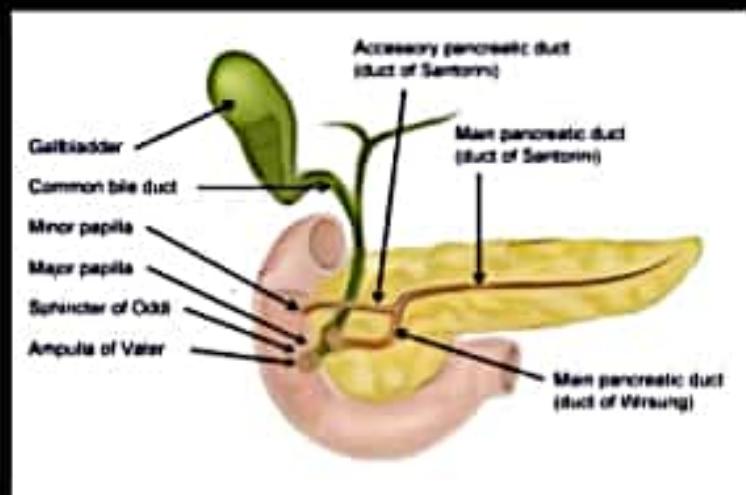
## Ducts of the pancreas

- **1.The main pancreatic duct (duct of wirsung)**
- It lies near the posterior surface of the pancreas and is recognised easily by its white colour.
- With in the head of the pancreas the pancreatic duct is related to the bile duct which lies on its right side. The two ducts enter the wall of the second part of the duodenum , and join to form the hepatopancreatic ampulla of vater .



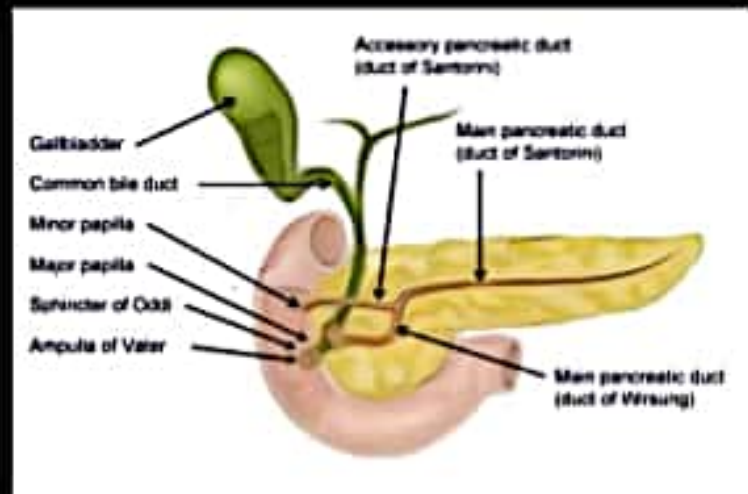
# PANCREATIC DUCTS

- The intercalated ducts – receive secretions from acini & pass to interlobular duct.
- Accessory pancreatic duct (Duct of Santorini) runs from head to minor papilla above main duct.



# PANCREATIC DUCTS

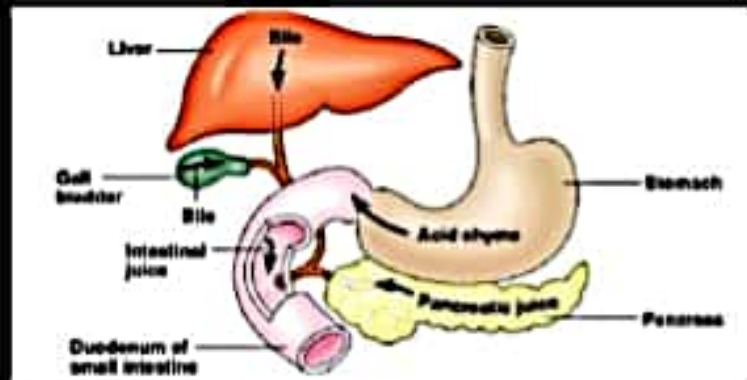
- Main pancreatic duct – **(Duct of Wirsung)** runs from tail to head, join common bile duct to form ampulla of Vater which is guarded by sphincter of oddi.



# PANCREATIC JUICE

## ■ Properties

- Transparent , isotonic
- 1200-1500 ml/day.
- Sp gravity – 1.010 to 1.018
- Mainly alkaline.

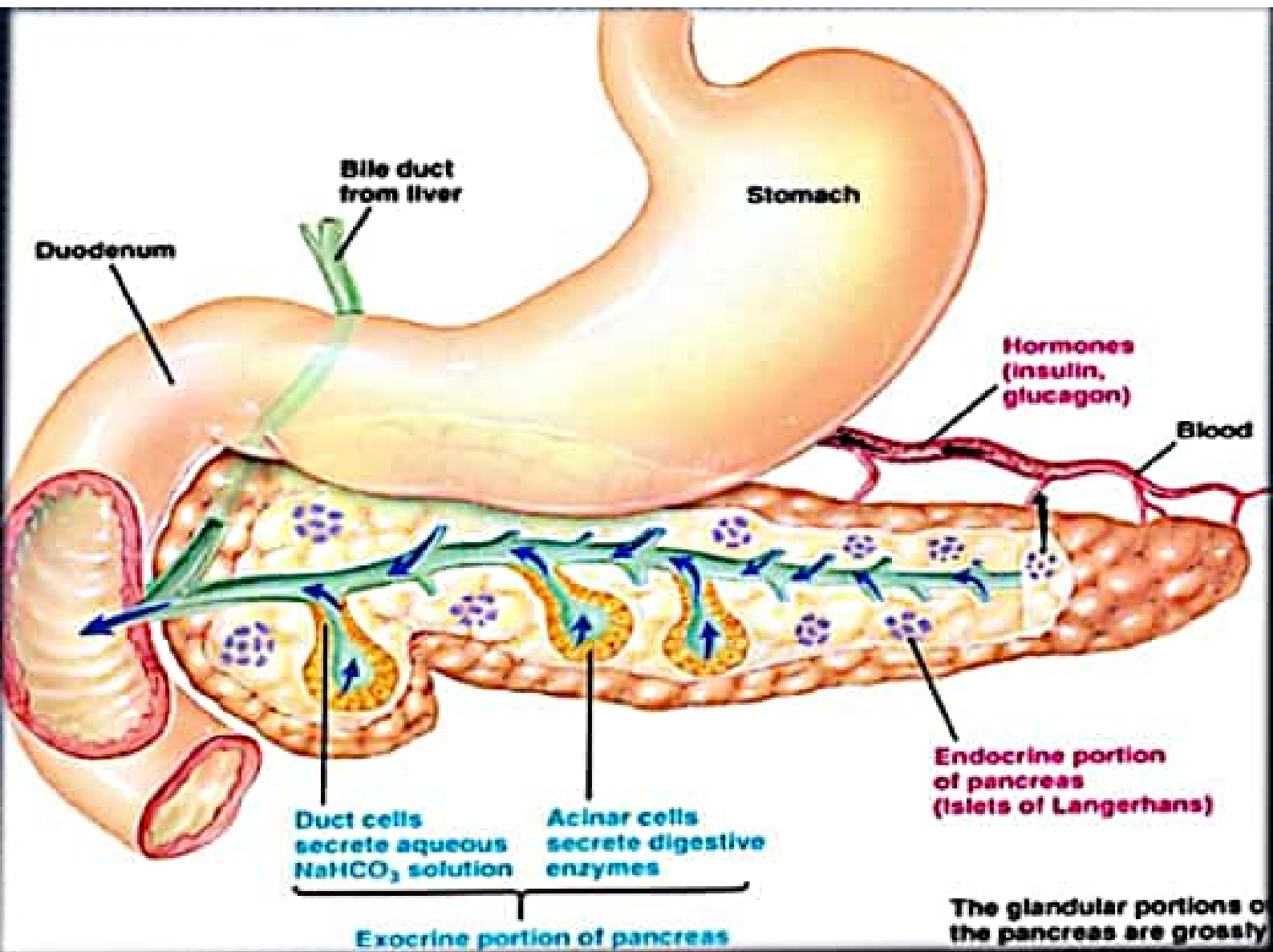


# PANCREATIC JUICE

- **Composition** – 99.5% water, 0.05% solids
- **Organic** – mainly enzymes, amylase, lipase, Protease & Trypsin inhibitor
- **Inorganic** –  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Ca}^+$ ,  $\text{Mg}^+$ ,  $\text{Zn}^+$  &  $\text{HCO}_3^-$ ,  $\text{Cl}^-$

# PANCREATIC ENZYMES

- **Pancreatic  $\alpha$  amylase** – active form, action on carbohydrate same as salivary amylase
  - Hydrolyses Glycogen, starch.
- **Lipolytic enzymes** – it includes Pancreatic lipases, cholesterol ester hydrolase, & phospholipase A2
- **Pancreatic lipases** – Hydrolyses neutral fats to Glycerol esters & FA





**THE PANCREAS IS BOTH AN  
EXOCRINE AND ENDOCRINE  
GLAND.**

## THE EXOCRINE PANCREAS

- This consists of a large number of lobules made up of small acini, the walls of which consist of secretory cells.
- Each lobule is drained by a tiny duct and these unite eventually to form the pancreatic duct, which extends the whole length of the gland and opens into the duodenum.
- The function of the exocrine pancreas is to produce pancreatic juice containing enzymes that digest carbohydrates , proteins and fats.

# THE EXOCRINE PANCREAS

- As in the alimentary tract, parasympathetic stimulation increases the secretion of pancreatic juice and sympathetic stimulation depress it.

## The endocrine pancreas

- Distributed throughout the gland are groups of specialised cells called the pancreatic islets (islets of langerhans).
- The islets have no ducts so the hormones diffuse directly into the blood.
- The endocrine pancreas secretes the hormones insulin and glucagon, which are principally concerned with control of blood glucose levels.

### Production of Pancreatic Hormones by Three Cell Types

- Alpha cells produce glucagon.
- Beta cells produce insulin.
- Delta cells produce somatostatin.