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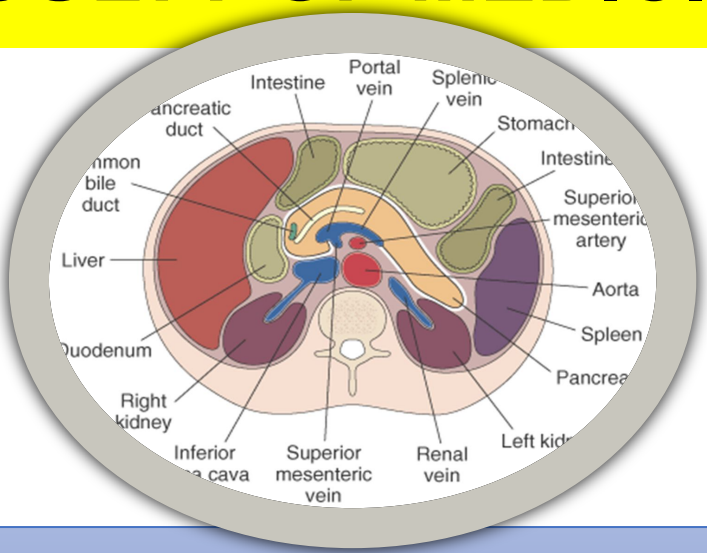
FACULTY OF MEDICINE



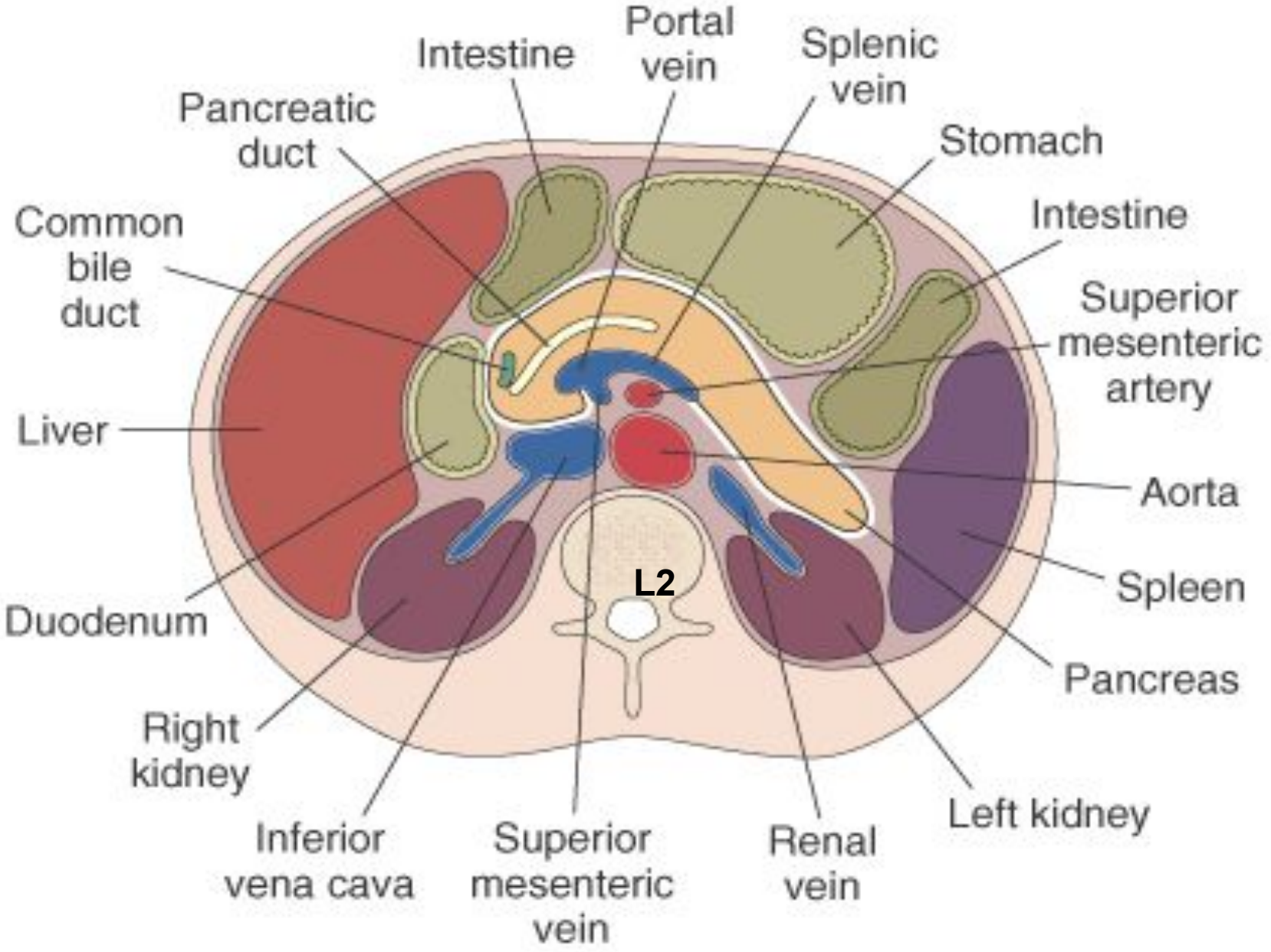
PATHOLOGY OF THE EXOCRINE PANCREAS

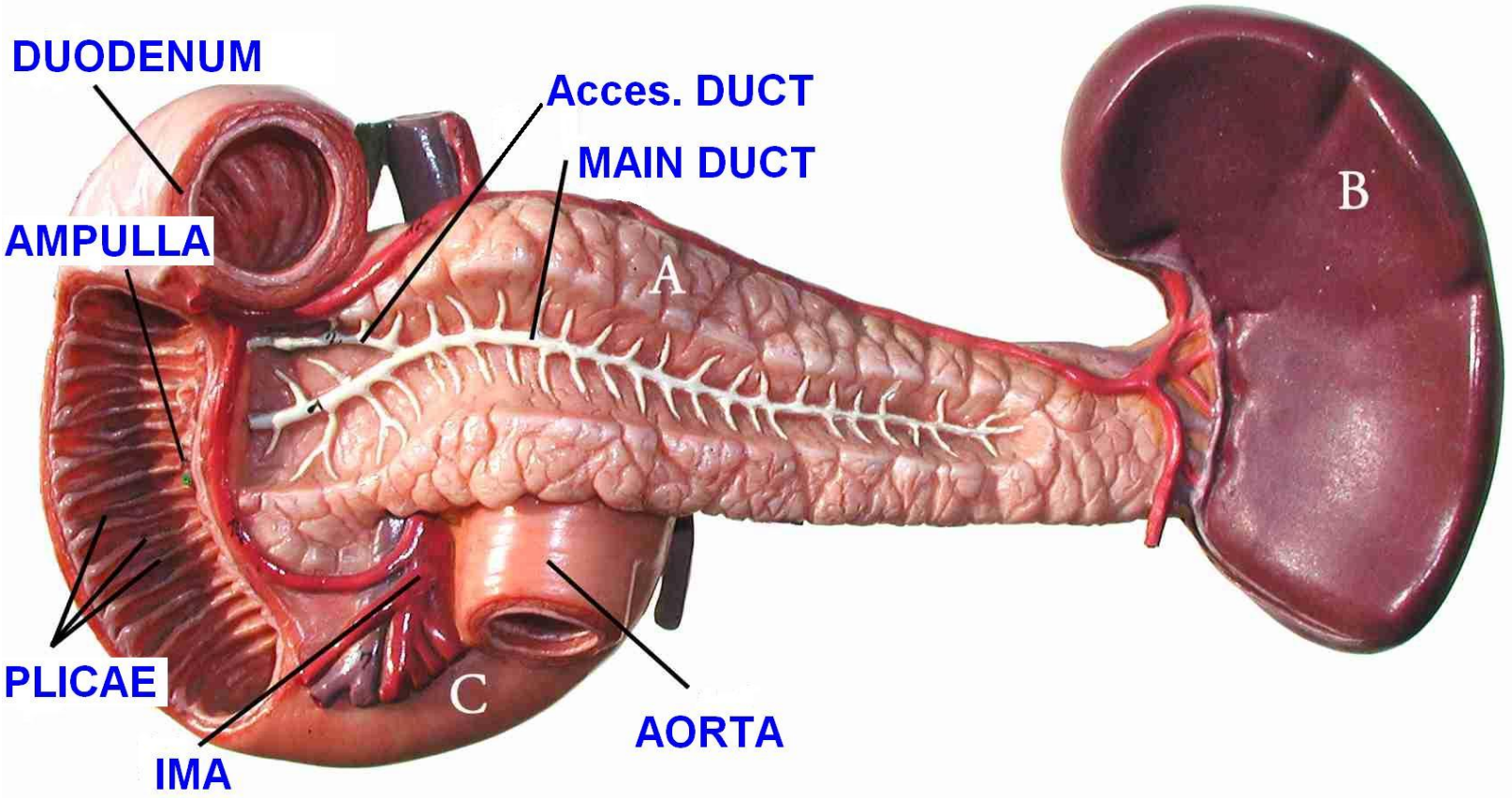
GAMAL ELIMAIRI

EXOCRINE PANCREAS

OBJECTIVES

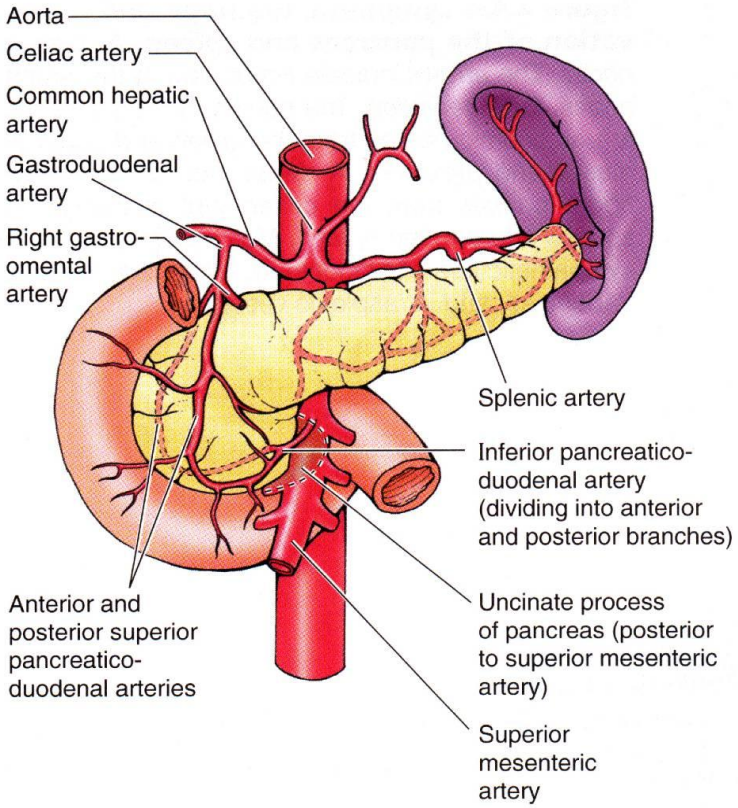
- Understand the aetiology
- Risk factors,
- Pathogenesis,
- Morphology,
- Clinical features and
- Outcome of pancreatic inflammations and neoplasms

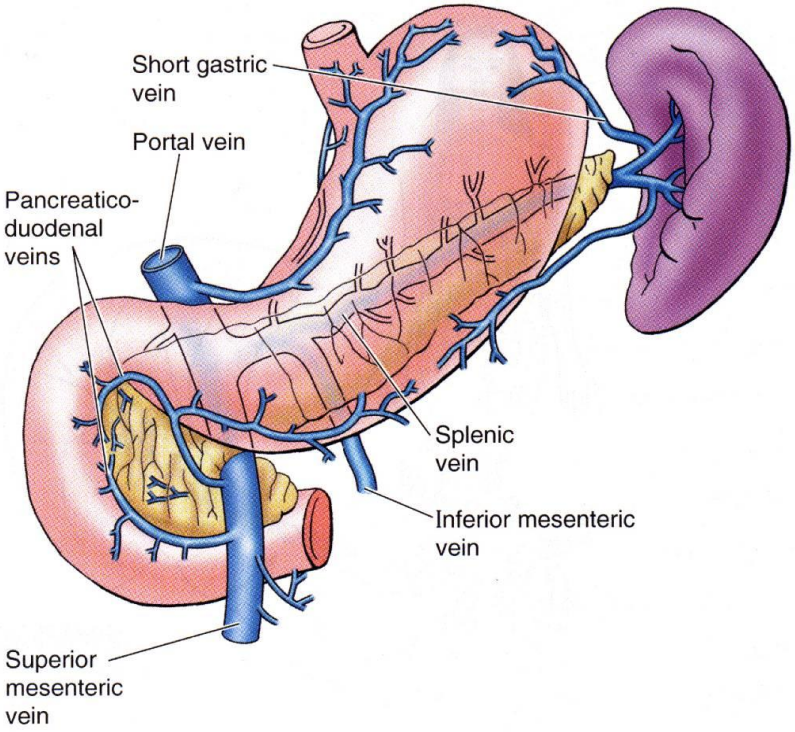

Intestine
Portal vein
Splenic vein
Pancreatic duct
Stomach
Common bile duct
Intestine
Superior mesenteric artery
Liver
Aorta
L2
Spleen
Duodenum
Pancreas
Right kidney
Left kidney
Inferior vena cava
Superior mesenteric vein
Renal vein



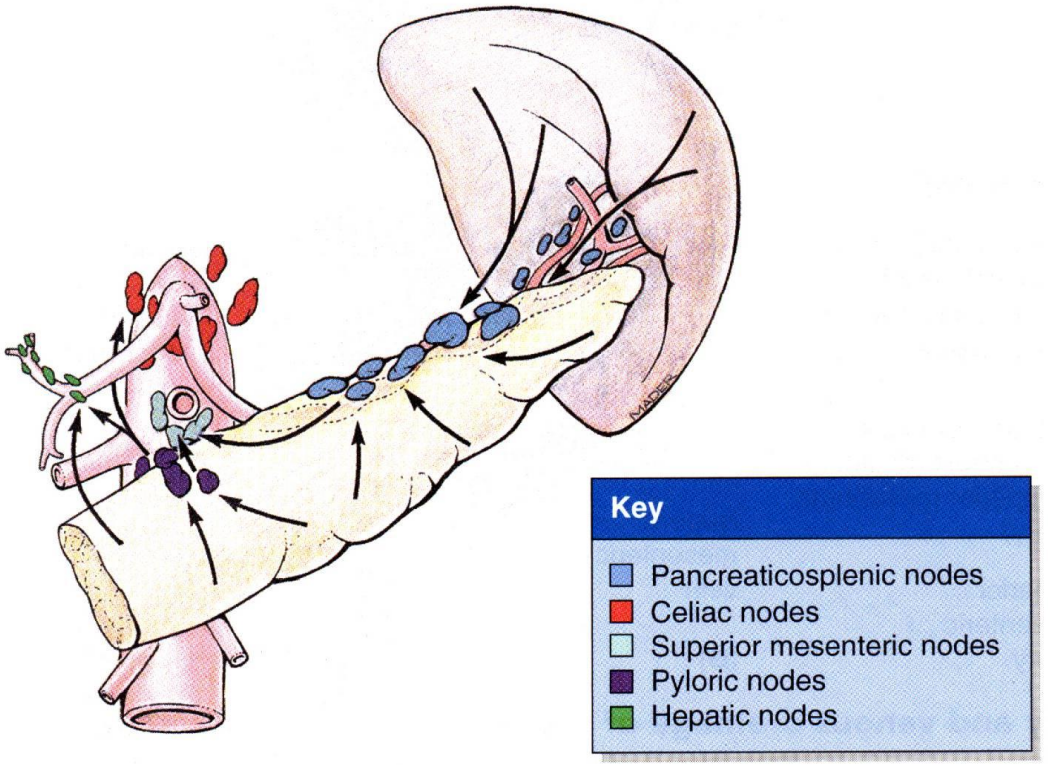
PANCREAS

Arterial supply and venous drainage of the pancreas and spleen





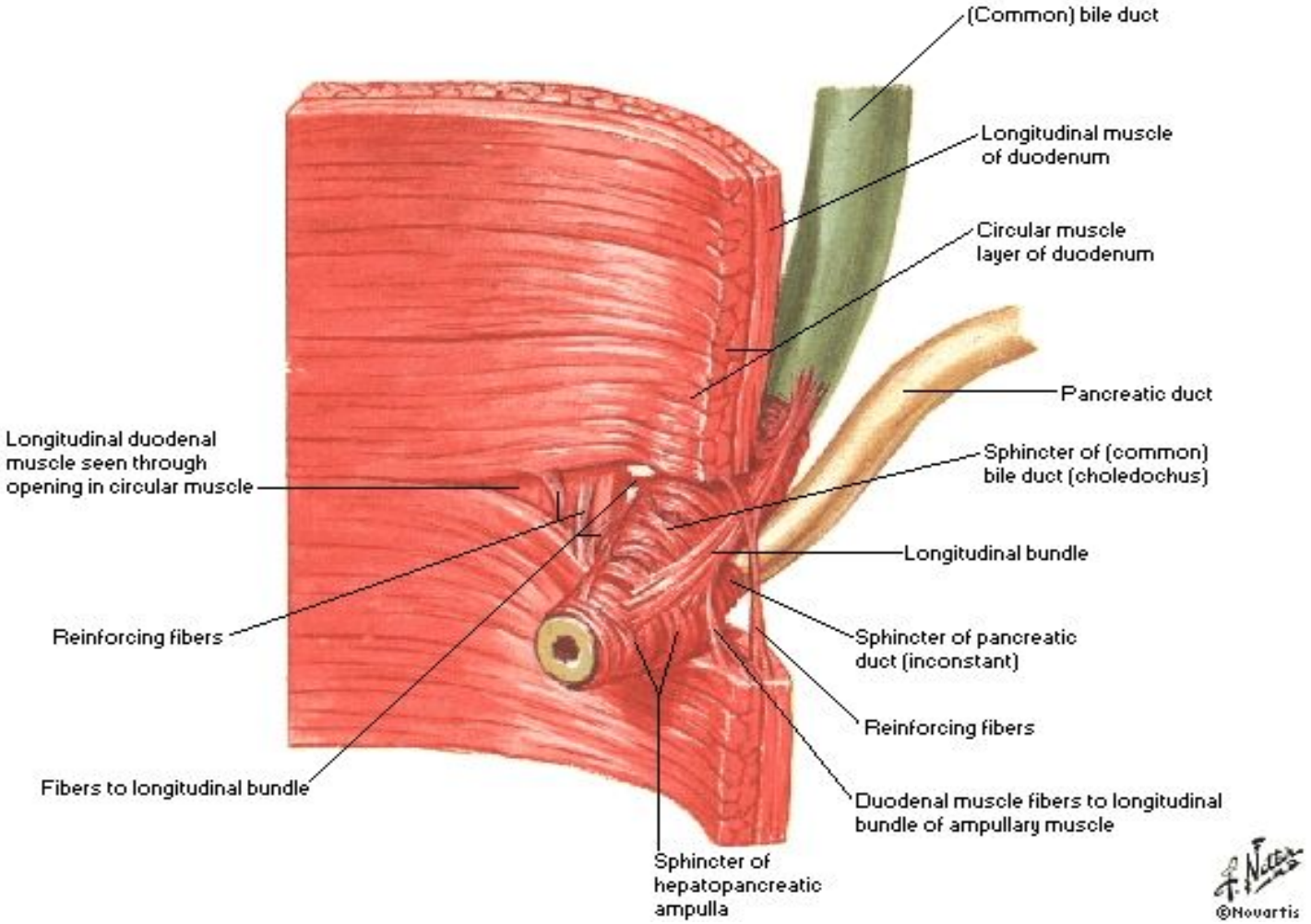
Lymphatic drainage of the distal pancreas and spleen



“Peri-”pancreatic lymph nodes, several groups.

Junction of Bile Duct and Duodenum

Dissection



Hepaticopancreatic ampulla (Ampulla of Vater)

Pancreatic Enzymes

- **Amylase**
- **Lipase**
- **DNA-ase**
- **RNA-ase**
- **Zymogens: Trypsinogen**
  Chymotrypsinogen
  Procarboxypeptidase A, B

PANCREAS DISEASES

- Congenital
- Inflammatory
  - Acute
  - Chronic
- Cysts
- Neoplasms

Congenital

- Agenesis (very rare)
- Annular Pancreas (pancreas encircles duodenum) (rare)
- Pancreas Divisum (failure of 2 ducts to fuse) (common)
- Ectopic Pancreatic tissue (very common)
- Cysts

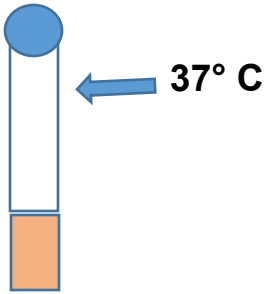
PANCREATITIS

- ACUTE (VERY SERIOUS)
- CHRONIC (Calcifications, Pseudocyst)

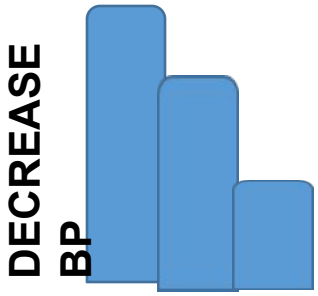
ACUTE PANCREATITIS

- **Idiopathic**:
- **Gallstones** (45%)
- Ethanol (35%)
- **T**umours: pancreas, ampulla,
- Scorpion stings
- Microbiological □.bacterial: □.viral: (mumps, varicella) □.parasites:
  Autoimmune: SLE, polyarteritis nodosa (PAN), Crohn's
- **S**urgery/trauma
- abdomen, penetrating peptic ulcer
- **H**yperlipidemia (TG >11.3 mmol/L; >1000 mg/dL),
  Hyperparathyroidism **H**ypercalcemia, **H**ypothermia
- Emboli or ischemia
- **D**rugs/toxins, estrogens, methyldopa, H2-blockers

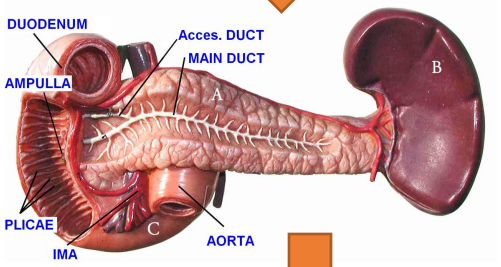
HYPOTHERMIA



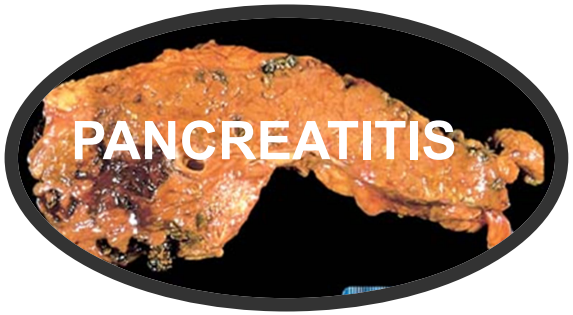
SHOCK



ALCOHOL



GALL STONES



MUMPS VIRUS

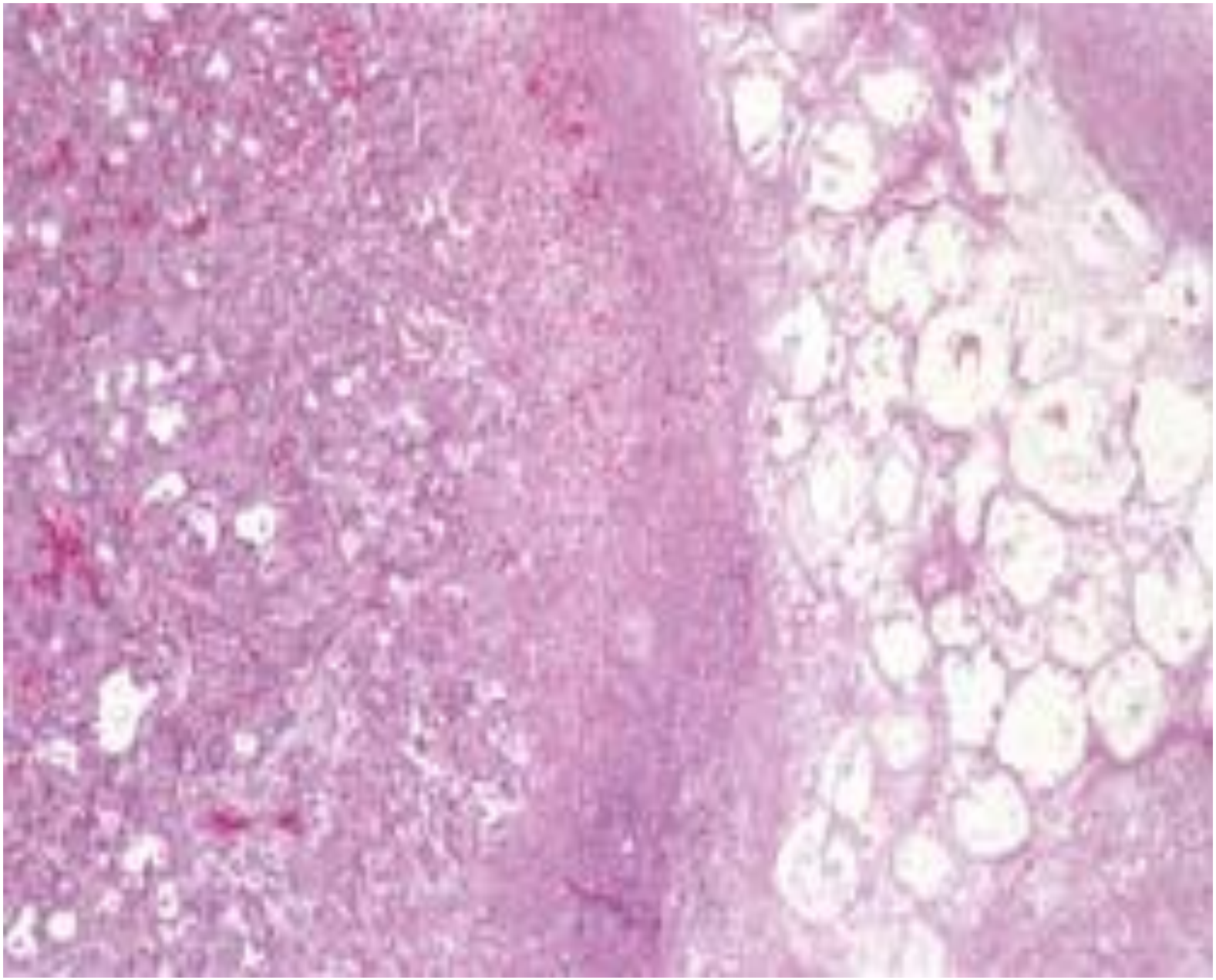
COMMON CAUSES OF PANCREATITIS

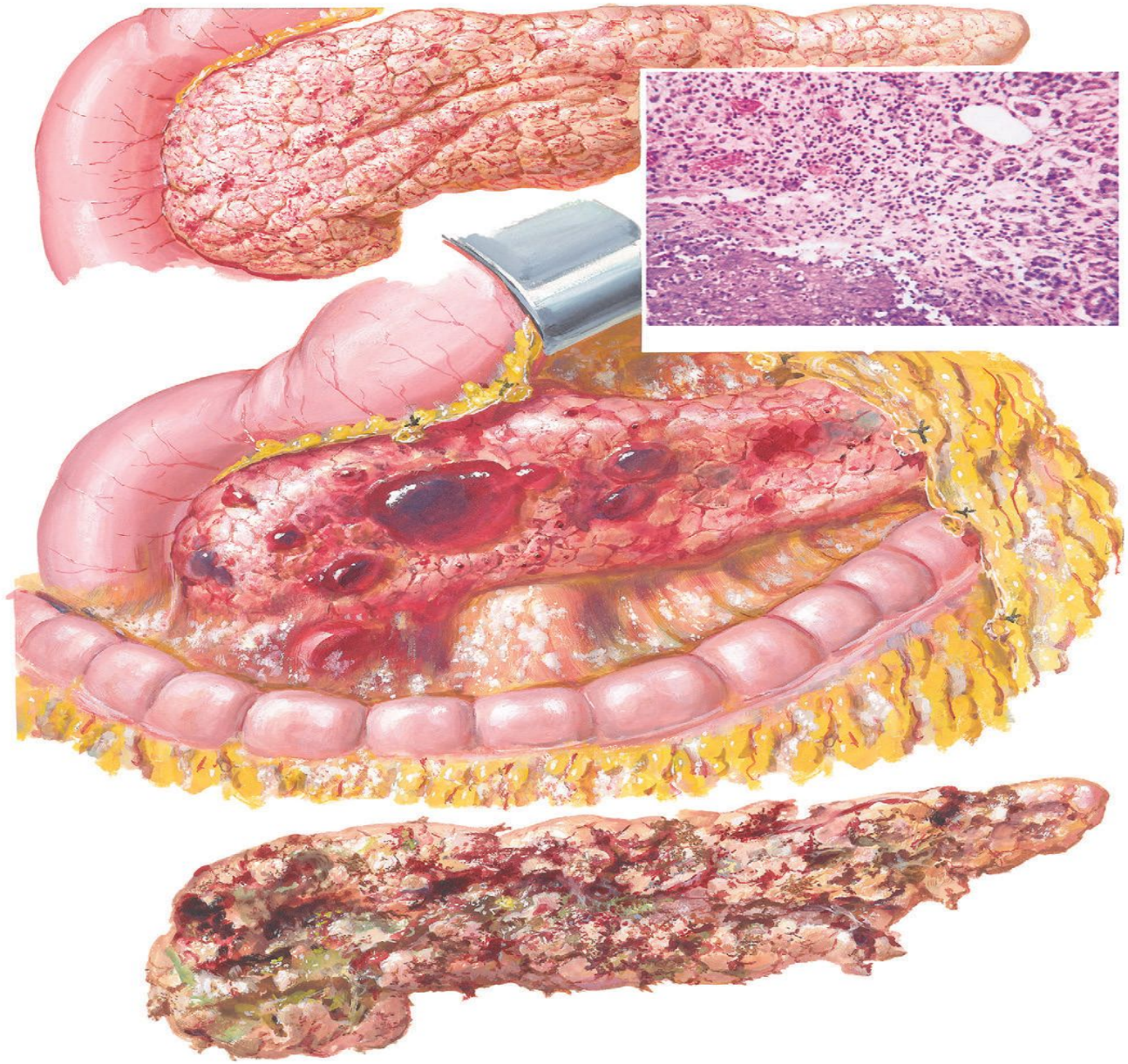
Pathogenesis

- **Activation of proteolytic enzymes within pancreatic cells, starting with trypsin, leading to local and systemic inflammatory response**
- **In gallstone pancreatitis, this is due to mechanical obstruction of the pancreatic duct by stones**
- In ethanol-related pancreatitis, pathogenesis is unknown
- Mutations prevent the physiological breakdown of trypsin

MORPHOLOGY

- OEDEMA
- FAT NECROSIS
- “SAPONIFICATION”
- ACUTE INFLAMMATORY INFILTRATE
- PANCREAS AUTODIGESTION
- BLOOD VESSEL DESTRUCTION





CLINICAL FEATURES

- **Pain**: epigastric, noncolicky, constant can radiate to back
- May improve when leaning forward (inglefinger's sign)
- Tender rigid abdomen; guarding
- **Nausea and vomiting**
- **Abdominal distention** from paralytic ileus
- **Fever**: chemical, not due to infection
- **Jaundice:** compression or obstruction of bile duct
- **Tetany:** transient hypocalcemia
- **Hypovolemic shock**: can lead to renal failure
- **Acute respiratory distress syndrome**
- **Coma**

CHRONIC PANCREATITIS

- Repeated episodes of clinically evident acute pancreatitis
- Common cause is alcohol
- Autoimmune pancreatitis
- Cystic fibrosis
- Familial pancreatitis
- Aminoaciduria or hyperparathyroidism
- Fibrosis & exocrine atrophy
- May results in intestinal malabsorption

CLINICAL FEATURES

- Abdominal Pain
- Vague abdominal symptoms
- chronic diarrhea(mal absorption)
- DM
- pseudocysts
- amylase elevated, or normal

Investigations

- laboratory:

□. increase in serum glucose

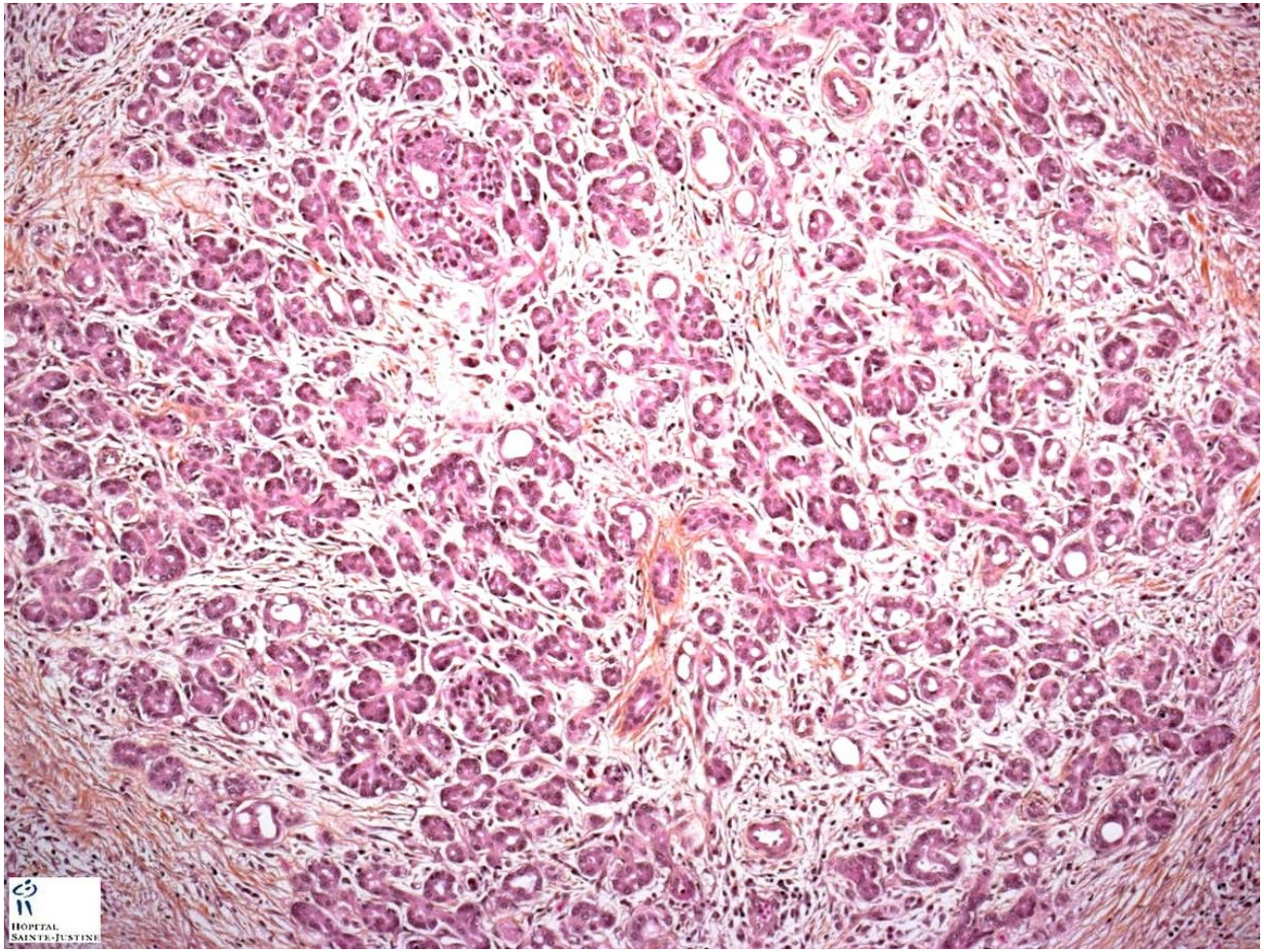
□. increase in serum ALP, less commonly bilirubin (jaundice)

□. Serum amylase

- Radiology: looking for pancreatic calcifications
- U/S or CT: calcification, dilated pancreatic ducts, pseudocyst
- MRCP or ERCP: abnormalities of pancreatic ducts-narrowing and dilatation
- • 72-h fecal fat test: measures exocrine function
- secretin test: gold standard, measures exocrine function but difficult to perform, unpleasant for the patient, expensive
- fecal pancreatic enzyme measurement (elastase-1, chymotrypsin) available only in selected centres

Management

- pain, difficult to control
- general management:
  . total abstinence from alcohol
  . enzyme replacement may help pain by resting pancreas via negative feedback analgesics - celiac ganglion blocks
- endoscopy: sphincterotomy, stent if duct dilated, remove stones from pancreatic duct
  surgery: drain pancreatic duct (resect pancreas if duct contracted
- . restrict fat,
  increase carbohydrate and protein (may also decrease pain)

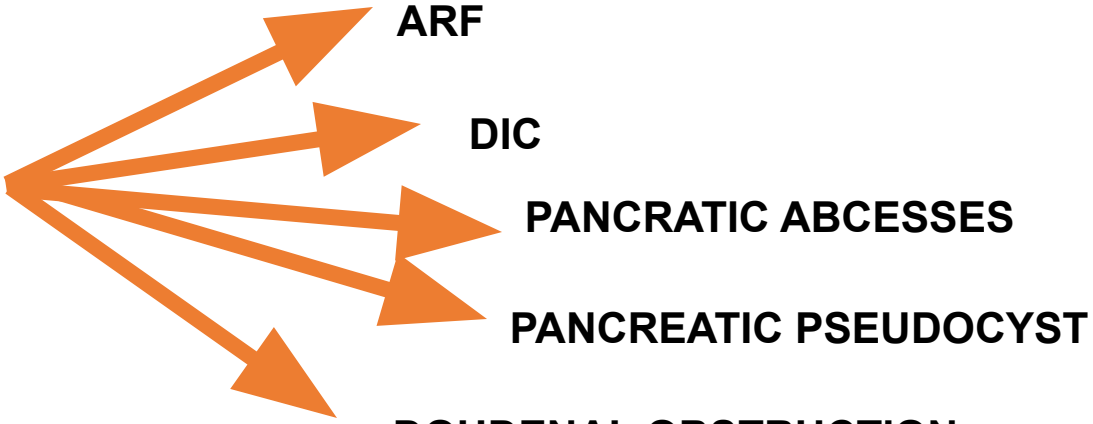

HÔPITAL
SAINTE-JUSTINE

Cysts & Cystic tumours

- **Pancreatic cysts** are of two types
- **True cysts** which are lined by epithelium and may be congenital
- **Pseudocyst** which lacks an epithelial lining and are usually the result of acute pancreatitis and can be drained surgically
- **True cystic tumours** also occur as benign cystadenoma & malignant cystadenocarcinoma

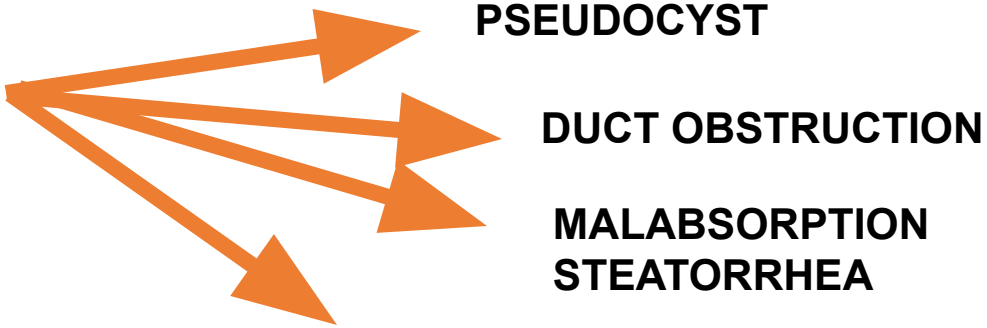
CONSEQUENCES of ACUTE and CHRONIC pancreatitis

ACUTE PANCREATITIS



- SYSTEMIC ORGAN FAILURE
  SHOCK
  ARDS
  ARF
- DIC
- PANCRATIC ABCESSES
- PANCREATIC PSEUDOCYST
- DOUDENAL OBSTRUCTION

CHRONIC PANCREATITIS



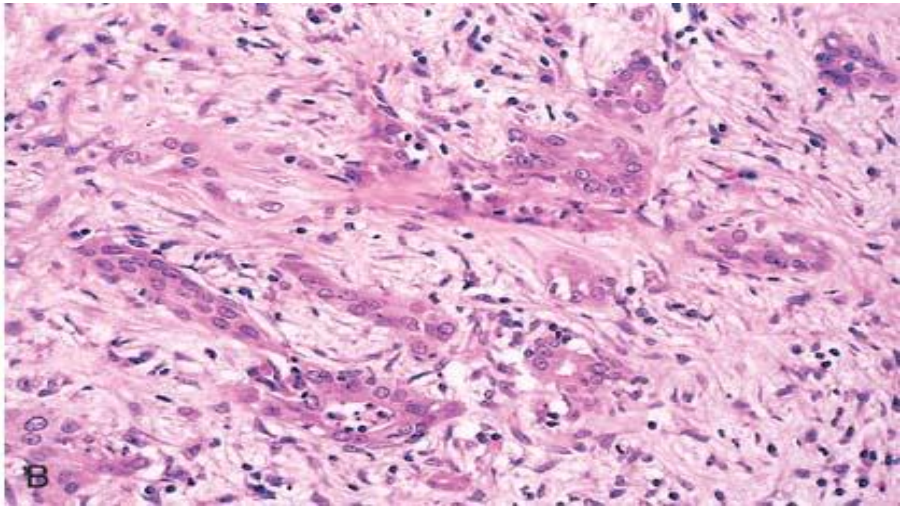
- PSEUDOCYST
- DUCT OBSTRUCTION
- MALABSORPTION
  STEATORRHEA
- SECONDARY DIABETES

CARCINOMA OF THE PANCREAS

- USUALLY ADENOCARCINOMA
- MAY PRESENT WITH OBSTRUCTIVE JAUNDICE
- VERY POOR PROGNOSIS
- **AETIOLOGY**
- CIGARETTE SMOKING
- DM
- FAMILIAL PANCREATITIS
- WEIGHT LOSS
- SYMPTOMS ATTRIBUTABLE TO THE LOCATION OF THE TUMOUR

CLINICOPATHOLOGICAL FEATURES

- MOST ARE ADENOCARCINOMA
- MOST COMMONLY ARISE IN THE HEAD OF THE PANCREAS
- COMPRESS THE COMMON BILE DUCT & CAUSE OBSTRUCTIVE JAUNDICE
- EXTENSIVE REPLACEMENT BY CARCINOMA CAN LEAD TO DM.
- SPREAD BY LYMPH & BLOOD TO THE LIVER



Pancreatic

Adenocarcinoma

REMEMBER

- Painless jaundice in an elderly person is CARCINOMA of the head of the pancreas until proven otherwise

THANK YOU