

# Pancreatitis

# Pathophysiology

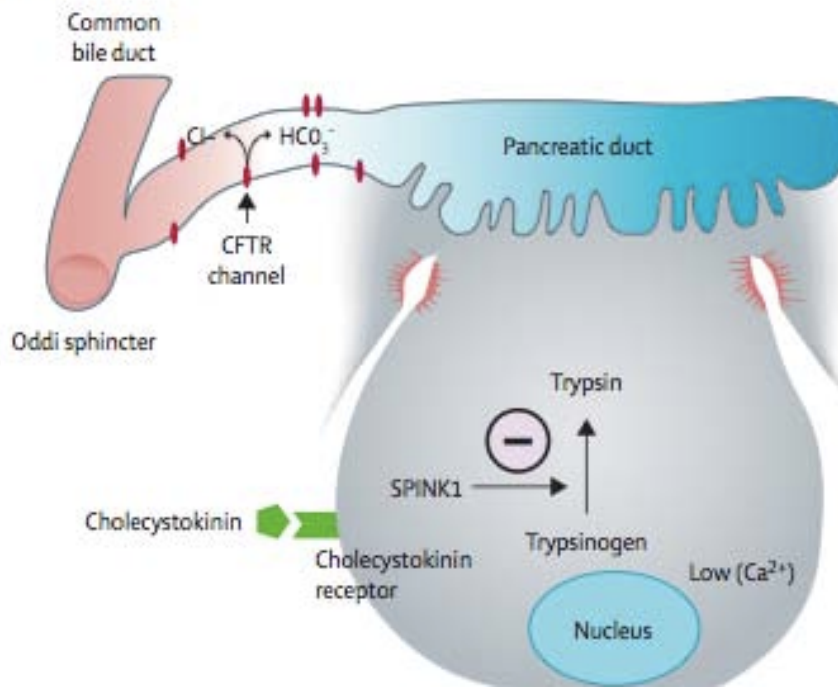
## ACUTE PANCREATITIS

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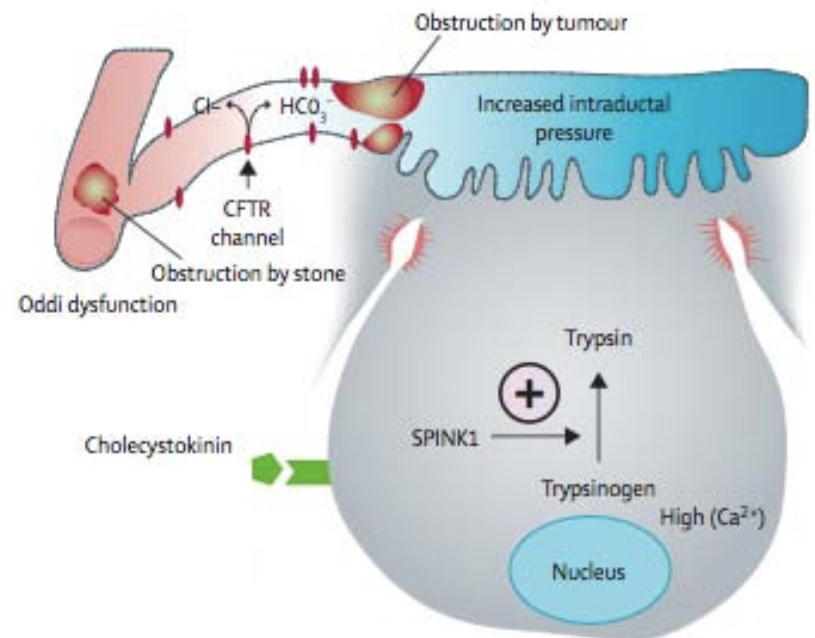
- **BILIARY OBSTRUCTION**
- Duct obstruction in the bile duct, pancreatic duct, or both.
- Increasing pressure
- Unregulated activation of digestive enzymes.
- Inflammation
  - TNF
  - IL-1
- Edema
  - Increased vascular permeability due to inflammation

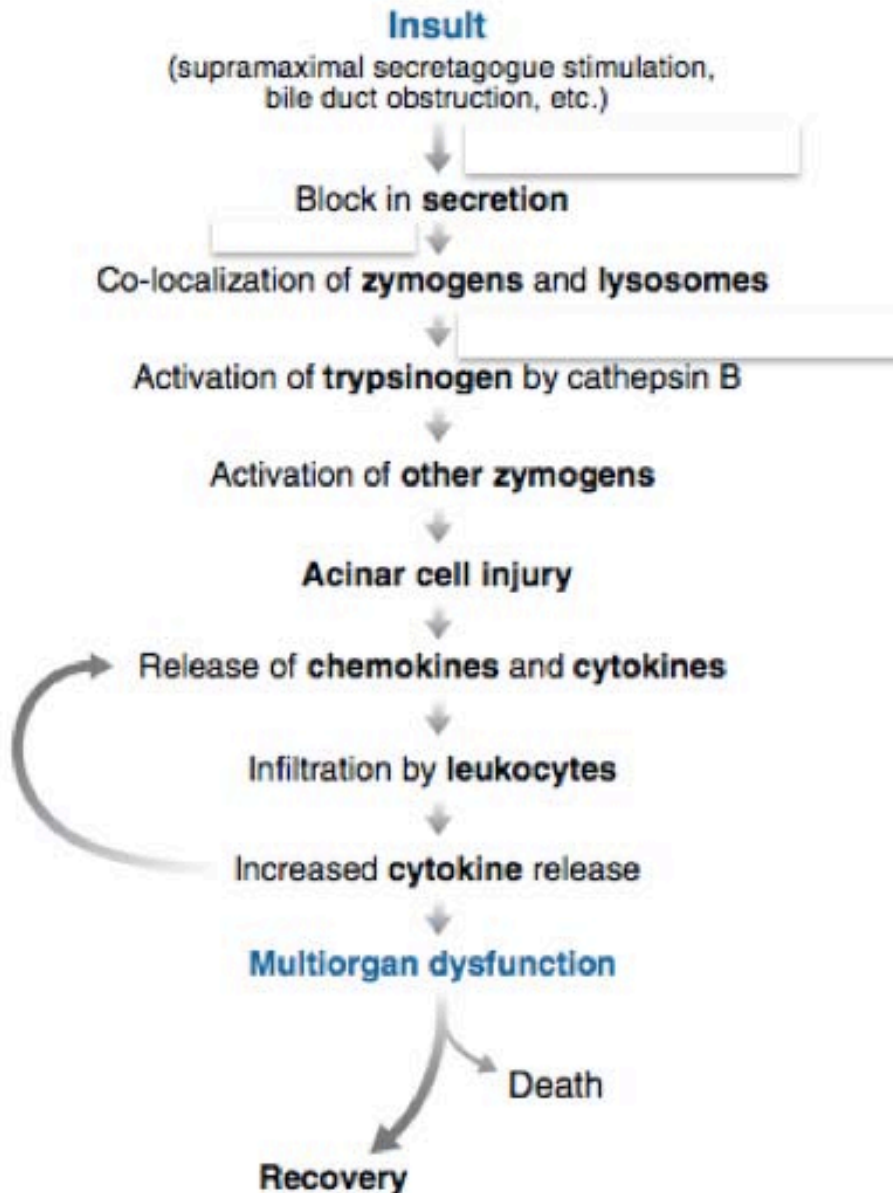
# Unregulated activation of digestive enzymes

## Normal



## Acute pancreatitis





# Pathophysiology

## ACUTE PANCREATITIS

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- **ALCOHOL**
- Most common etiology of chronic pancreatitis and most acute pancreatitis patients have underlying chronic disease.

# What is considered one serving of alcohol?

- One drink contains about 14g pure alcohol

**12 fl oz of  
regular beer**



about 5%  
alcohol

=

**8–9 fl oz of  
malt liquor**  
(shown in a  
12 oz glass)



about 7%  
alcohol

=

**5 fl oz of  
table wine**



about 12%  
alcohol

=

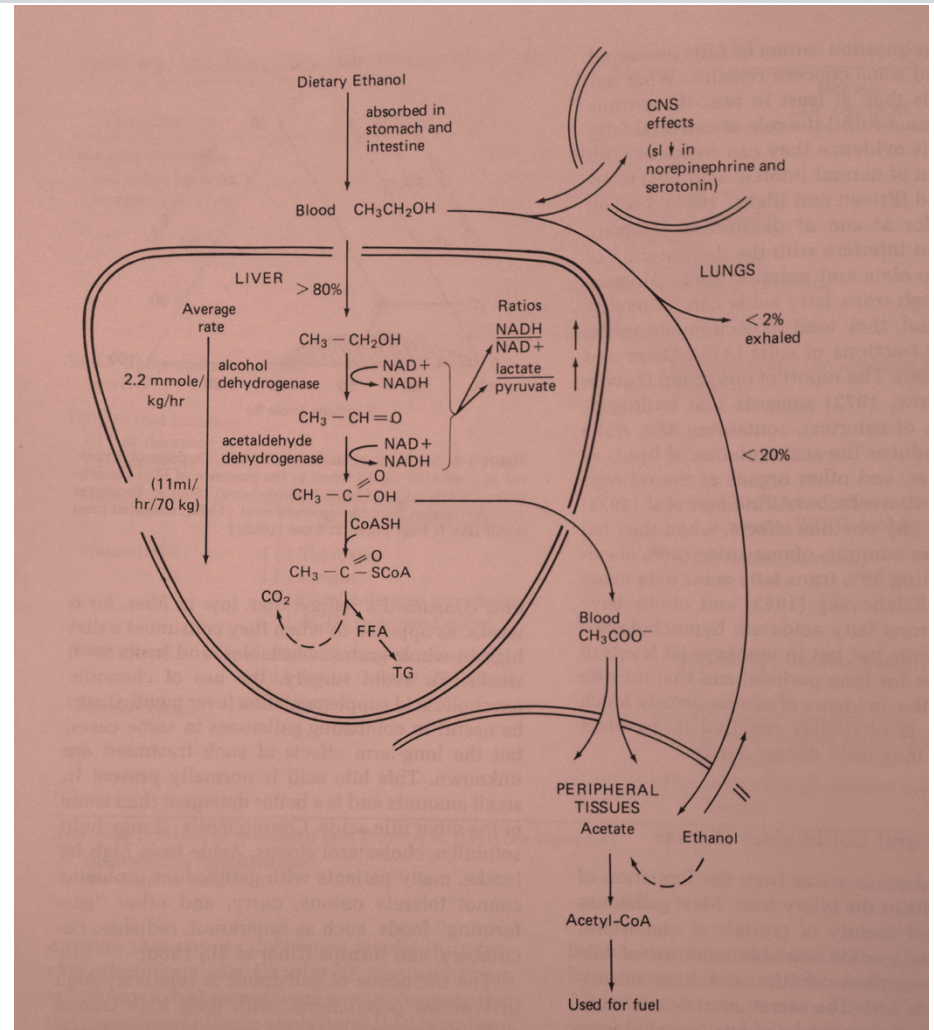
**1.5 fl oz shot of  
80-proof spirits**  
("hard liquor"—  
whiskey, gin, rum,  
vodka, tequila, etc.)



about 40%  
alcohol

# Mini Alcohol Lesson

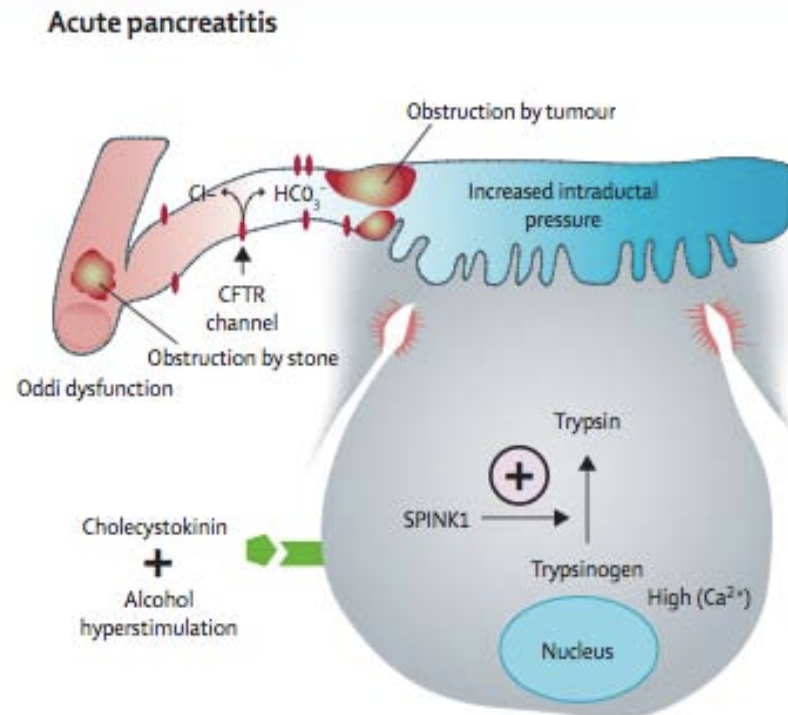
- ADH: Alcohol dehydrogenase
- Can only function until a certain limit.
- MOES: microsomal ethanol oxidizing system



# Pathophysiology

## ACUTE PANCREATITIS

- **ALCOHOL**
- Sensitizes cells to CCK stimulation
- Zymogen activation





# Pathophysiology

## CHRONIC PANCREATITIS

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- Permanent and irreversible damage to the pancreas
- Chronic inflammation and fibrosis
- Destruction of exocrine and endocrine tissue.

# Pathophysiology

## CHRONIC PANCREATITIS

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- **BILIARY OBSTRUCTION**
- Stricture of the main pancreatic duct as a consequence of long term obstruction.
- Benign strictures can develop after severe acute pancreatitis attacks.
- Trauma to the pancreas lead to strictures.
- Recurrent acute pancreatitis
- Leads to necrosis and pseudocysts
- Leads to exocrine and endocrine insufficiency

# Pathophysiology

## CHRONIC PANCREATITIS

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- **ALCOHOL**
- Sensitizes cells to CCK stimulation
- Zymogen activation
- Alcohol metabolites stimulate pancreatic stellate cells.
- Stellate cells - fibrosis

# Diagnosis

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- Digestive enzymes
  - Amylase
  - Lipase
- Ultrasounds
- CT scan
- ERCP

# Amylase

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- Pancreas accounts for 40-45% of serum amylase.
- Rises within 6 to 12 hours
- Cleared quickly from the blood
- Not 100% sensitive or specific
- Normal range: 25-125 U/L
- Use with lipase to diagnose pancreatitis

# Lipase

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- Greater specificity for pancreatitis
- Rises within 4-8 hours
- Remains elevated for longer period of time
- Normal range: 0-110 U/L

# Ultrasound

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- Search for gallstones, dilation of the bile duct, and ascites.

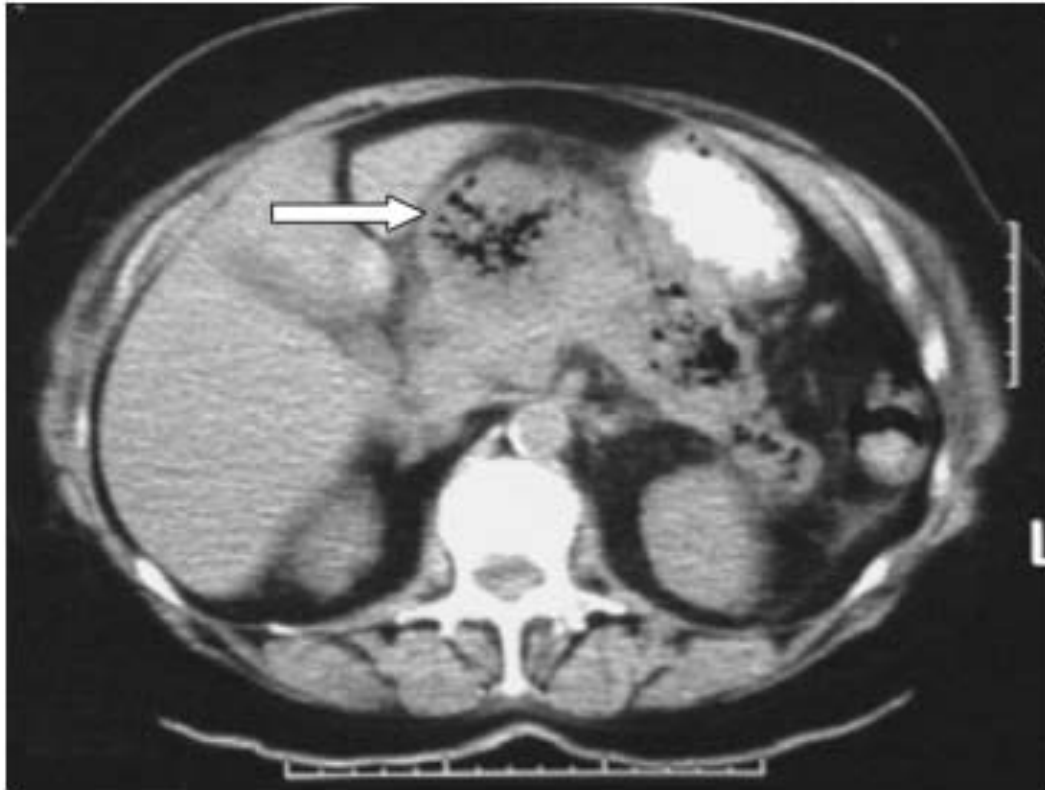
# Computed Tomography

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- Most important imaging test for diagnosis of pancreatitis.
- Diffuse or segmental enlargement of pancreas
- Fluid collection
- Pancreatic inflammation
- Pancreatic necrosis
- Help diagnose disease severity



# Pancreatic CT



**Fig. 1** Computed tomography demonstrating infected pancreatic necrosis, with abscess and gas bubbles (arrow)

# ERCP

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- Endoscopic retrograde cholangiopancreatography
- Scope placed down the throat and into the small intestine where the pancreas and bile duct can be visualized.
- Used when it is suspected a person's bile or pancreatic duct may be narrowed or blocked due to:
  - Tumors, gallstones, inflammation, infections, scarring, pseudocysts.

# Prognosis

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- Prognosis can be determine by using a clinical scoring systems.

# Ranson's Score

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- Ranson Criteria
  - 11 signs of prognostic significance during the first 48 hours.
  - Scores  $<2$  mortality = 2.5%
  - Scores  $>3$  mortality = 62%
  - The higher the Ranson's score the higher the incidence of complications, necrosis, and infection.

# Ranson's Criteria for Severity

At Admission
Age >55 yr
WBC >16,000/mL
LDH >350 IU/L
AST >250 IU/L
Glucose >200 mg/dL
At 48 Hours
Hematocrit decrease >10%
BUN increase >5 mg/dL
Calcium <8 mg/dL
Pao <sub>2</sub> <60 mm Hg
Base deficit >4 mg/dL
Fluid sequestration >6 L

# APACHE-II Score

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- Predicts severity.
- Assigns points for 12 physiologic variables, age, and chronic health.
- 12 variables: temperature, heart rate, respiratory rate, mean arterial blood pressure, oxygenation, arterial pH, serum potassium, sodium, and creatinine, hematocrit, WBC, and glasgow coma scale.
- $<9$  = higher survival rate
- $>13$  = high likelihood of dying

# Case Study

## NUTRITION ASSESSMENT

### Anthropometric

- Male, 29
- 5'11", 245 lbs
- BMI 34.2
- IBW 172, 142%
- NPO

### Biochemical

- BUN 30 (8-18)
- Creatinine serum 1.6 (.6-1.2)
- Osmolality 303 (285-295)
- Bilirubin total 1.9 (<1.5)
- Bilirubin direct .9 (<.3)
- Alkaline phosphatase 256 (30-120)
- ALT 38 (4-36)
- AST 56 (0-35)
- CPK 219 (55-170)
- Lactate dehydrogenase 402 (208-378)
- **Lipase 980** (0-110)
- **Amylase 543** (25-125)
- **CRP 18** (<1)
- Cholesterol 210 (120-199)
- **Triglycerides 285** (40-160)
- WBC 19.8 (4.8-11.8)
- Neutrophil % 90 (50-70)

# Case Study

## NUTRITION ASSESSMENT

### Clinical

- Abdominal pain
- N/V
- Depression
- Dry skin
- Abdomen tender, guarding, rebound
- Medications:
  - Imipenen
  - Pepcid
  - Meperidine
  - Ondansetron
  - Colace
  - Milk of Magnesia
  - Ativan

### Dietary

- Six pack of beer, 4-5 shots of bourbon daily; mixed drinks and wine on weekends
- Typical Intake
  - Breakfast: coffee and toast
  - Lunch: Sub sandwich or pizz
  - Dinner: Eats out
  - Hasn't eaten much over past three days because of pain, N/V
  - Current diet order NPO with post pyloric feeding tube

### Genetics

- Mom with breast cancer
- Dad with HTN



# Case Study

## NUTRITION DIAGNOSIS

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### **PES Statement**

Inadequate oral intake related to nausea and vomiting as evidenced by patient statement of poor appetite due to abdominal pain.

# Case Study

## PLAN

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- NCM (25-35 kcal/kg/day)
  - 2159-3022 REE
- NCM Protein 1.2-1.5 g/kg/day
  - 133-167 g/day PRO
- 1900-2400 mL
- Mild-moderate: NPO
- Severe: Enteral feeding
- Recommend patient limit alcohol consumption to prevent future attacks

# Sample Diet

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**Breakfast:**

Honey Nut Cheerios  
Skim lactose-free milk  
Small banana

2200 Kcals

15% of Calories from fat

138 g Protein

**AM Snack:**

Greek yogurt with granola

**Lunch:**

Ham sandwich with lettuce, tomato, 2 tsp light mayo  
Apple  
Baby carrots

**PM Snack:**

Low fat cheese and crackers

**Dinner:**

Grilled chicken  
White Rice  
Steamed Broccoli

**HS Snack (or dessert):**

Nonfat frozen yogurt  
Sliced strawberries