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Acute Pancreatitis in the Dog: Diagnosis and Management

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VMX 2025 VETERINARY MEETING & EXPO

Conflict of Interest Disclosure

• Gastrointestinal Laboratory	Director
• IDEXX Laboratories	Paid Consultant
• Nutramax Laboratories	Paid Consultant
• ISK	Paid Consultant
• CEVA Animal Health	Paid Consultant
• Glycosbio	Paid Consultant
• Bond Pet Care	Paid Consultant
• Nutramax Laboratories, IDEXX Laboratories, Paid Speaker, CEVA Animal Health, Siemens Healthineers	Paid Speaker
• Hill's Pet Care, Nutramax Laboratories	Grant Support

Introduction

Pancreatic Inflammation

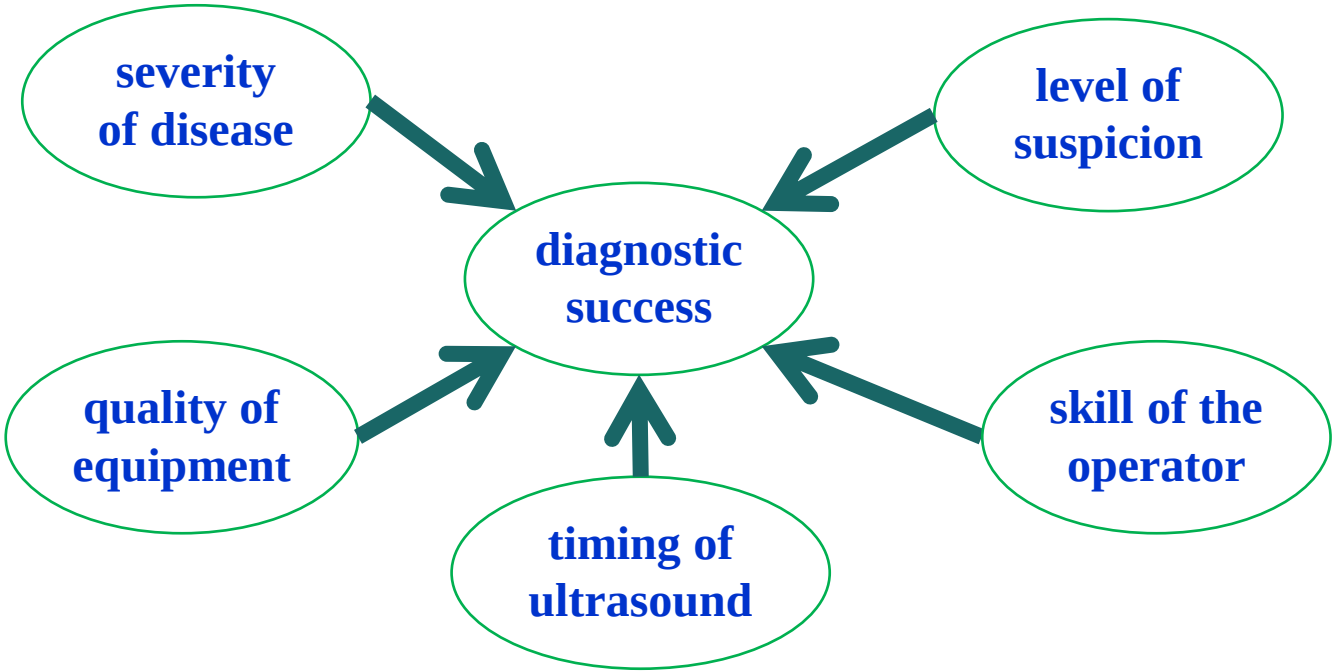
- more common than previously believed
- acute pancreatitis is associated with significant morbidity and mortality
- definitive diagnosis of pancreatitis can be challenging
- management of acute pancreatitis in any species has largely rested on supportive and symptomatic care

Diagnosis of Acute Pancreatitis in Dogs

Abdominal Ultrasound

- enlargement of the pancreas
- fluid around the pancreas
- echogenicity changes of the pancreas:
  - decreased echogenicity: necrosis
- echogenicity changes around the pancreas:
  - increased echogenicity: peripancreatic fat necrosis
- dilation of the pancreatic duct

Ultrasound for the Diagnosis of Pancreatitis



Advanced Imaging

- contrast-enhanced ultrasound
  - promising studies from Japan
- computed tomography
  - isolated case reports
  - disappointing studies from Europe
- magnetic resonance imaging
  - a single study has suggested some usefulness

⇨ not yet used for routine diagnosis

CBC and Chemistry Profile

- a variety of changes can be observed
- none are specific for pancreatitis

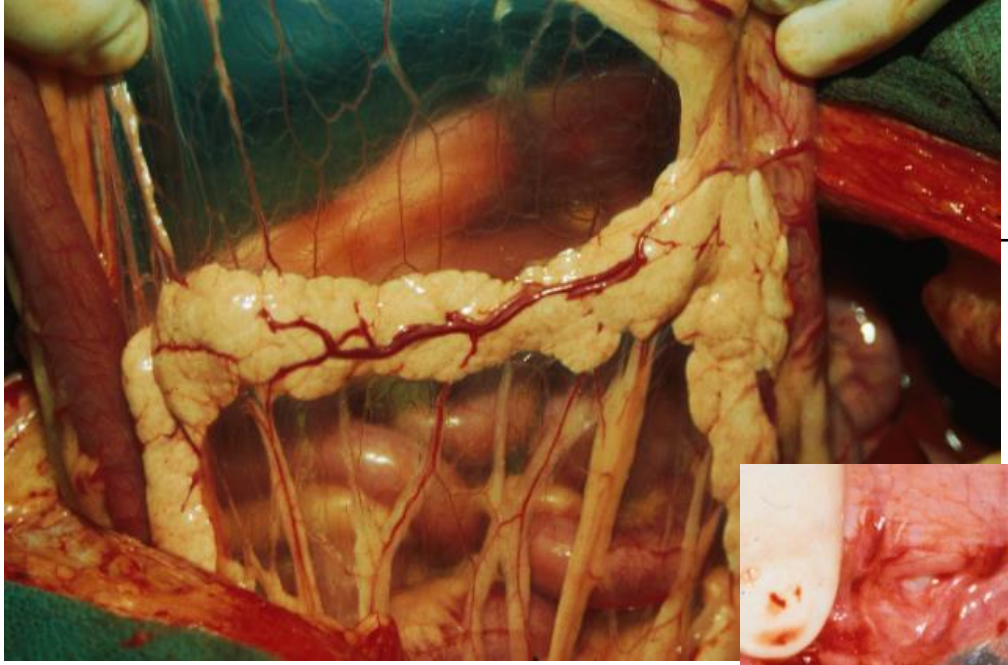
⇨ however, CBC and chemistry profile are crucial to evaluate the patient for systemic complications

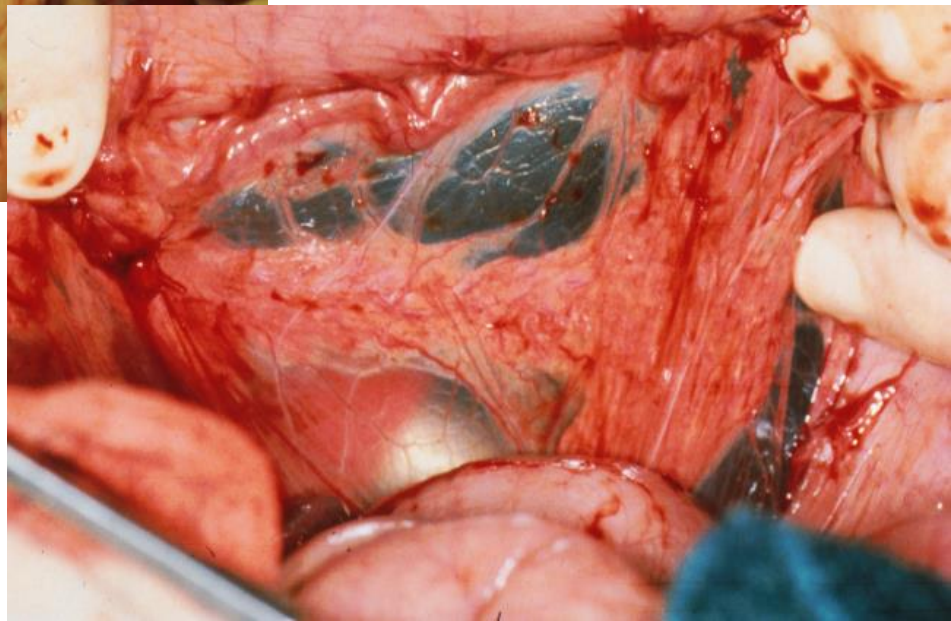
Lipase Activity can be Measured by Different Assays

- many assays utilize a 1,2 diglyceride as a substrate
  - available for dry and wet chemistry
- others use a triglyceride (triolein)
  - available for dry chemistry only
- others use a synthetic substrate DGGR
  - traditionally only available for wet chemistry
  - first assay for dry chemistry (Catalyst PL)

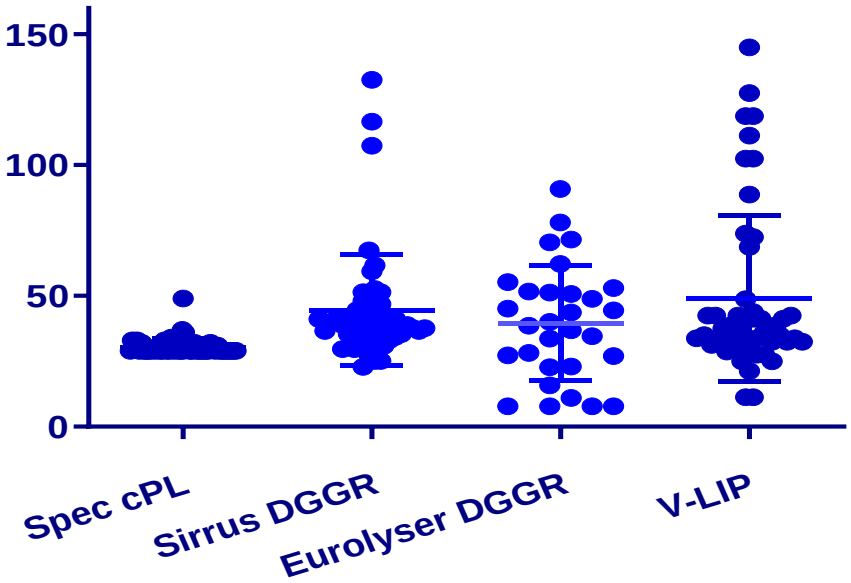
Important Considerations

- even if assays use the same substrate they may produce completely different results
  - assay conditions are crucial
    - co-factors added
    - temperature
    - analyzer
    - pH
    - many others





Assay Comparison



⇨ Spec cPL is the most specific assay for the measurement of pancreatic lipase

Where is Lipase Activity Coming From?

- extra-pancreatic lipases
- PLRP2
- esterases
- proteinases
- hemoglobin

DGGR Study

- 30 client-owned dogs
- presented to the Veterinary Teaching Hospital for vomiting, diarrhea, or abdominal pain
- diagnosis of pancreatitis in 15 dogs based on clinical history, clinical signs, and ultrasonographic findings

Graca et al. 2005

Sensitivity and Specificity

	sensitivity	specificity
1,2 DiG assay	60%	73%
DGGR assay	93%	53%

Graca et al. 2005

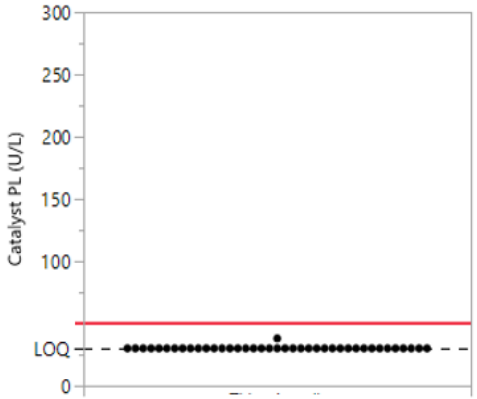
Catalyst PL by Idexx Laboratories

- a new DGGR-based in-house assay for the catalyst analyzer
- first DGGR-based lipase assay on a dry-chemistry analyzer
  - ⇨ proprietary technology to keep DGGR stable
- first DGGR-based lipase assay that appears to be specific for the measurement of pancreatic lipase
  - ⇨ proprietary technology

Catalyst PL by Idexx Laboratories

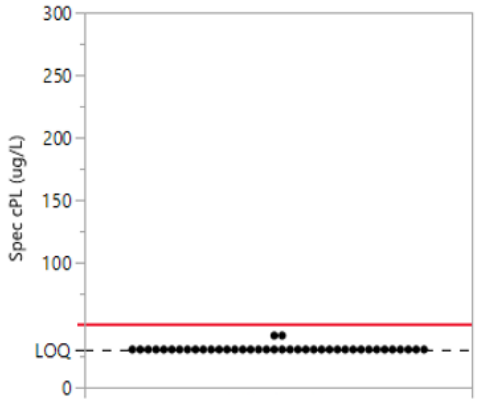
- internal analytical validation has been completed
- external analytical validation is under way
- provides a numerical result that has been aligned with the Spec PL assays
- ideal for patients with acute clinical signs that require immediate and accurate results
- more data are under way

Specificity in Dogs with PAA



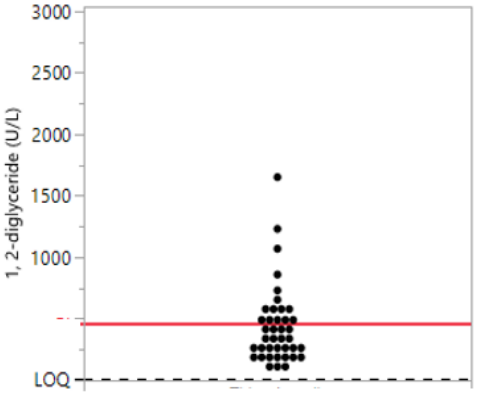
Catalyst PL

3 samples > 30 U/L
0 samples > 50 U/L



Spec cPL

5 samples > 30 ug/L
0 samples > 50 ug/L

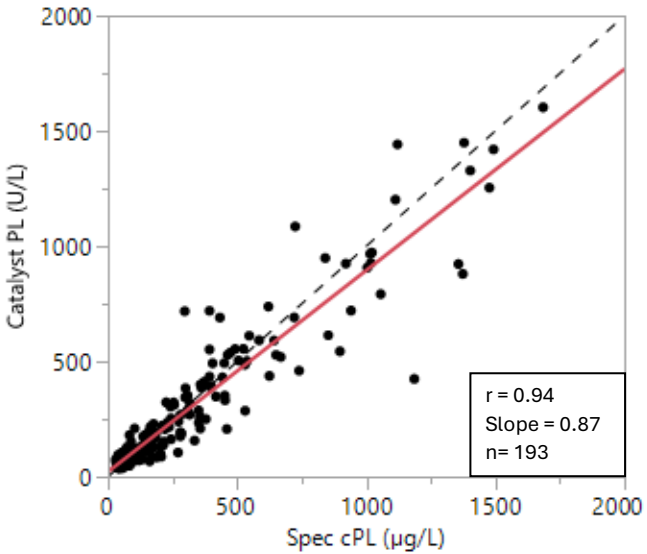


1,2-diglyceride

15 samples > 450 U/L

Lower 25% of RI
Limit of Quantification

Method Comparison



Serum Lipase Activity - Summary

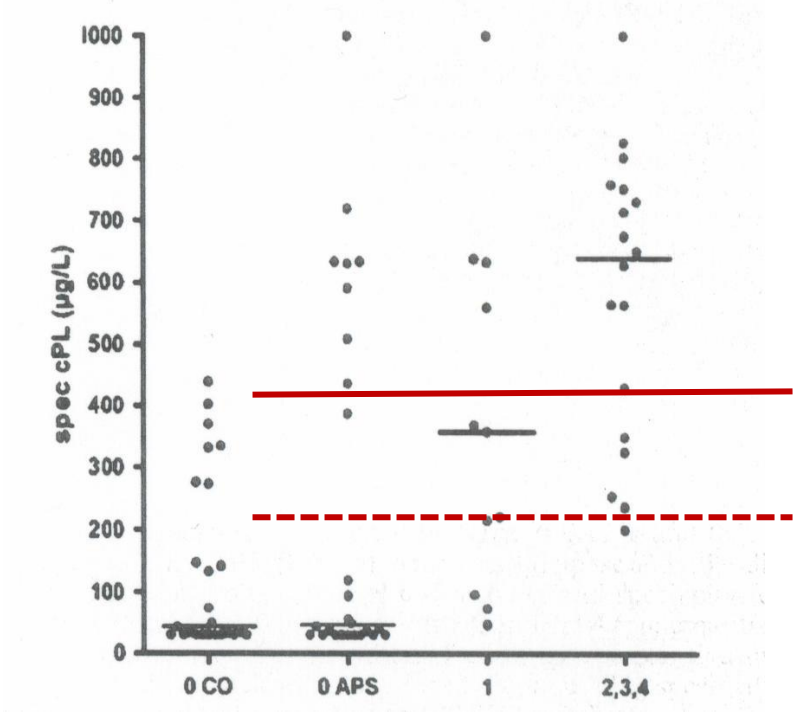
- only few assays currently available are truly specific for pancreatic lipase and thus pancreatitis
- depending on the substrate, elevated in some patients with spontaneous pancreatitis

⇨ assay must be carefully chosen based on specific data for the assay

Lipase Immunoassays

- use an antibody that recognizes a specific moiety of the lipase molecule
- different lipases would have to be very similar to be detected by the same assay

Spec cPL Multicenter Study



CO = not suspected
APS = suspected
1 = not primary pancreatitis
2 = possibly pancreatitis
3 = probably pancreatitis
4 = pancreatitis

specificity: 78%
sensitivity: 93%

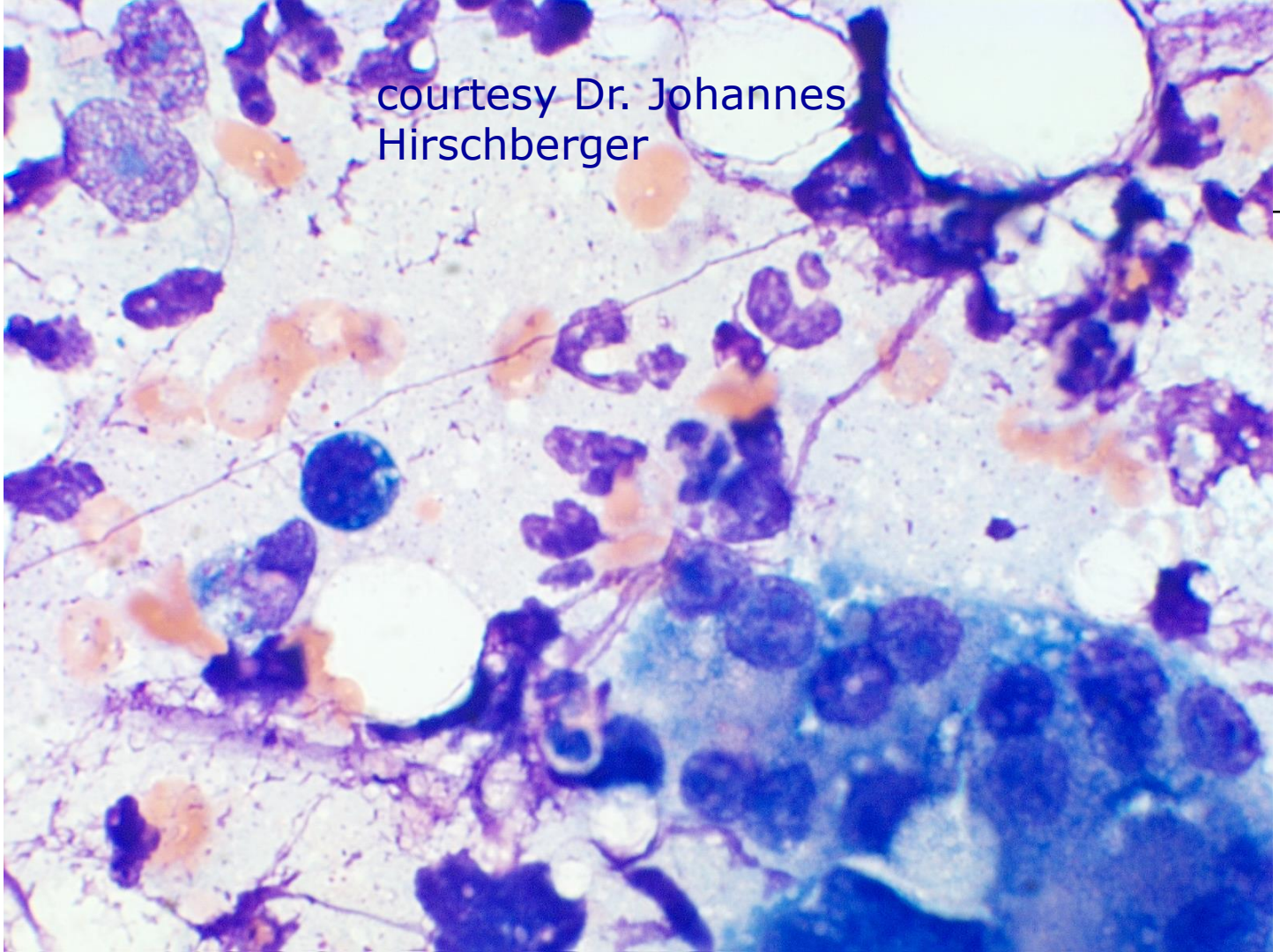
McCord et al. 2009

SNAP cPL®

- SNAP cPL®
- correlates well with the Spec cPL assay
  - negative result rules out pancreatitis
  - positive result suggests pancreatitis
    - Spec cPL should be performed to confirm diagnosis and to get a base-line v alue for monitoring
- “human” factor must be considered when devices are being read manually

Pancreatic Cytology

- fine-needle aspiration is very safe in dogs
- very useful to confirm an inflammatory process (high specificity)
- not very useful to rule out an inflammatory process (low sensitivity)


courtesy Dr. Johannes
Hirschberger

Management of Acute Pancreatitis in Dogs

Management Components

- treatment of cause

Treatment of Cause

- treatment of any identified risk factors
  - hypercalcemia, hypertriglyceridemia, others
- treatment of hypovolemia
- limit exposure to unnecessary drugs
  - especially those that have been shown to cause pancreatitis in any species
  - is the drug needed?
  - is there another alternative?

Management Components

- treatment of cause
- aggressive fluid therapy

Management Components

- treatment of cause
- aggressive fluid therapy
- rigorous monitoring

Management Components

- treatment of cause
- aggressive fluid therapy
- rigorous monitoring
- early intervention against complications

Complications

- severe forms of pancreatitis can be associated with a multitude of systemic complications:
  - electrolyte and acid/base imbalances
  - disseminated intravascular coagulation
  - myocarditis
  - acute renal failure
  - pulmonary failure
  - multiorgan failure
- ⇨ careful monitoring and early intervention are key to successful recovery

Management Components

- treatment of cause
- aggressive fluid therapy
- rigorous monitoring
- early intervention against complications
- nutritional considerations

Nutritional Considerations

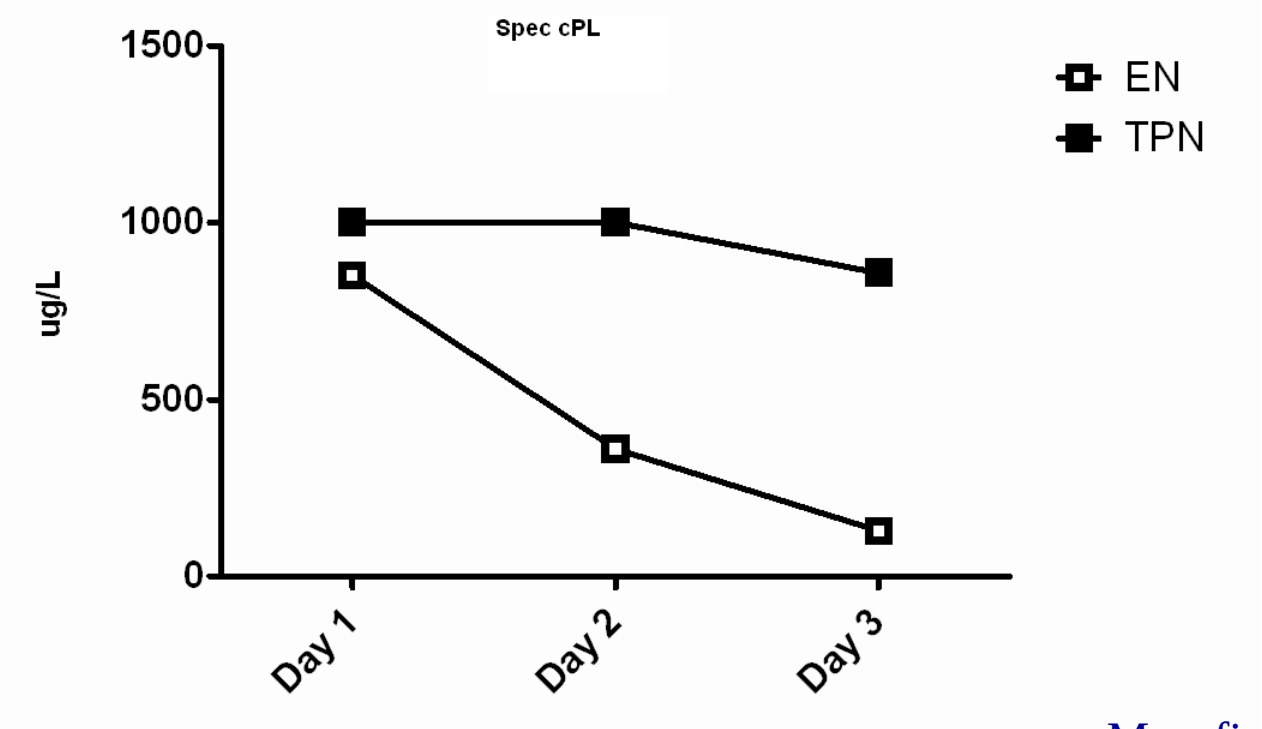
- acute pancreatitis is a highly catabolic disease
- routine NPO is no longer suggested for patients with acute pancreatitis
- outcome in human patients improves if patients receive caloric support
- relevant questions:
  - enteral vs. parenteral?
  - prepancreatic vs. postpancreatic?

Comparison of Enteral and Parenteral Nutrition in Dogs

- 10 dogs
  - 5 fed parenterally
  - 5 fed by esophagostomy tube
- there was no difference in mortality
- disease severity score decreased significantly more rapidly in dogs fed by esophagostomy tube

Mansfield et al. 2009

Comparison of Enteral and Parenteral Nutrition in Dogs



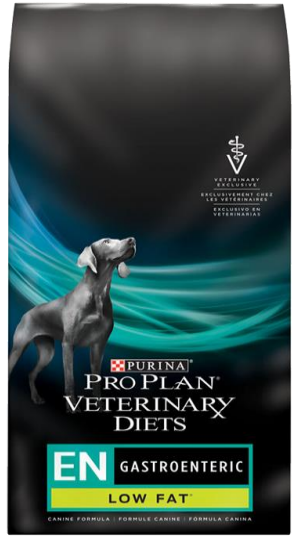
Mansfield et al. 2009

Nutritional Support

- enteral nutrition is suggested over parenteral nutrition
- pre-pancreatic nutrition is suggested for most patients
- gastrostomy and nasogastric tubes can be used
- in patients that can not be fed by the enteral route, partial or total parenteral nutrition can be employed

Dietary Recommendations

- low-fat diet (< 20 g fat/1000 kcal)
- only low-fat treats:
  - vegetables
  - fruits
  - low-fat treats
  - home-made treats



Liquid Diet

- good choice for small tubes
- 0.9 – 1.0 kcal/ml
- approximately 20% of calories as fat
- or 19 g of fat/1000 kcal

Management Components

- treatment of cause
- aggressive fluid therapy
- rigorous monitoring
- early intervention against complications
- nutritional considerations
- analgesia

Analgesia

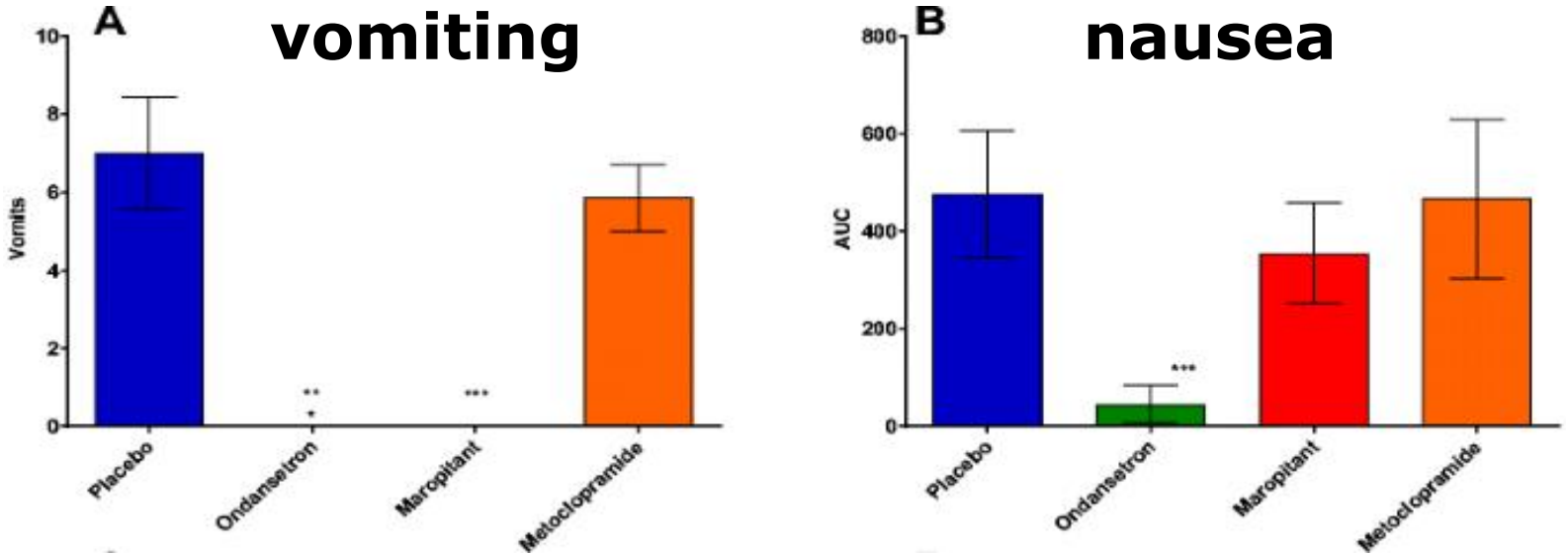
- abdominal discomfort is the key clinical sign in human patients with pancreatitis
- only noted in 58% of dogs with pancreatitis
- however, in many patients abdominal discomfort becomes apparent after analgesic therapy has been instituted

Management Components

- treatment of cause
- aggressive fluid therapy
- rigorous monitoring
- early intervention against complications
- nutritional considerations
- analgesia
- antiemetic/antinausea therapy

Antiemetics / Antinausea

- ondansetron, dolasetron, or other 5-HT_3 antagonists
- maropitant (NK_1 antagonist)



Other Management Strategies

- antibiotics?

Antibiotics in Patients with Acute Pancreatitis

- infectious complication is the cause of death in about 50% of human pancreatitis patients that die
- several meta-analysis studies did not find a beneficial effect of antibiotics in these patients
- recent treatment recommendations do not include routine use of antibiotics
- never been systematically studied in dogs
- dogs with severe acute pancreatitis usually do not reach the late stage of the disease

Other Management Strategies

- antibiotics?
- anti-inflammatory agents?

Anti-Inflammatory Agents - Steroids

- steroids are not considered to be useful for the routine treatment of humans with acute pancreatitis
- a single Japanese study suggested a beneficial effect in dogs with acute pancreatitis
- corticosteroids have a wide variety of effects
  - some may be detrimental (e.g., immuno-suppression) in dogs with pancreatitis

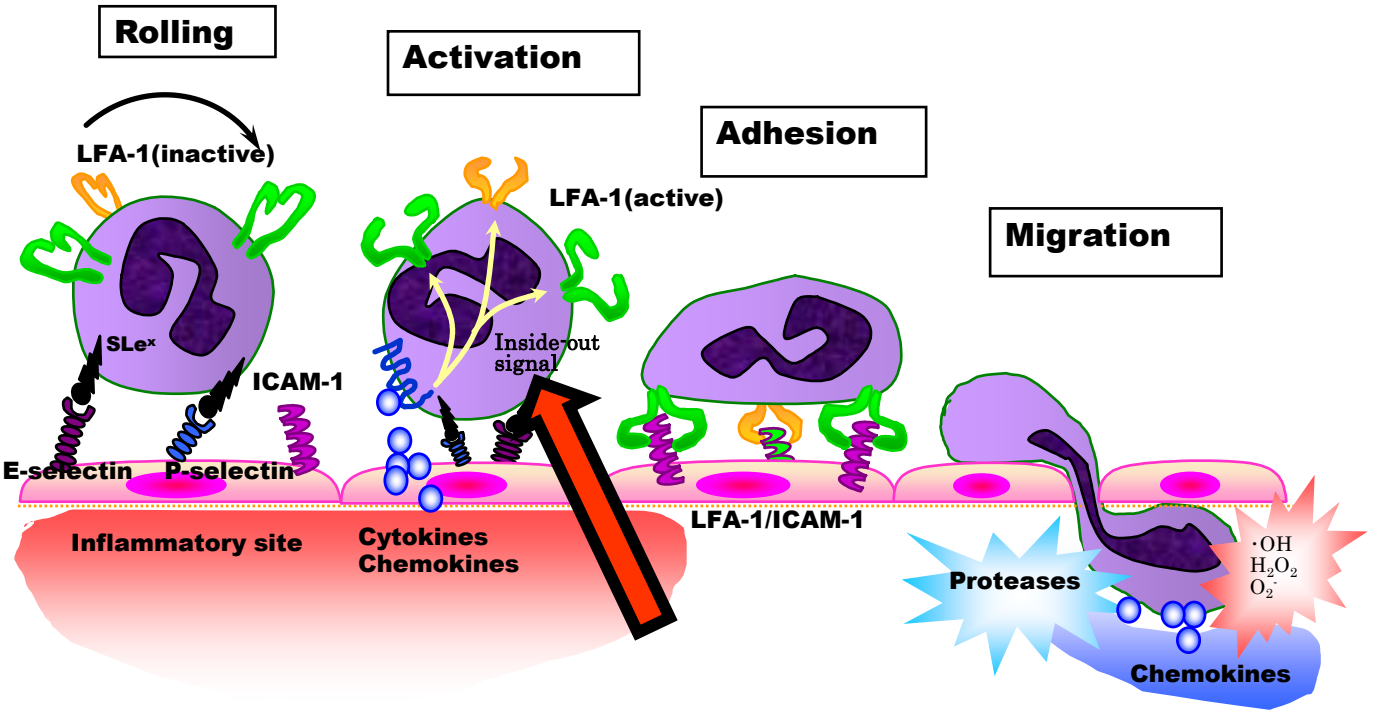
Fuzapladib Sodium

- fuzapladib has recently received conditional approval by the FDA
- PANOQUELL®-CA1 (fuzapladib sodium for injection)

Fuzapladib Sodium

- a novel drug that acts as a leukocyte (lymphocyte) function-associated antigen-1 (LFA-1) activation inhibitor
- proof of concept shown in canine experimental pancreatitis
- clinical efficacy demonstrated in a controlled clinical trial in Japan
- controlled multi-center clinical trial in the USA demonstrated positive effects

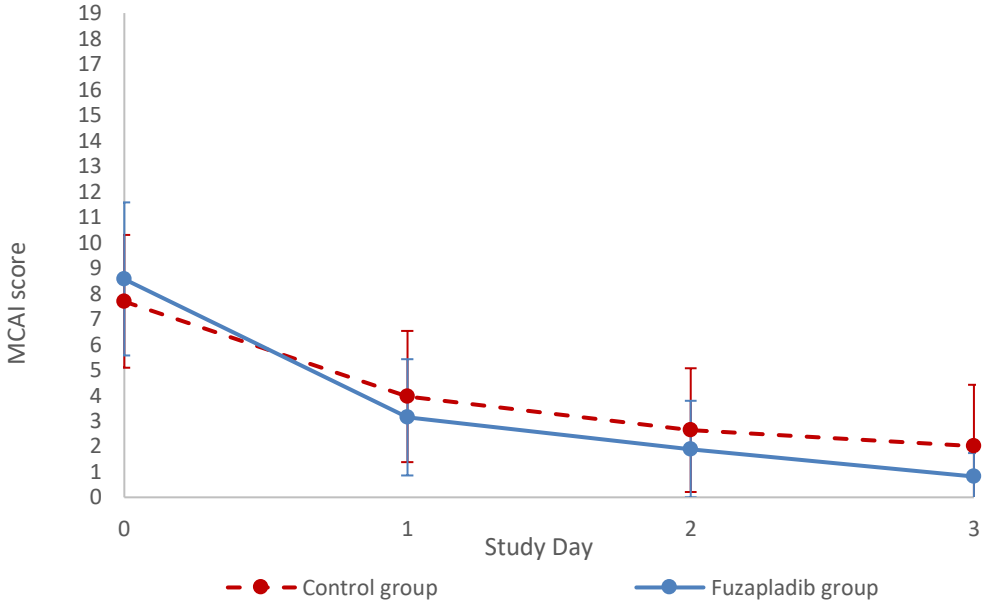
Mode of Action



US multi-center controlled clinical trial

- 35 dogs
  - treatment group: 16
    - fuzapladib 0.4 mg/kg q 24 hrs IV for 3 days
  - control group: 19
    - placebo (not noticeably different from treatment)

MCAI


MCAI score
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
0
1
2
3
Study Day
Control group
Fuzapladib group

Take Home Points

1. pancreatitis is more common than previously believed
2. the optimal diagnosis is achieved by integrating all clinical data, including history, imaging, and clinical pathology
3. a new DGGR-based lipase assay for the Catalyst is available that is specific for the measurement of pancreatic lipase and thus a diagnosis of pancreatitis

Take Home Points

4. until recently the standard of care was centered on supportive and symptomatic care
5. fuzapladib offers a novel treatment strategy for dogs with pancreatitis and has recently received conditional approval by the FDA

The GI Lab

Promoting Gastrointestinal Health in Companion Animals

www.vetmed.tamu.edu/gilab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