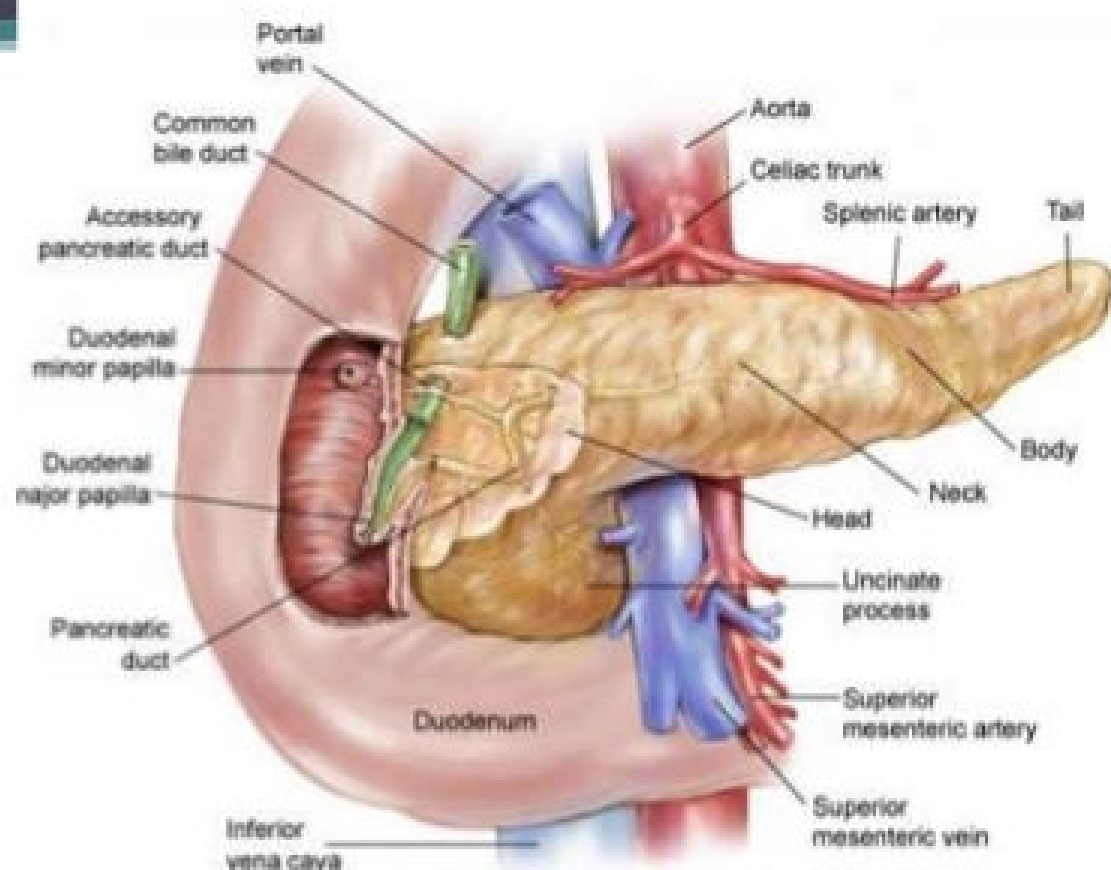


ANATOMY AND CONGENITAL ANOMALIES OF PANCREAS

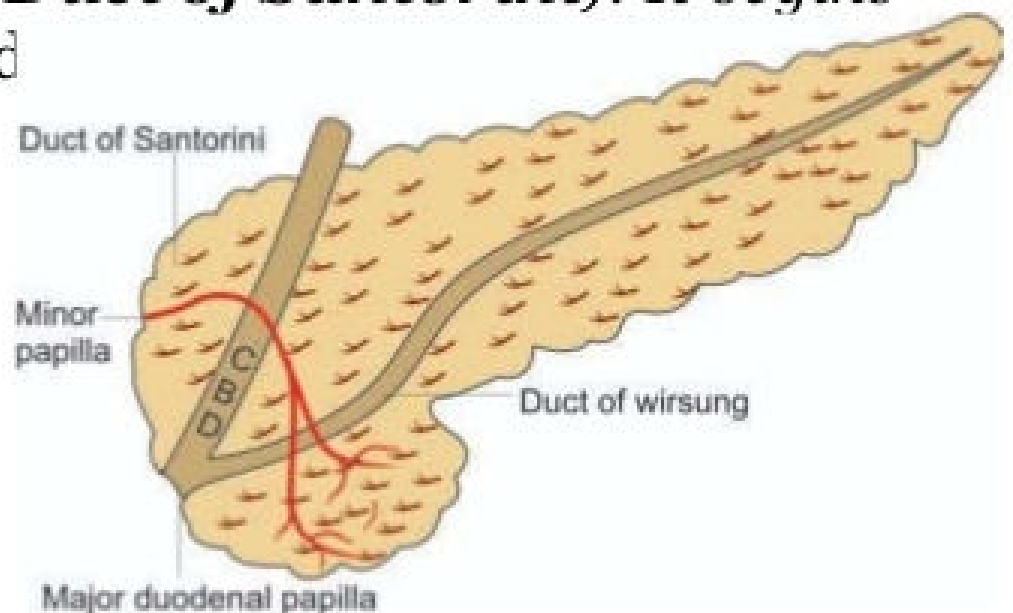
Anatomy



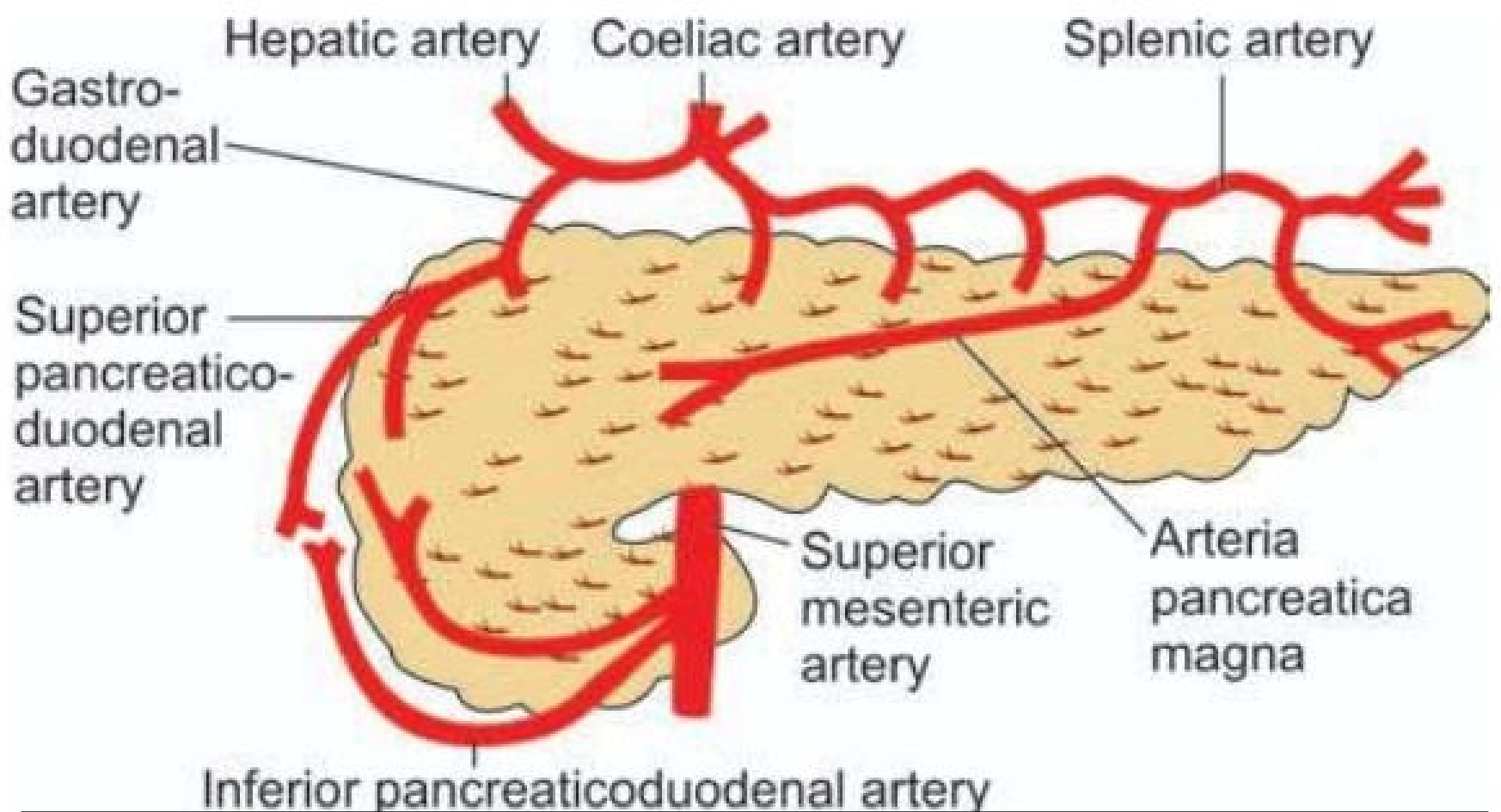
- Weight: 75 - 125 g
- Size: 10 to 20 cm
- It lies in the retro peritoneum just anterior to the first lumbar vertebrae
- Anatomically divided into four portions, the head, neck, body and tail.

Pancreatic ducts

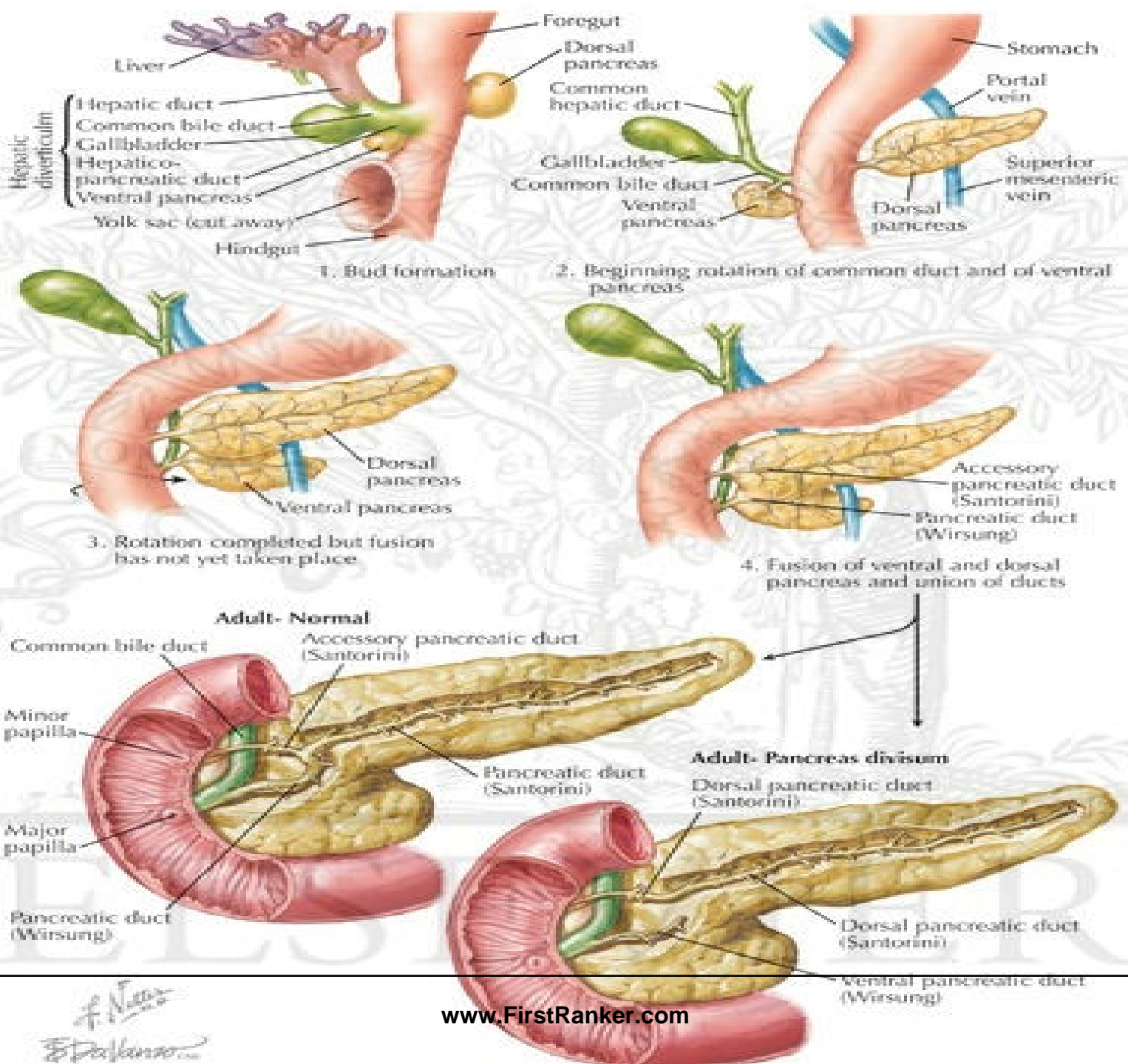
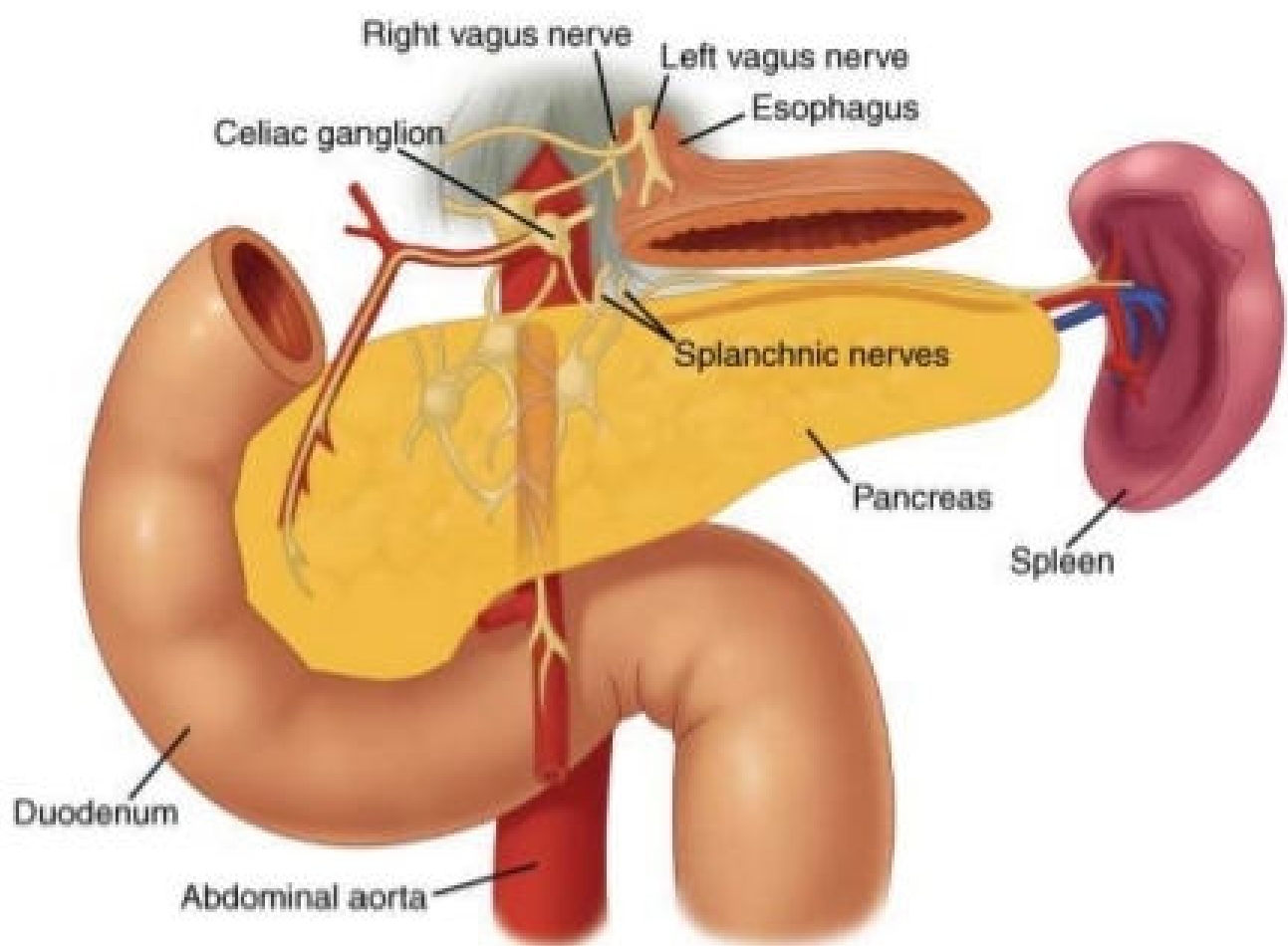
- **Main duct of pancreas (*Duct of Wirsung*):** It begins in the tail of pancreas and runs along its posterior surface, receives numerous tributaries at right angle along its length (*'Herring bone pattern'*). It joins the bile duct to form hepatopancreatic ampulla (*of Vater*)
- **Accessory pancreatic duct (*Duct of Santorini*):** It begins in the lower part of the head opens into the duodenum at minor duodenal papilla (6-8 cm from the pylorus).



Arterial supply

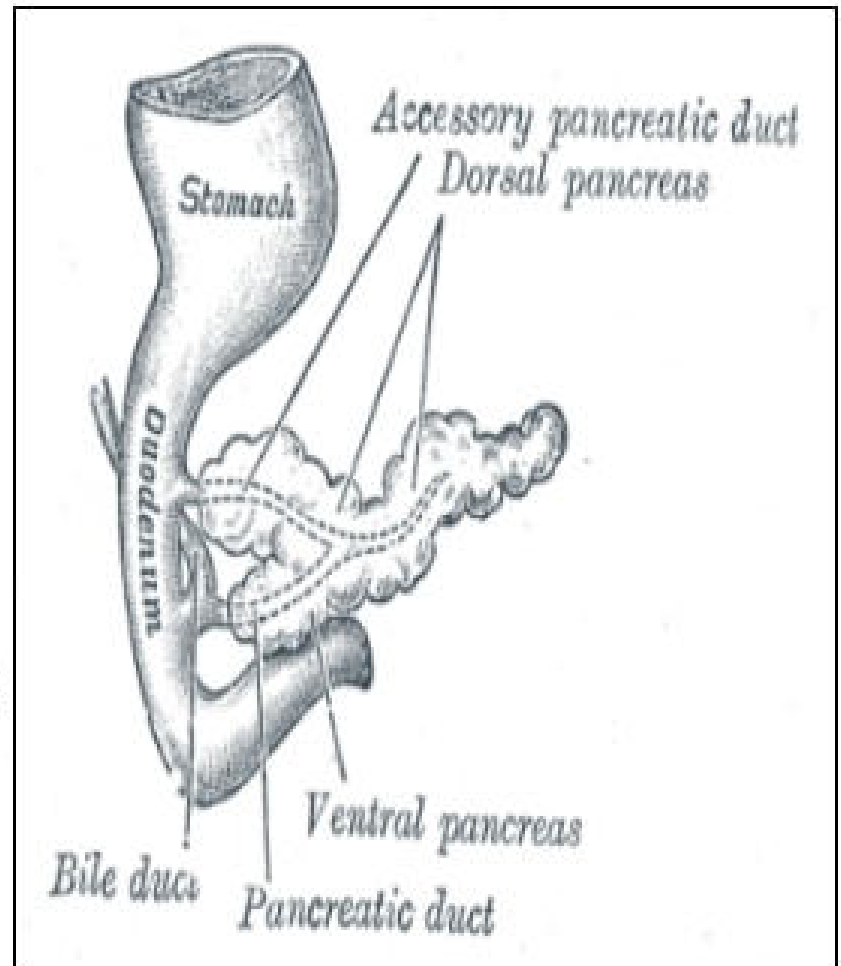


Nerve supply

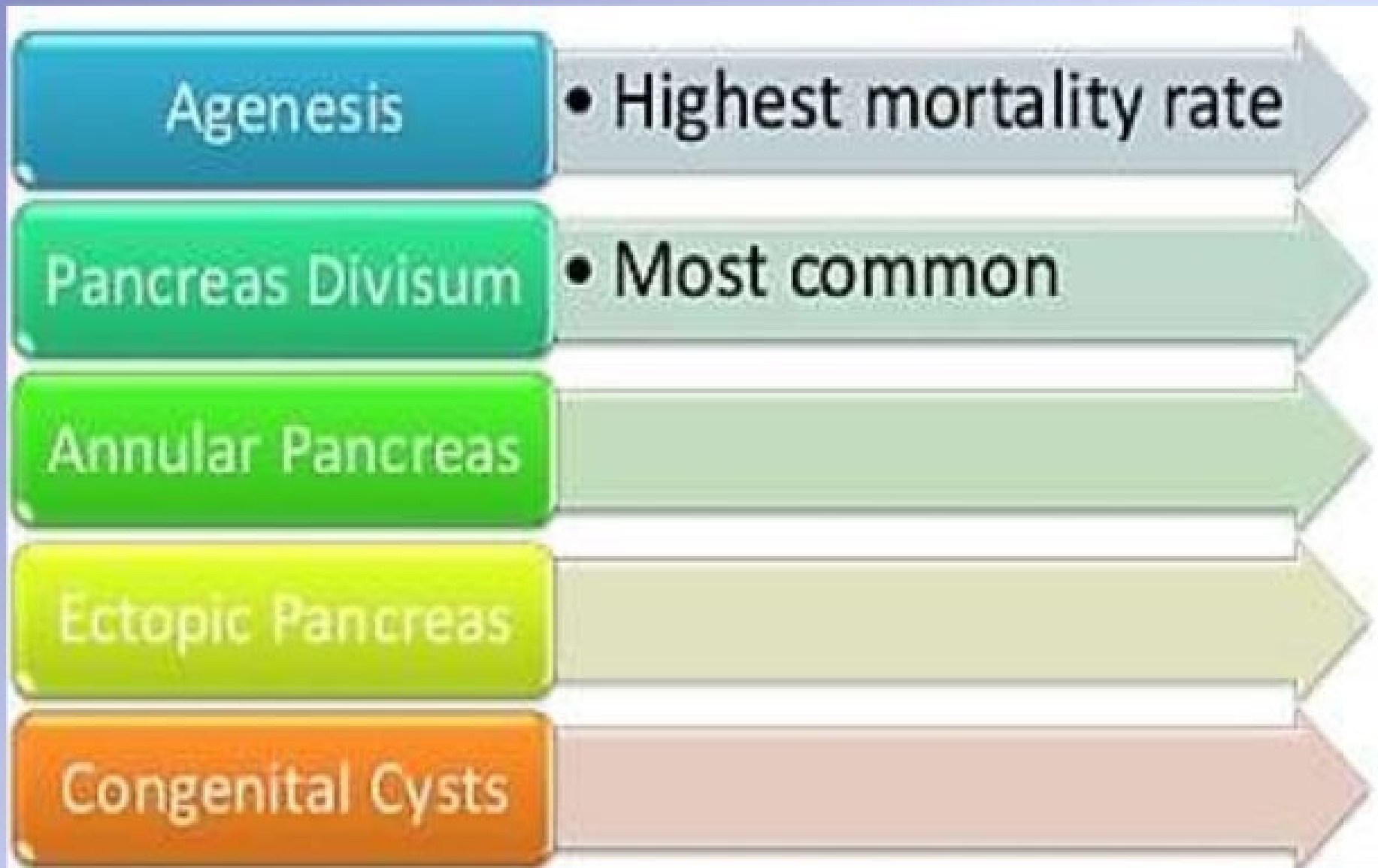


NORMAL EMBRYOLOGY

- The openings of two ducts carried into line with each other.
- Two parts of the gland fuse to form one pancreas.
- Dorsal pancreatic duct becomes the accessory pancreatic duct.
- Duct of ventral bud forms the main pancreatic duct.
- Terminal parts of branching ducts form pancreatic acini.



- Classification of Pancreatic Anomalies
- 1. Migration anomalies
 - Anular pancreas
 - Ectopic pancreas
- 2. Fusion anomalies
 - Pancreas divisum
- 3. Ductal duplication anomalies
 - Number variations
 - Form variations
- 4. Miscellaneous
 - Agenesis
 - Hypoplasia



Pancreas divisum:

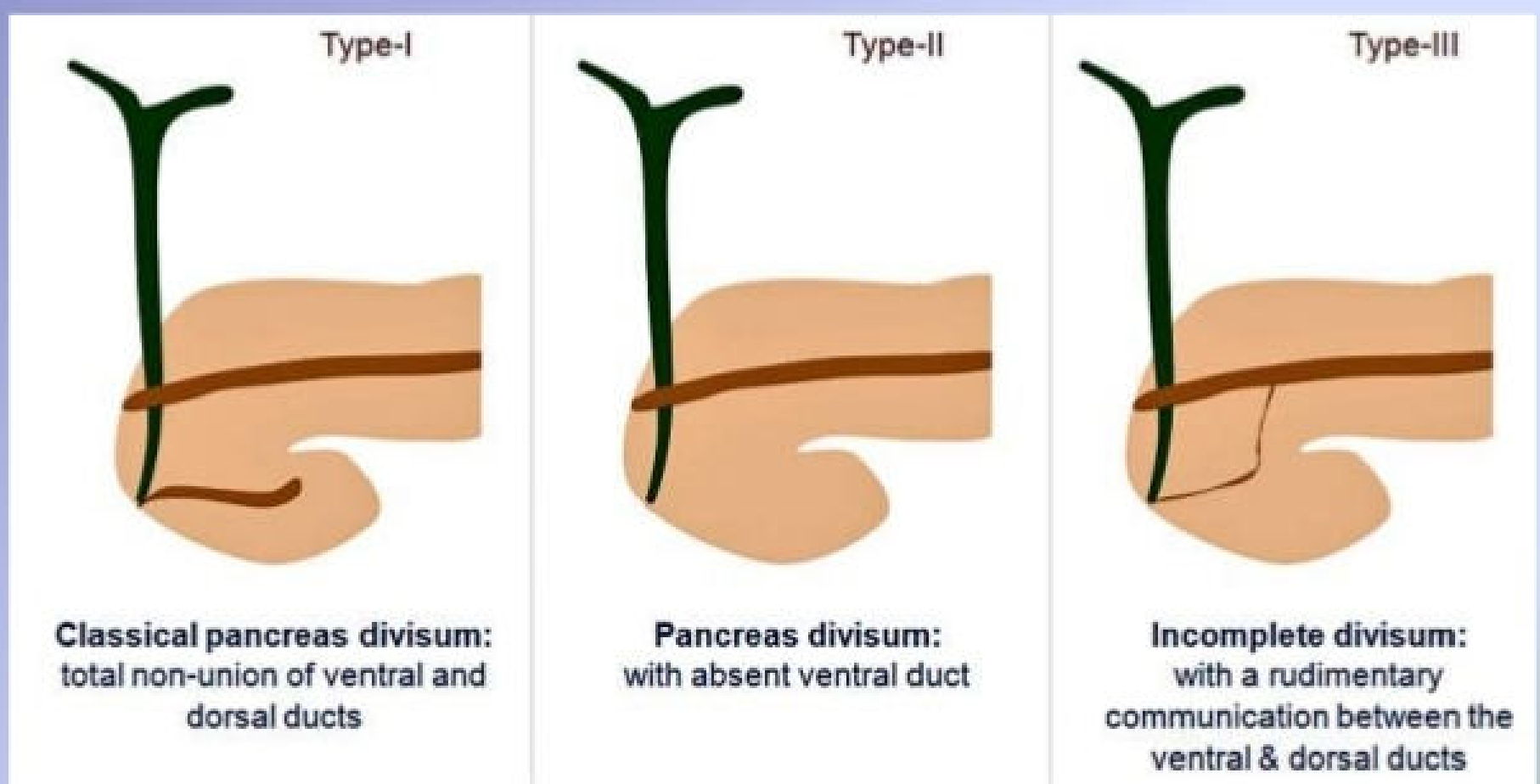
- Most common congenital pancreatic ductal anatomic variant-upto 14%
- Pathogenesis:

ventral bud failed to fuse with dorsal bud during fetal development(6-8th wk of gestation).



dorsal pancreatic duct drains most of the pancreatic glandular parenchyma via the minor papilla

- Three variants have been described:
- type 1 or classical divisum -total failure of fusion;
- type 2 -dorsal drainage is dominant in the absence of the duct of Wirsung;
- type 3 or incomplete divisum -small communicating branch is present .



- C/F-Most asymptomatic, in some-recurrent acute pancreatitis -inadequate drainage of pancreatic secretions via the minor papilla.
- MRCP -noninvasive diagnosis -without the use of contrast material -avoids -ERCP induced acute pancreatitis. .
- MDCT may also depict this anomaly, when the pancreatic duct is visualized.
- Rarely, pancreas divisum is associated with Santorinicele.

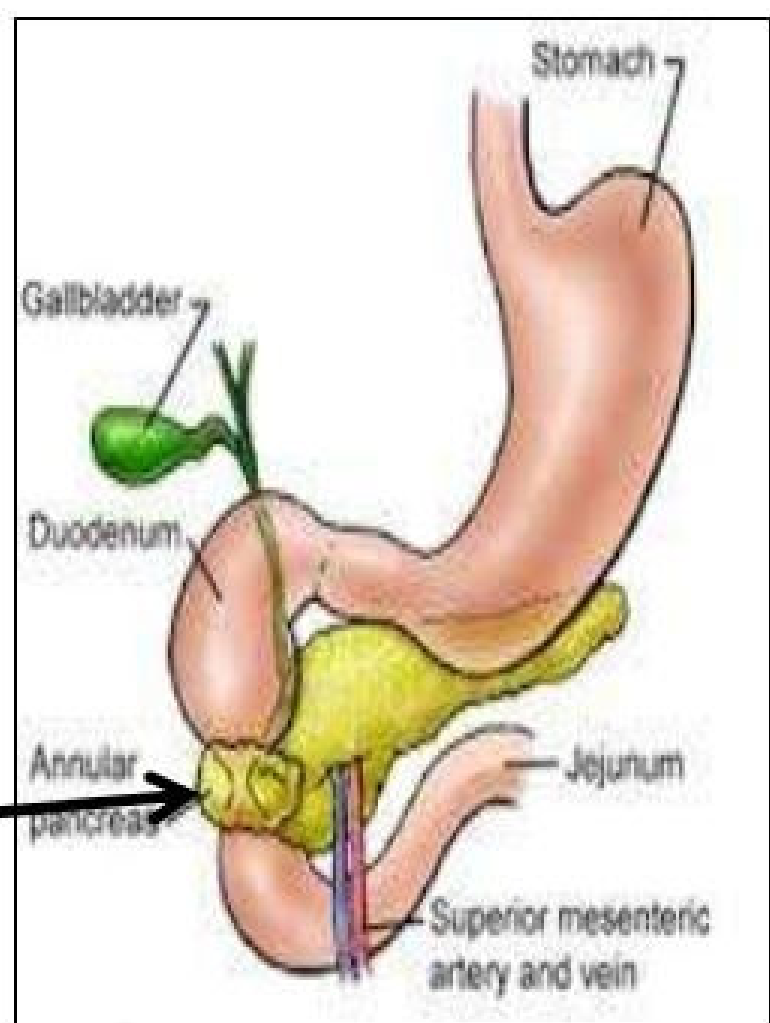
Annular Pancreas

- Rare congenital anomaly in which incomplete rotation of the ventral anlage leads to a segment of the pancreas encircling the second part of the duodenum.

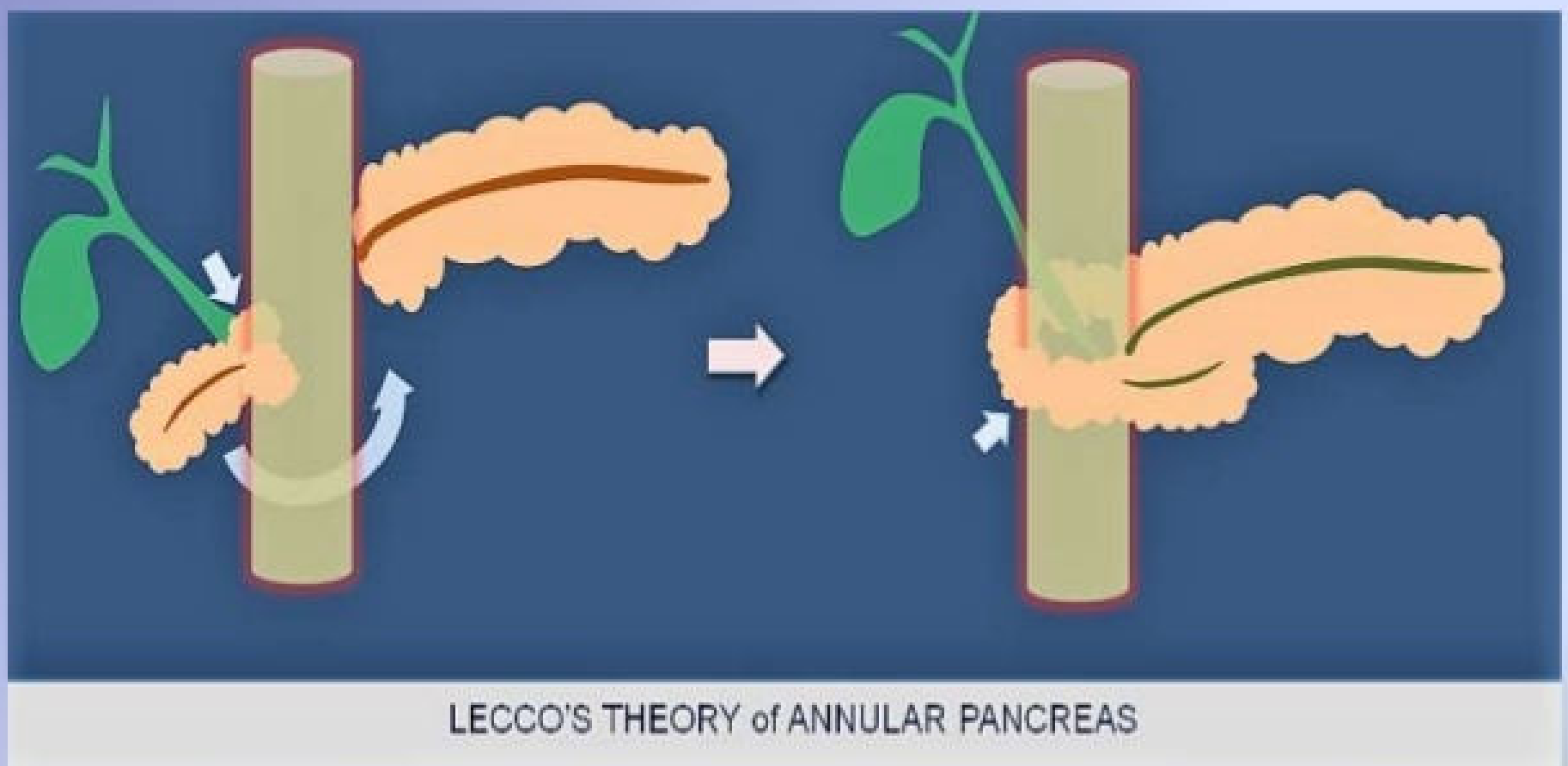
Annular Pancreas

- A ring of pancreatic tissue that completely encircles the duodenum.
- Pathogenesis:
 - May occur when the ventral bud splits (become bifid), the two segments may encircle the duodenum .

ANNULAR PANCREAS



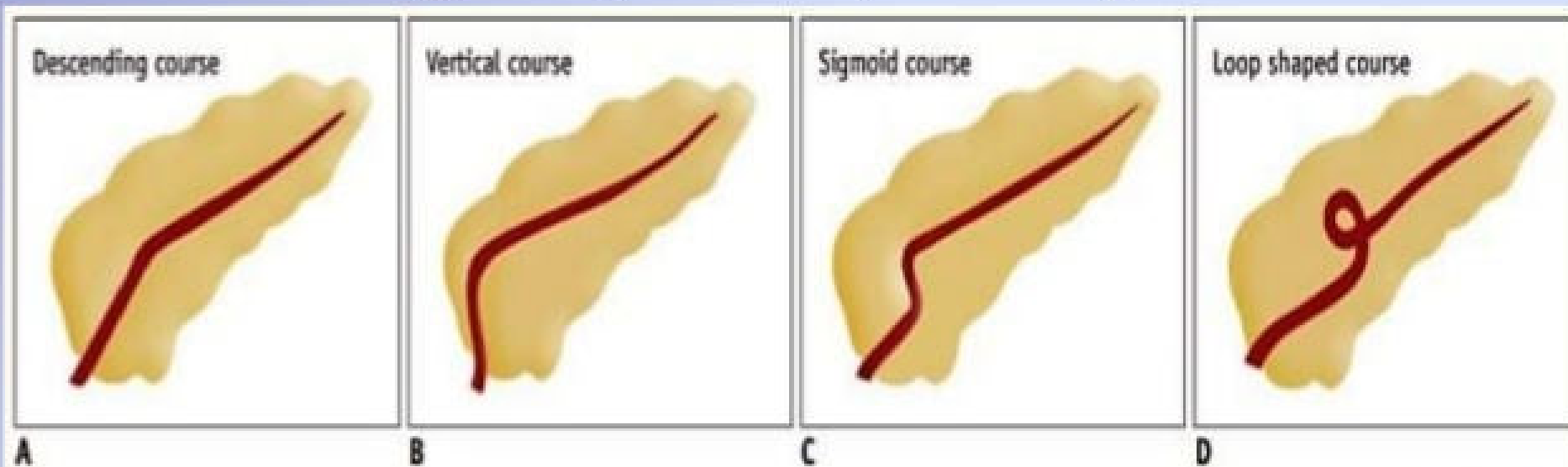
- Two main hypotheses to explain **pathogenesis of annular pancreas**.
- 1. Tip of the right ventral bud adheres to the duodenal wall and stretches to form a ring during normal rotation, as proposed by **Lecco** .
- 2. Left ventral bud persists, which develops to complete a circle of pancreatic tissue around the duodenum, as proposed by **Baldwin** .



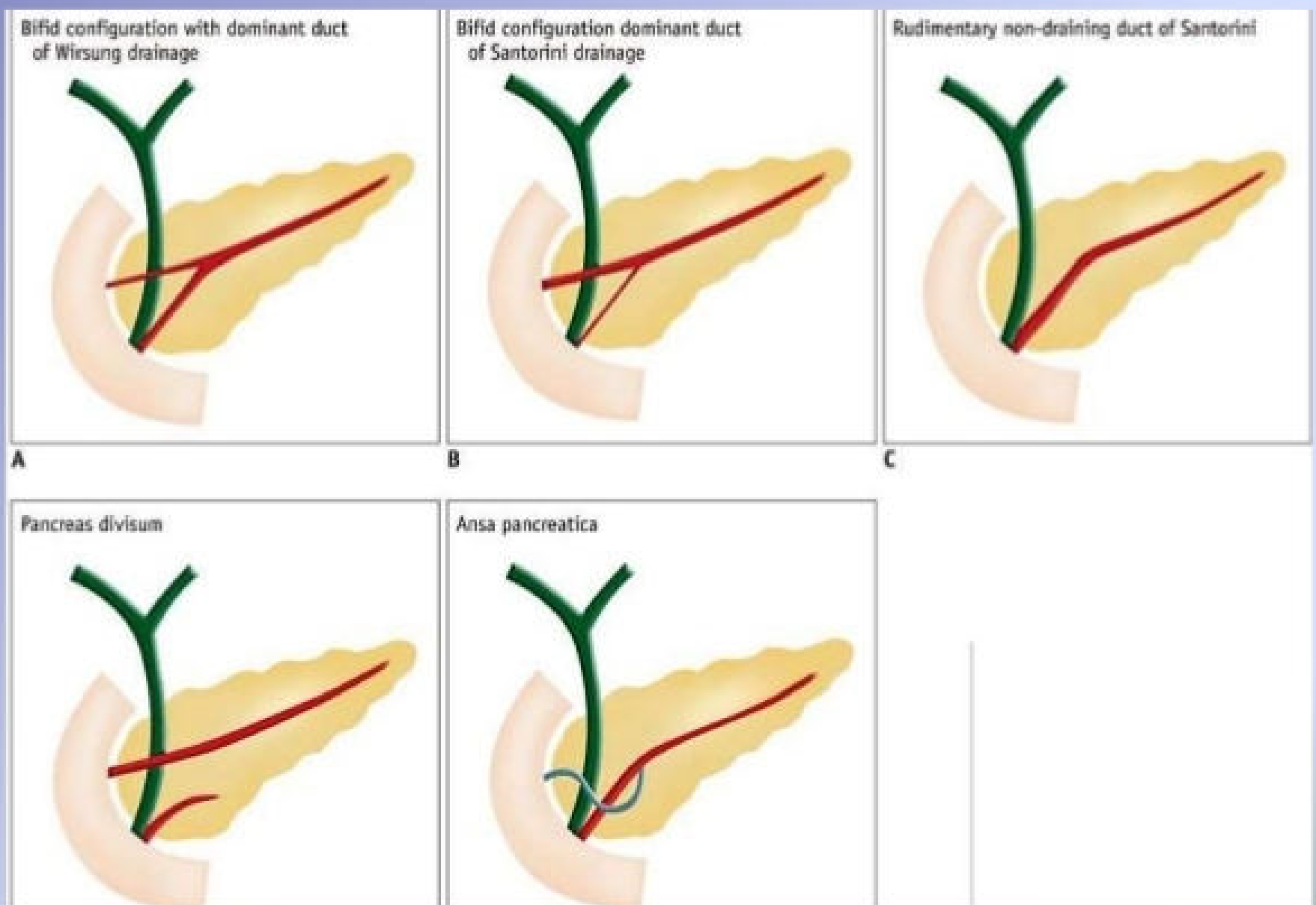
- **Two types** of annular pancreas: extramural and intramural.
- **Extramural** type, the ventral pancreatic duct encircles the duodenum to join the main pancreatic duct.
- **Intramural** type, the pancreatic tissue is intermingled with muscle fibers in the duodenal wall, and small ducts drain directly into the duodenum.

Variations of the Pancreatic Duct

- **Course:**
- Most common descending course(50%) .
- Others: sigmoid, vertical, and loop course.



- **Configuration:**
- Bifid configuration with a dominant duct of Wirsung –MC(60%).
- Less common configurations :absent duct of Santorini (30%), a dominant duct of Santorini without divisum (1%), and 'ansa pancreatica'.



- Duplication anomalies of the main pancreatic duct are not uncommonly seen.
- Cystic dilatations of terminal portions of the ducts of Wirsung and Santorini are termed Wirsungocele and Santorinicele .
- Anomalous pancreaticobiliary ductal junction .
Often associated with choledochal cyst formation and carcinoma in the biliary tract.

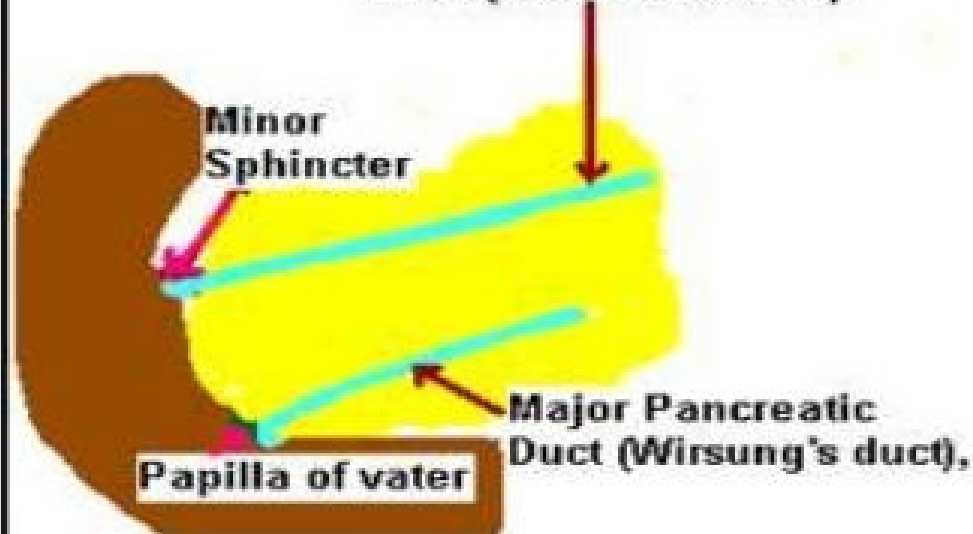
Pancreatic agenesis and hypoplasia

- Agenesis of the pancreas is rare and generally incompatible with life.
- Hypoplasia -absence of the ventral or dorsal anlagen.
- Partial agenesis of the dorsal pancreas more common than agenesis of the ventral portion.
- Complete agenesis of the dorsal pancreas extremely rare.

Complete dorsal agenesis, the anterior head, neck, body and tail of the pancreas, the duct of Santorini and the minor papilla are absent.



Accessory Pancreatic Duct (Santorini's duct)

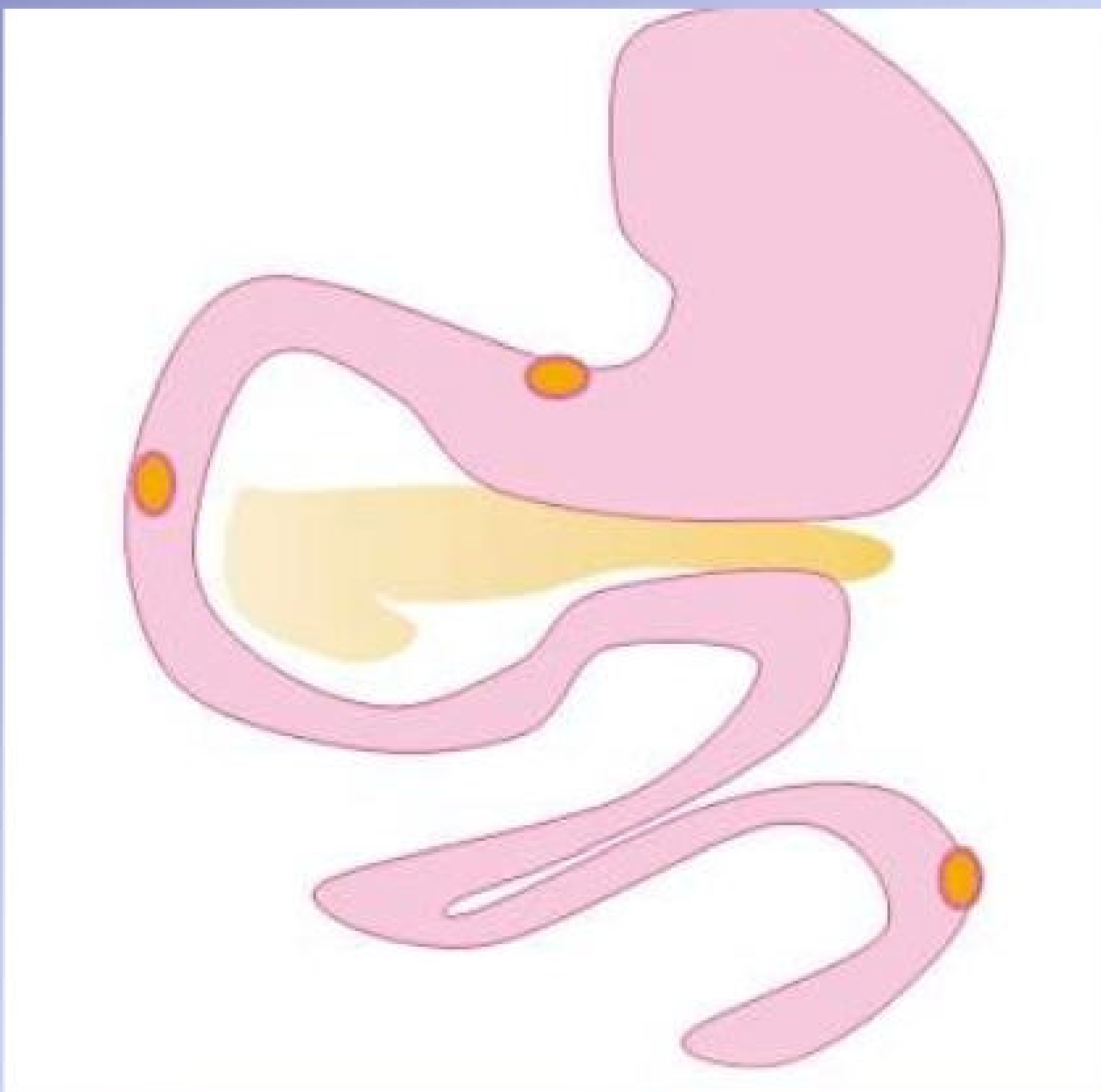


Partial Dorsal Agenesis of the Pancreas

In partial dorsal agenesis, a variable amount of pancreatic tissue is absent but a remnant of the duct of Santorini and the minor papilla are present.

Ectopic Pancreas

- A.k.a heterotopic pancreatic tissue.
- Most are completely asymptomatic.
- Common sites:
 - ❖ Submucosa of Gastric antrum (70%)
 - ❖ Proximal Duodenum /jejunum
 - ❖ Ileum,colon,appendix,mesentery,GB, Meckel's Diverticulum.



Pancreatic Cysts

- Very rare entity, mostly seen in female children <2yrs.
- Develop as a result of sequestration of primitive pancreatic ducts and are lined by cuboidal epithelium .
- Multiple congenital cysts are associated with other anomalies, such as von Hippel–Lindau disease and hepato-renal polycystic disease

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