

Pancreatitis in dogs and cats: Diagnosis and Treatment

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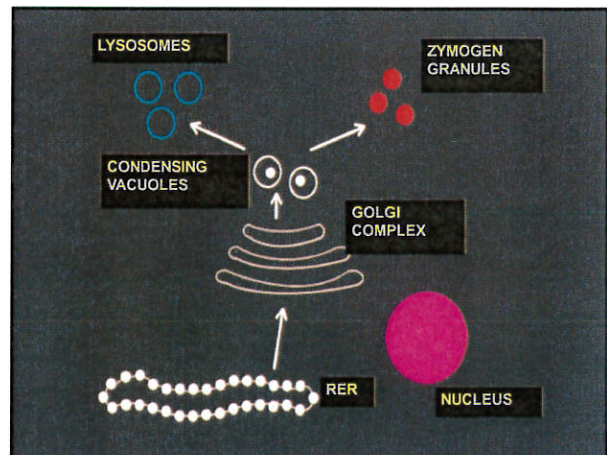
GI Lab – Texas A&M University

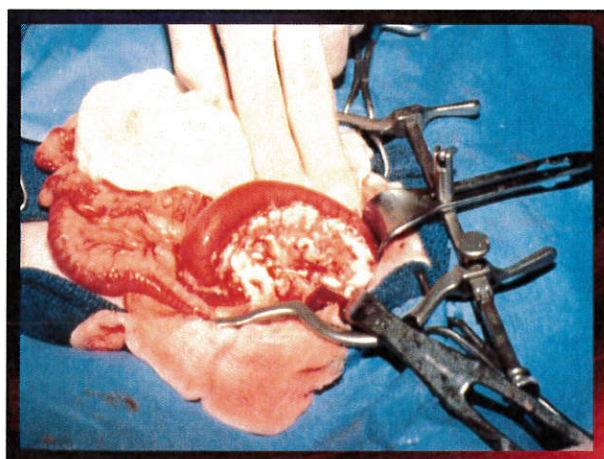
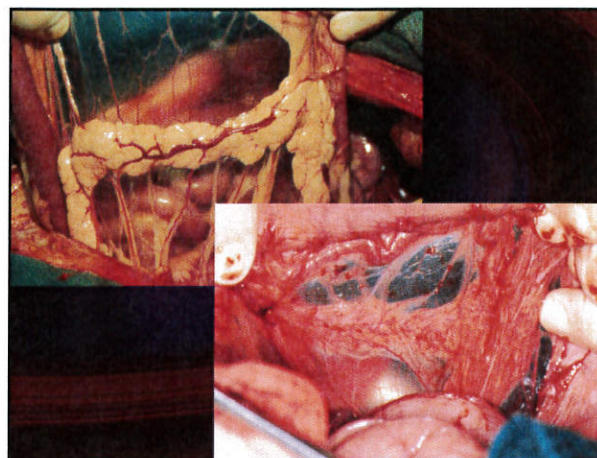
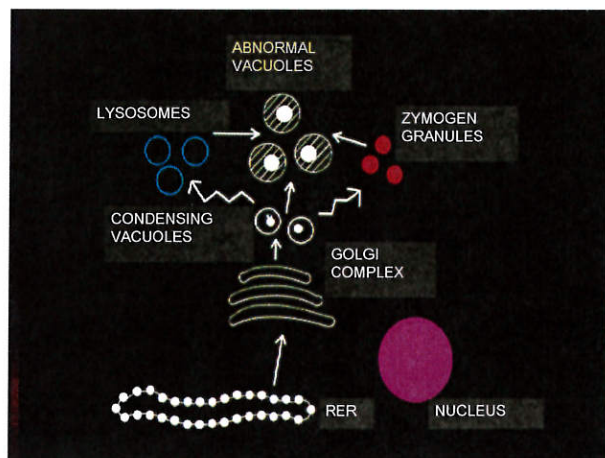
Pancreatitis - Main points to make!

- Pancreatitis can be subclinical
- Enzyme concentration vs activity
- Amylase and lipase activities are not sensitive or specific tests
- TLI is not a sensitive test
- PLI is both sensitive and specific and there are logical reasons for this
- Spec cPL and SNAP cPL are very practical "new and improved" versions of the classic cPLI assay

Pancreatitis - Treatment

- Removal of cause
- Fluid therapy
- Control pain and vomiting
- Do not overstimulate pancreas
- Nutritional support as needed
- Monitor for complications
- Treat concurrent diseases





PANCREATITIS – EXPLORATORY LAPAROTOMY

- Hemorrhage
- Necrosis
- Fat necrosis
- Adhesions
- Ascites



• **BIOPSY IS SAFE!**

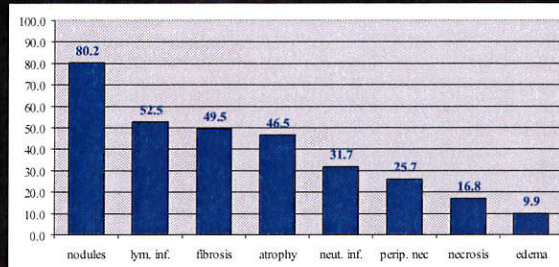
Pancreatic Lesions in Dogs in the USA

- more than 200 dogs
- pancreas sectioned every 2 cm
- only 8% had no lesions in any sections



Newman et al. 2004

Exocrine Pancreatic Lesions



↳ Lesions in exocrine pancreas were much more common than expected

Presenting Signs

- Vomiting
- Anorexia
- Diarrhea
- Abdominal pain (?)



Pancreatitis

Remove the cause

- Nutrition
- Drugs and toxins
- Infectious agents
- Ischemia/hypoperfusion
- Hypercalcemia
- Pancreatic neoplasia

Clinical Signs

- | | |
|-------------------------|-----|
| • anorexia | 91% |
| • vomiting | 90% |
| • weakness | 79% |
| • abdominal pain | 58% |
| • dehydration | 46% |
| • diarrhea | 33% |
| • fever | 21% |
| ⇒ non-specific findings | |

n = 70

Hess et al., 1998

Radiography

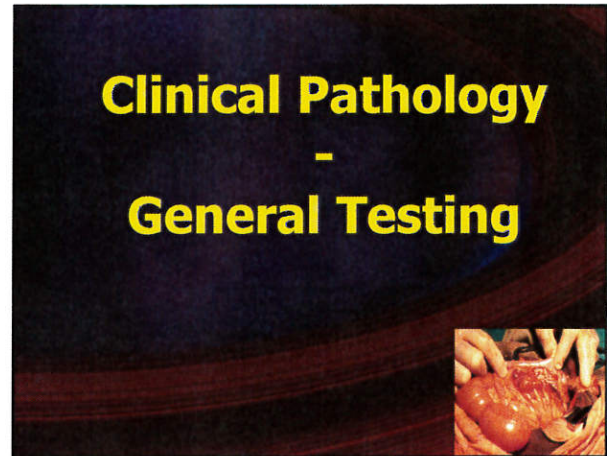
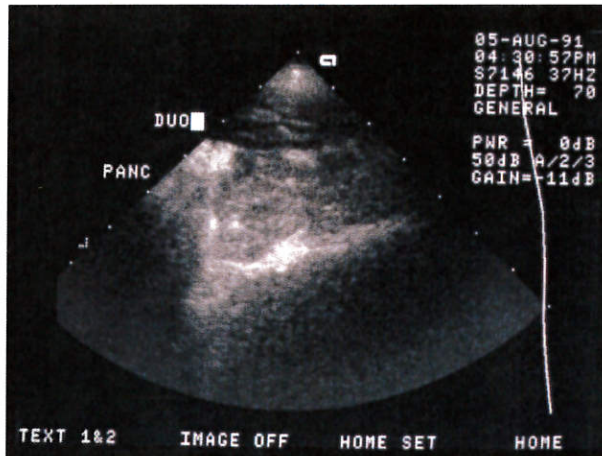
- abdominal radiographs
 - decreased contrast
 - dilated intestinal loops
 - transposition of abdominal organs
- thoracic radiographs
 - pleural effusion

Suter et al., 1969; Garvey et al., 1984; Hill et al., 1993

Abdominal Ultrasonography

- fluid accumulation around the pancreas
- enlargement of the pancreas
- increased echogenicity (fibrosis)
- decreased echogenicity (necrosis)
- pancreatic mass effect
- if stringent criteria are applied abdominal ultrasound is highly specific
- sensitivity is largely operator dependant and has been reported to be up to 68% in dogs

Saunders, 1991, Swift et al. 2000, Gerhardt et al. 2001, Saunders et al. 2002



Hematology in Dogs with Pancreatitis

- thrombocytopenia 59%
- neutrophilia and left shift 55%
- anemia 29%

⇒ non-specific findings

n = 70

Hess et al., 1998

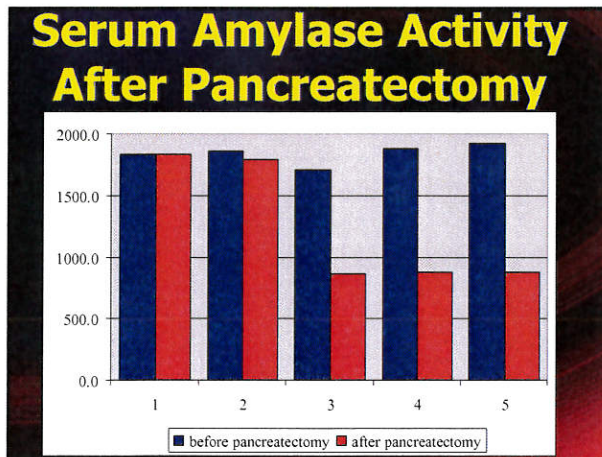
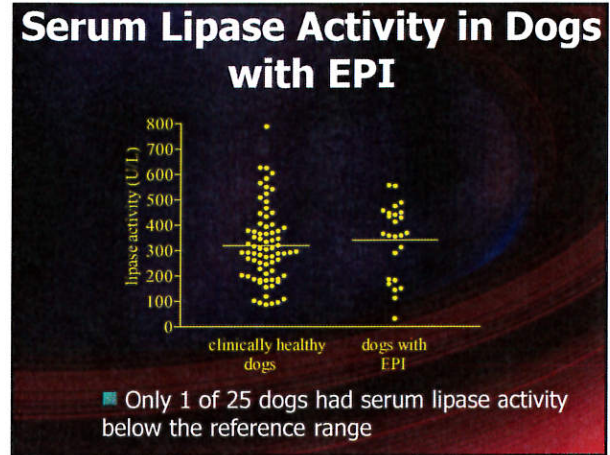
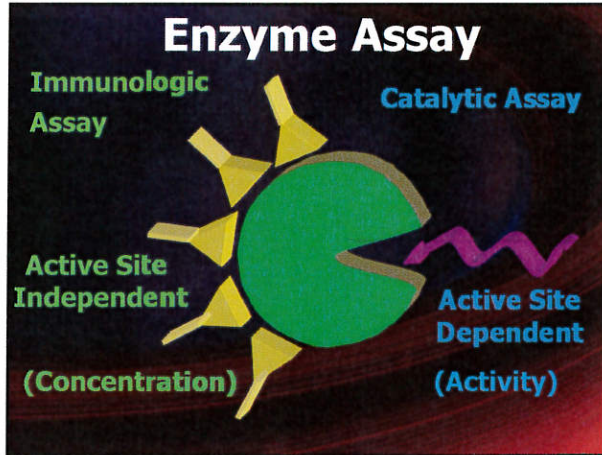
Serum Chemistry Profile in Dogs

- hypochloremia 81%
- elevation of SAP 79%
- hypophosphatemia 68%
- elevation of ALT 61%
- azotemia 59%
- hyperbilirubinemia 53%
- hypoalbuminemia 50%
- hypercholesterolemia 48%
- hypoglycemia 39%
- hyperglycemia 30%

⇒ non-specific findings

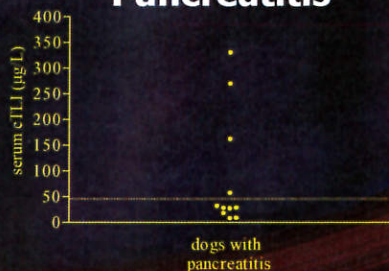
n = 64

Hess et al., 1998



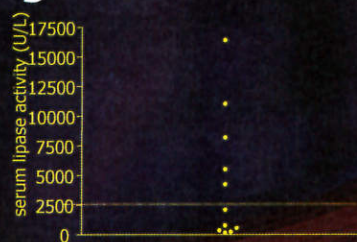
Serum amylase and lipase activities are neither sensitive nor specific for pancreatitis in dogs or cats

Serum cTLI in 11 Dogs with Pancreatitis



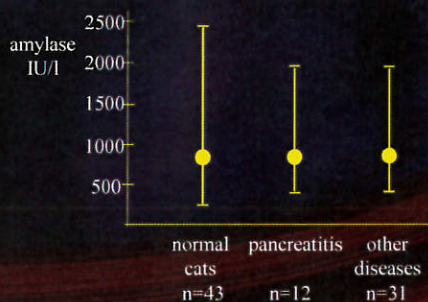
● only 4 of 11 dogs had serum cTLI concentrations above the recommended cut-off value of 50 µg/L (sensitivity: 36.4%)

Serum Lipase Activity in 11 Dogs with Pancreatitis



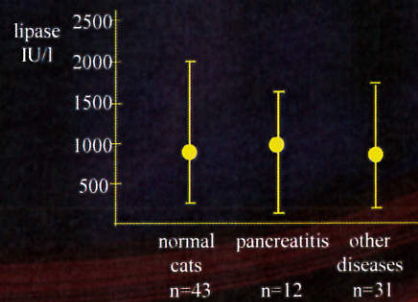
■ Only 6 of 11 dogs had serum lipase activities above the recommended cut-off value of 3 times the upper limit of the reference range (sensitivity: 54.5%)

Serum Amylase Activity does not Increase in Cats with Pancreatitis



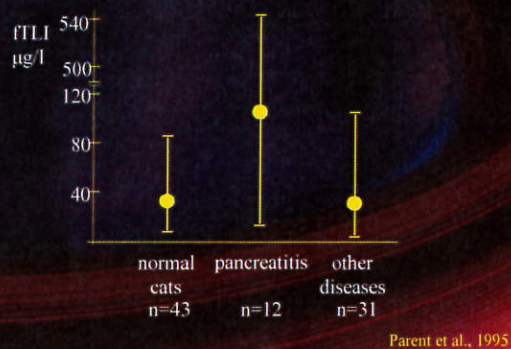
Parent et al., 1995

Serum Lipase Activity does not Increase in Cats with Pancreatitis



Parent et al., 1995

Serum fTLI Concentration



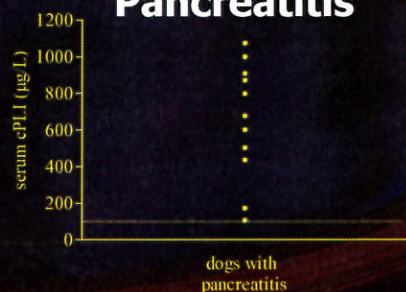
Sensitivity of serum TLI

- sensitivity only 30-60%
 - trypsinogen (TLI) is a small molecule that is quickly excreted in urine
 - trypsinogen is activated to trypsin during pancreatitis
 - trypsin is also quickly removed by plasma proteinase inhibitors

Steiner 2001, Swift 2000, Gerhardt 2001

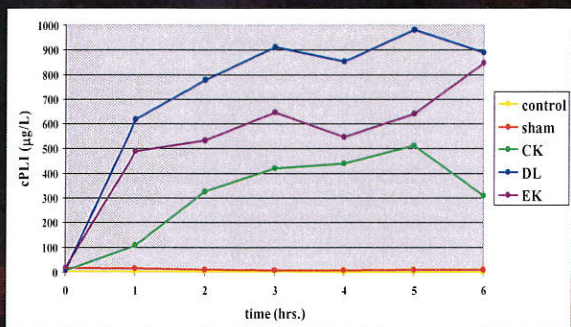
Serum canine Pancreatic Lipase Immunoreactivity (cPLI) Concentration

Serum cPLI in 11 Dogs with Pancreatitis

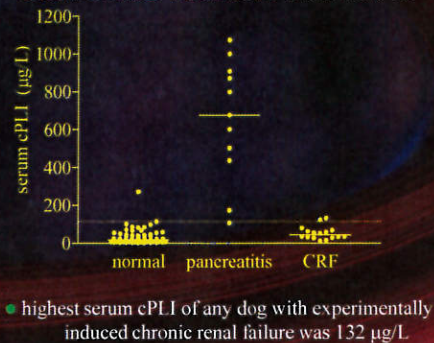


- 9 of 11 dogs had serum cPLI concentrations above the recommended cut-off value of 200 µg/L
- (sensitivity: 81.8%)

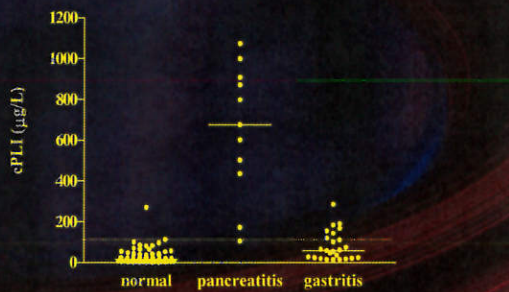
Serum cPLI in Dogs with Experimental Pancreatitis



Serum cPLI in Dogs with Chronic Renal Failure

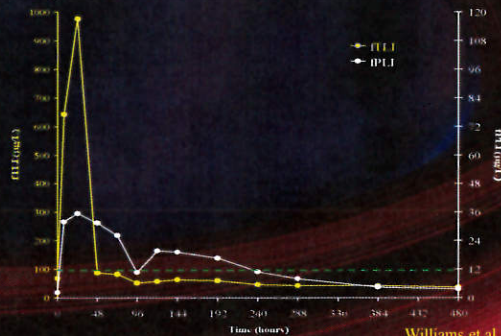


Serum cPLI in Dogs with Gastritis

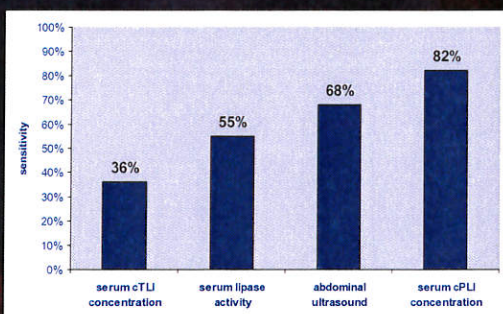


● in 24/25 dogs with gastritis serum cPLI (ELISA) is less than the currently recommended cut-off value

fTLI and fPLI in Cats with Experimental Pancreatitis



Test Sensitivities for Canine Pancreatitis



Steiner et al. 2001; Hess et al. 2000

Collaboration

- Spec c/f PL[®] (Idexx Laboratories)
 - Monoclonal antibodies against PL
 - Recombinant PL standards
- Quantitative assays from labs
- SNAP cPL and fPL for in-clinic testing (10 minutes)

Serum Lipase vs. Spec cPL[™]

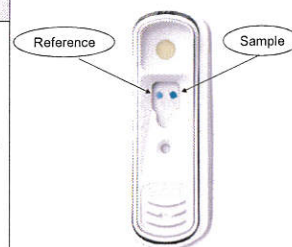
Serum Lipase and Spec cPL are **NOT** the same thing!

- Serum lipase activity is not specific for the pancreas and can be elevated with renal and GI disease
- Serum lipase activity helps indicate pancreatitis but can't be used as a stand alone diagnostic indicator
- Serum PLI (cPL and fPL) is only produced by the pancreas and therefore is very specific for pancreatitis



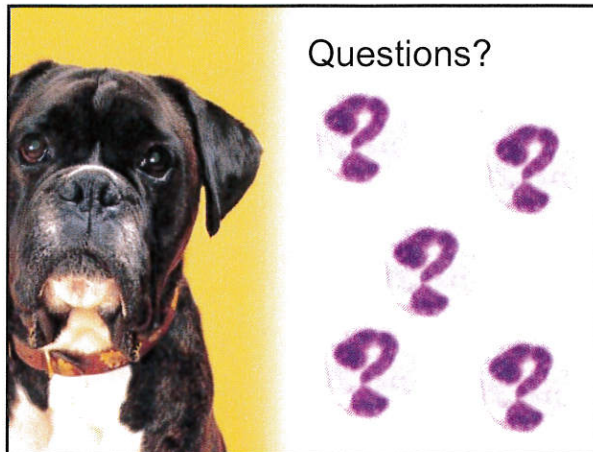
SNAP cPL

Features
• Two results: Normal or Abnormal
• Read time: 10 minutes
• Storage: Refrigeration
• Sample type: Serum
• Read: Visual; semi-quantitative
• Uses the same technology as Spec cPL [®] <ul style="list-style-type: none"> - Optimized to match the performance of Spec cPL with an Abnormal range that captures Spec cPL levels >200 (i.e. elevated and consistent w/ pancreatitis zones)
• Correlation to Spec cPL ~95%



PLI assays are good tests for pancreatitis because:-

- Prompt and sustained increases occur when there is pancreatitis
- No increases in non-pancreatic diseases such as renal failure and gastritis
- No increases in response to corticosteroid therapy
- PLI is stable in serum



"Pancreatitis"

- Canine – acute and chronic
- Feline – acute and chronic
- Histologically defined subgroups
- Etiologically defined subgroups
- Clinical and subclinical disease
- Concurrent diseases of the digestive system complicate the clinical picture even further

Pancreatitis

- Acute pancreatitis is a self-limiting benign disease in approximately 90% of human patients
- The remaining 10% present with, or progress to, severe necrotizing pancreatitis, and up to 50% die

Pancreatitis - Treatment

- Removal of cause
- Fluid therapy
- Control pain and vomiting
- Do not overstimulate pancreas
- Nutritional support as needed
- Monitor for complications
- Treat concurrent diseases

Pancreatitis Remove the cause

- Nutrition
- Drugs and toxins
- Infectious agents
- Ischemia/hypoperfusion
- Hypercalcemia
- Pancreatic neoplasia

Pancreatic Parasites

- Feline pancreatic fluke
 - *Eurytrema procyonis*
 - Fenbendazole (30 mg/kg q24h x 6 days)
- Feline hepatic fluke
 - *Amphimerus pseudofelineus*
 - Pancreatic invasion → pancreatitis
 - Praziquantel (40mg/kg q24h x 3 days)

Pancreatitis Control Pain and Vomiting

- Major clinical signs
 - Anorexia
 - Vomiting
 - Depression
 - Abdominal pain
 - Fever

Pancreatitis – Treatment

- **Analgesia**

- Fentanyl
 - bolus injection or transdermal
- Morphine
 - intermittent bolus or CRI
- Intraperitoneal lidocaine

Pancreatitis – Treatment

- **Analgesia**

- Intraperitoneal lidocaine
 - 2mg/kg diluted in 50mL of warm 0.9% NaCl (dogs)



Pancreatitis Monitor for complications

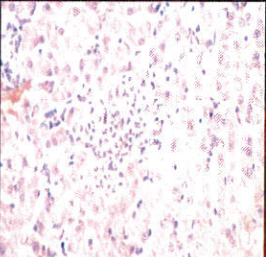
- Hyperlipidemia
- Hyperglycemia
- Uremia
- Hypokalemia
- Hypocalcemia
- Obstructive hepatopathy

Pancreatitis

Monitor for complications

Hepatopathy

- Toxic
 - (Enzymes)
- Obstructive
 - (Bile Duct)



Pancreatitis – Treatment

- Surgery
 - Peritoneal lavage ✓✓✓✓
 - Debridement
 - Partial pancreatectomy ✓
 - Drainage
 - Cholecystoduodenostomy



Feline Pancreatitis with Hepatic Lipidosis

- Observed in 5 of 13 cats examined
- Clinical signs not different from those in cats with lipidosis alone
- Coagulation abnormalities more common
- Peritoneal effusion common
- Poor prognosis

(Akol et al. 1993)

Pancreatitis - Treatment



Pancreatitis - Treatment

Fluid therapy

- Azotemia
- Potassium
- Calcium

Pancreatitis - Treatment

- Proteinase inhibitors
Aprotinin (Trasylo[®])
Synthetic Inhibitors
Plasma (α -macroglobulins)

Only plasma is practical !(\$\$)

Pancreatitis – Treatment



Plasma contains both albumin and α -macroglobulins

Pancreatitis – Treatment

Corticosteroids?

- Acute - usually No!
- Chronic – usually OK or beneficial (especially in cats)

Pancreatitis – Treatment

- Septic complications very rare in dogs / cats
- Antibiotic therapy probably not helpful

Pancreatitis – Treatment

- Gradually reintroduce food
 - Moderate to low fat (dogs)
 - Moderate protein
 - High carbohydrate (dogs)
 - Rice, pasta, potato
- Gradually return to normal diet
- Diet type not important in cats

Pancreatitis – Treatment

- **Chronic Disease**
 - Increasingly recognized
 - Very few studies
 - Low fat diet in dogs
 - Corticosteroids
 - Oral pancreatic enzymes?

