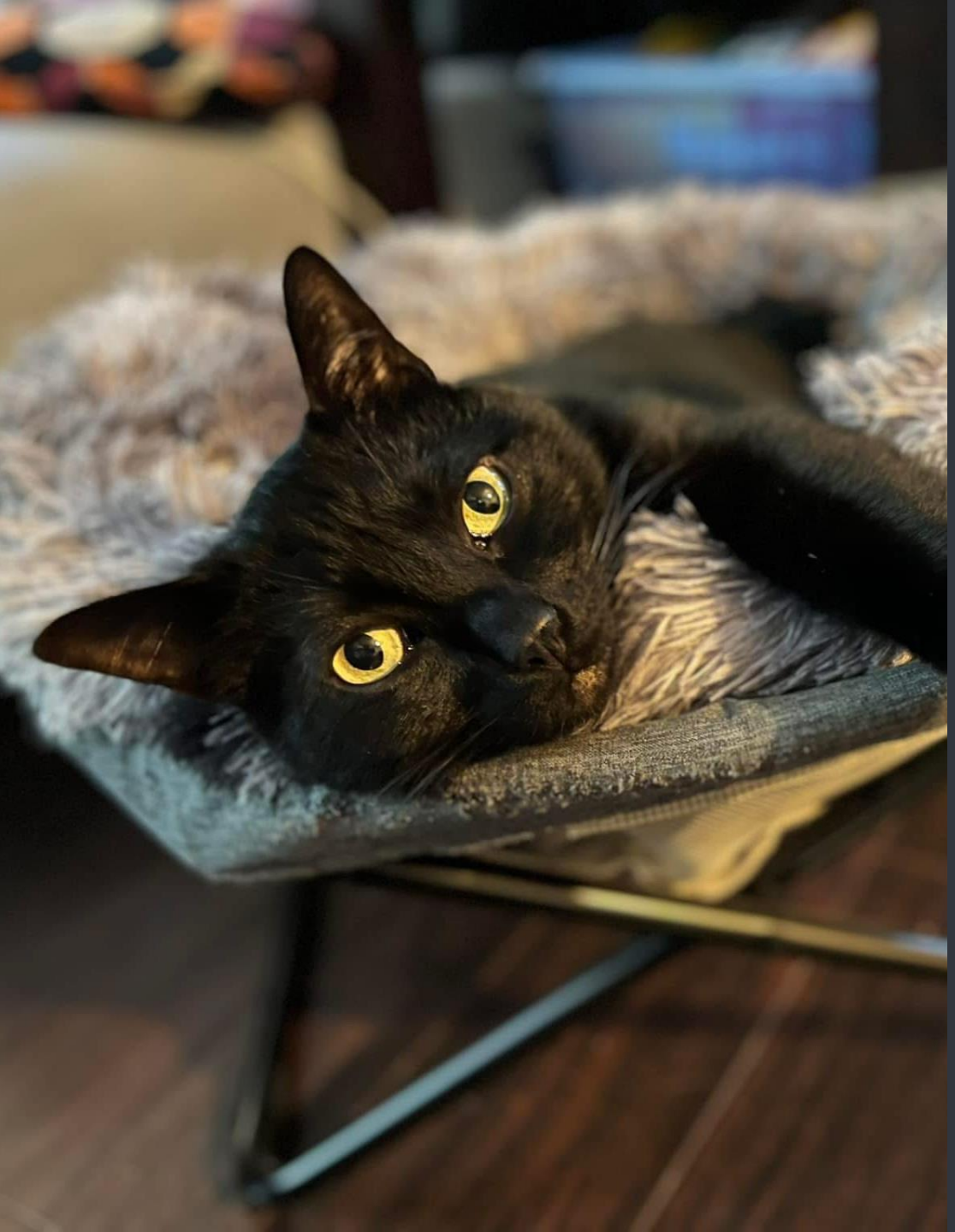

Not a Copycat:
Why Cats Are Not Small Dogs When it Comes to Pancreatic Disease

Jill Pomrantz, DVM, DACVIM (SAIM)

November 6, 2025

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Disclosure:
Full-time Employee of IDEXX

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The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical exam and presentation, and laboratory data. With respect to any drug therapy or monitoring program, you should refer to applicable product insert(s) for complete description of dosage, indications, interactions, and cautions. Diagnosis, treatment, and monitoring should be patient specific and is the responsibility of the veterinarian providing primary care. (2025)

Learning objectives

- Familiarize with pancreatic physiology and pathophysiology
- Understand acute and chronic pancreatitis and the spectrum in cats
- Recognize clinical picture and when to suspect pancreatitis
- Understand how to diagnose pancreatitis
- Understand patient treatment and follow-up
- Learn from case examples

Oliver

Bailey

Signalment

Oliver	Bailey
+ 7yo MN DSH	+ 11yo FS DLH

History

Oliver	Bailey
+ Progressive hyporexia + Weight loss + Lethargy x 1 week + Chronic intermittent vomiting and diarrhea	+ History of pancreatitis and chronic enteropathy + Recent flare up of gastrointestinal signs including vomiting, diarrhea and now stopped eating

Physical examination

Oliver	Bailey
+ TPR: within normal limits + +/- hydrated + Abdomen: mass effect in cranial abdomen, non-painful	+ T 103.5, P 220 bpm, R 80 bpm + 5% dehydrated + Quiet in the exam room + BCS 6/9 with dorsal muscle wasting

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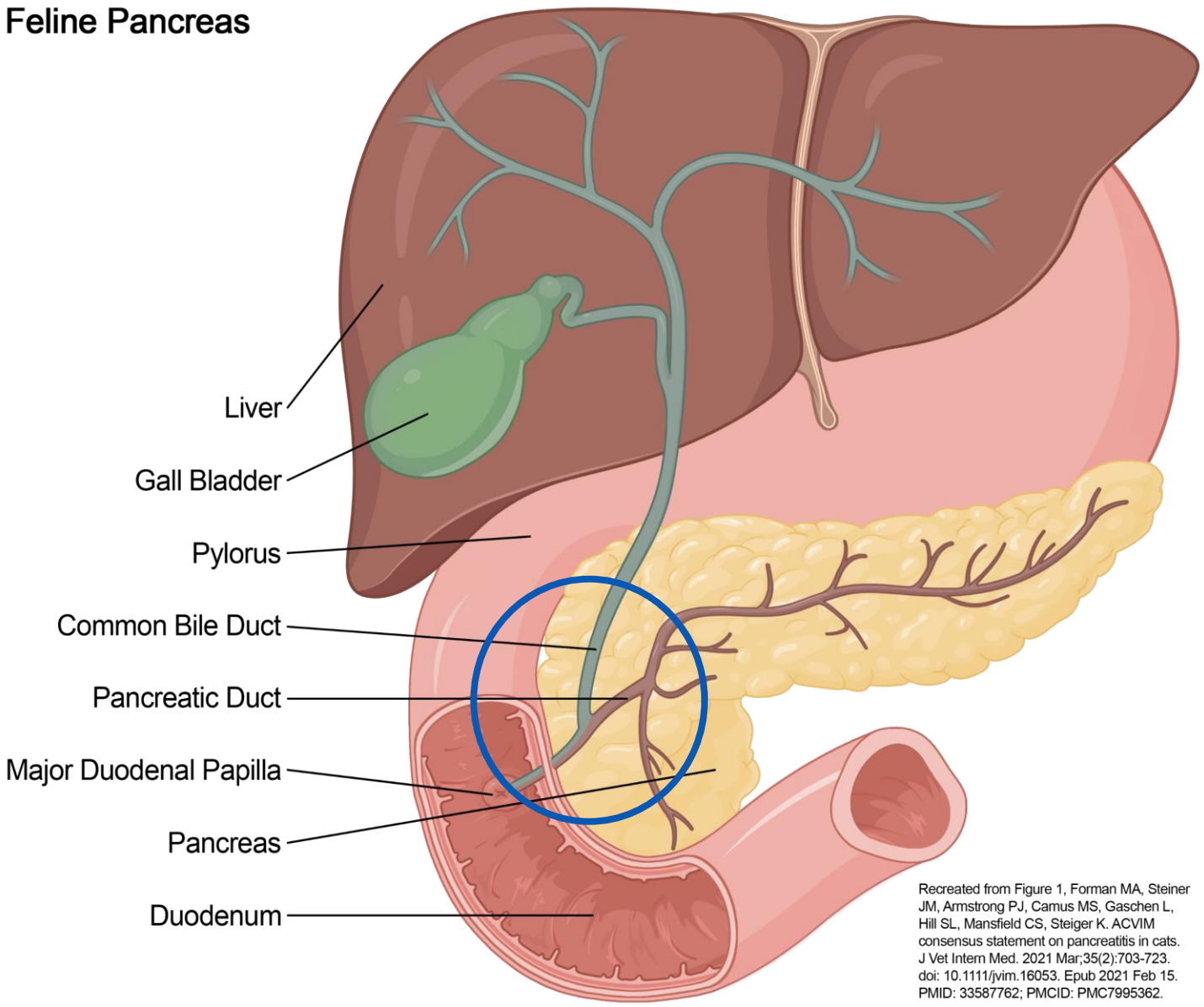
Pathophysiology

Pancreatic anatomy

- Right and left lobes, central portion
- Folded within proximal bend of the duodenum
  - Close association with proximal duodenum, pyloric antrum, liver, and the transverse colon
  - Pancreatic and common bile ducts merge just before duodenal papilla
  - Accessory pancreatic duct uncommon



Recreated from Figure 1, Forman MA, Steiner JM, Armstrong PJ, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. J Vet Intern Med. 2021 Mar;35(2):703-723. doi: 10.1111/jvim.16053. Epub 2021 Feb 15. PMID: 33587762; PMCID: PMC7995362.

Penninck D, D'Anjou M-A. Pancreas. In: Penninck D, D'Anjou M-A, eds. *Atlas of Small Animal Ultrasonography, 2nd Edition*. Oxford: Wiley- Blackwell; 2015: 309–330.

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Pancreatic physiology and pathophysiology

- Exocrine pancreas
  - Acinar cells produce digestive enzymes
    - Trypsinogen, chymotrypsinogen
    - Lipase, prophospholipase, esterase
    - Amylase, lactase
    - Ribonuclease, deoxyribonuclease
- Endocrine pancreas
  - Beta cells produce insulin

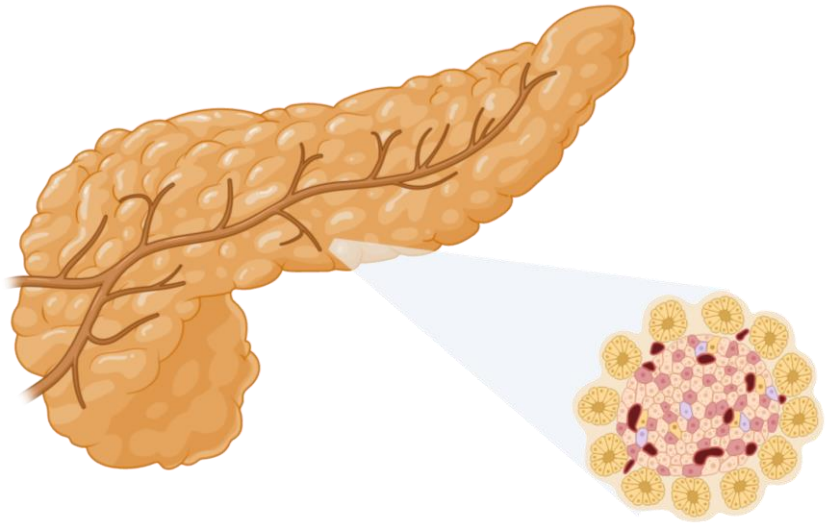

Image courtesy of Dr. Rebekah Mack, BioRender

Karpińska M, Czauderna M. Pancreas-Its Functions, Disorders, and Physiological Impact on the Mammals' Organism. *Front Physiol*. 2022 Mar 30;13:807632. doi: 10.3389/fphys.2022.807632.

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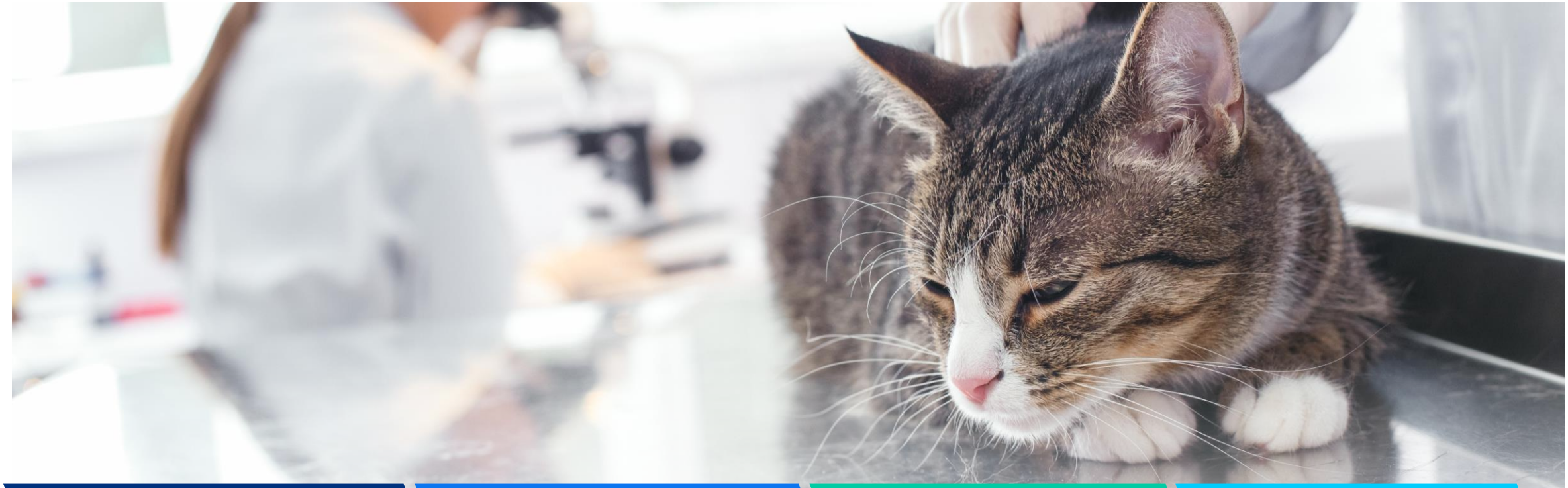
Pathophysiology of pancreatitis



Pancreatic insult → Cytokine production → Inflammation → Pancreatitis

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Pancreatitis – acute *and* chronic

Acute pancreatitis

- An acute inflammatory process does not lead to permanent changes
  - **Reversible**
  - Primary cell type is neutrophils
- Outcomes
  - Death
  - Resolution
  - Progression to chronic pancreatitis if the inflammation is recurrent or severe

Chronic pancreatitis

- Chronic inflammatory process accompanied by permanent changes, mainly fibrosis and acinar atrophy
  - Primary cell type is lymphocytes
  - Acute flare-ups may occur
- Possible etiologies
  - Recurring acute pancreatitis
  - Transmission of inflammation from surrounding organs
  - Immune-mediated disease

Hoeyrup, N, Spillmann T, Toresson L. Cyclosporine Treatment in Cats with Presumed Chronic Pancreatitis-a Retrospective Study. *Animals* 2021, *11*(10),2993; doi.org/10.3390/ani11102993.

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How common is pancreatitis?

- 115 cats with necropsy for any reason
- Acute pancreatitis
  - Neutrophilic inflammation
  - Interstitial edema/necrosis of mesenteric fat
- Chronic pancreatitis
  - Lymphocytic inflammation
  - Cystic acinar degeneration
  - Interstitial fibrosis

- Results
  - Overall histologic prevalence of pancreatitis
    - 66.1% (76/115 cats)
    - 45% in clinically normal cats
  - Acute pancreatitis (7)
  - Chronic pancreatitis (58)
  - Acute and chronic pancreatitis (11)

Clinical Relevance?

De Cock HEV, Forman MA, Farver TB, et al. Prevalence and histopathologic characteristics of pancreatitis in cats. *Vet Pathol*. 2007; 44: 39-49. doi: 10.1354/vp.44-1-39.

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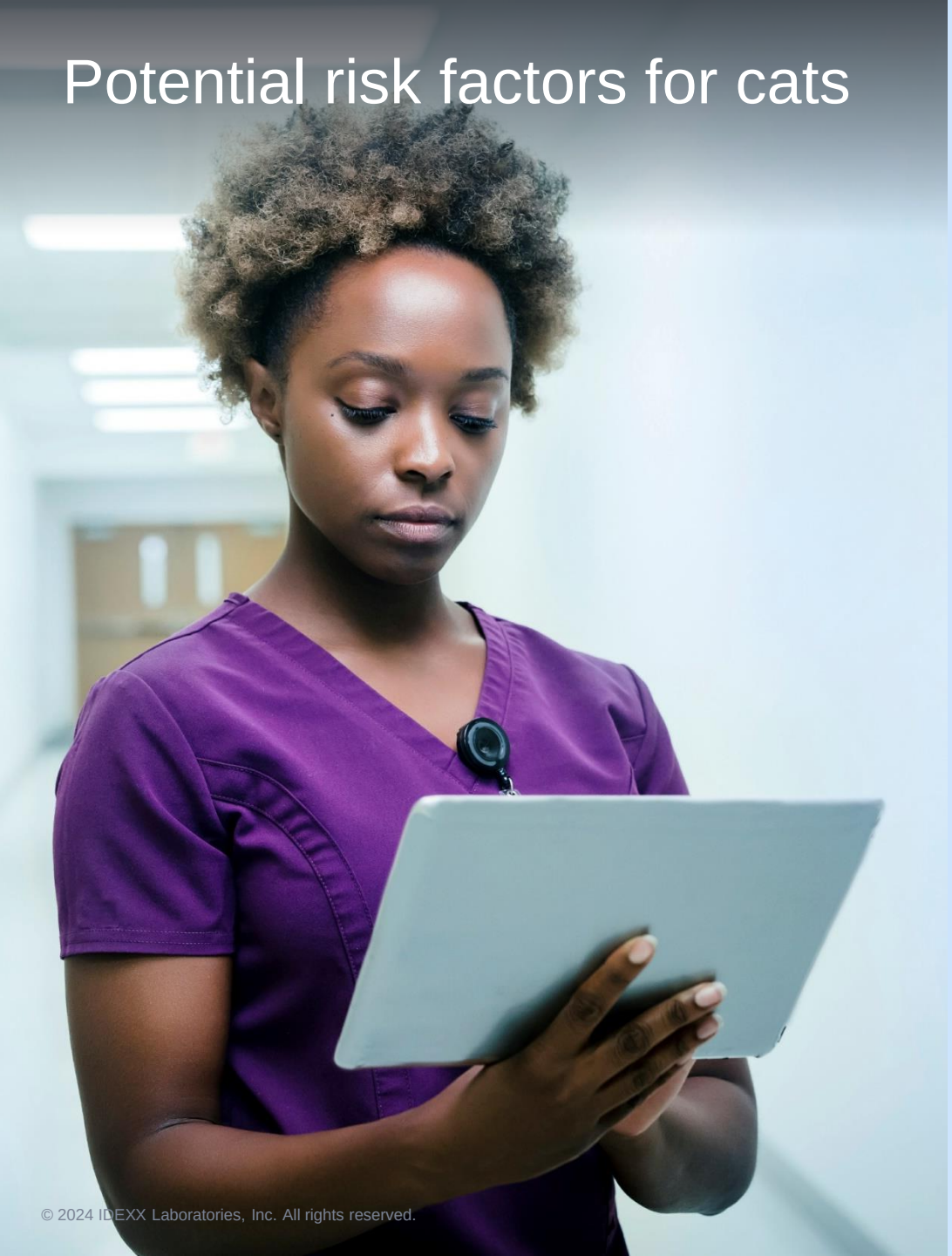
Potential risk factors for cats



- Infections
  - Parasites (*Toxoplasma*, flukes)
  - Viruses (coronavirus, calicivirus, parvovirus, herpesvirus)
- Trauma
- Surgery
- Pancreatic neoplasia
- Toxicity (e.g., organophosphates)
- Concurrent diseases (diabetes mellitus, chronic enteropathies, cholangitis, nephritis, IMHA)

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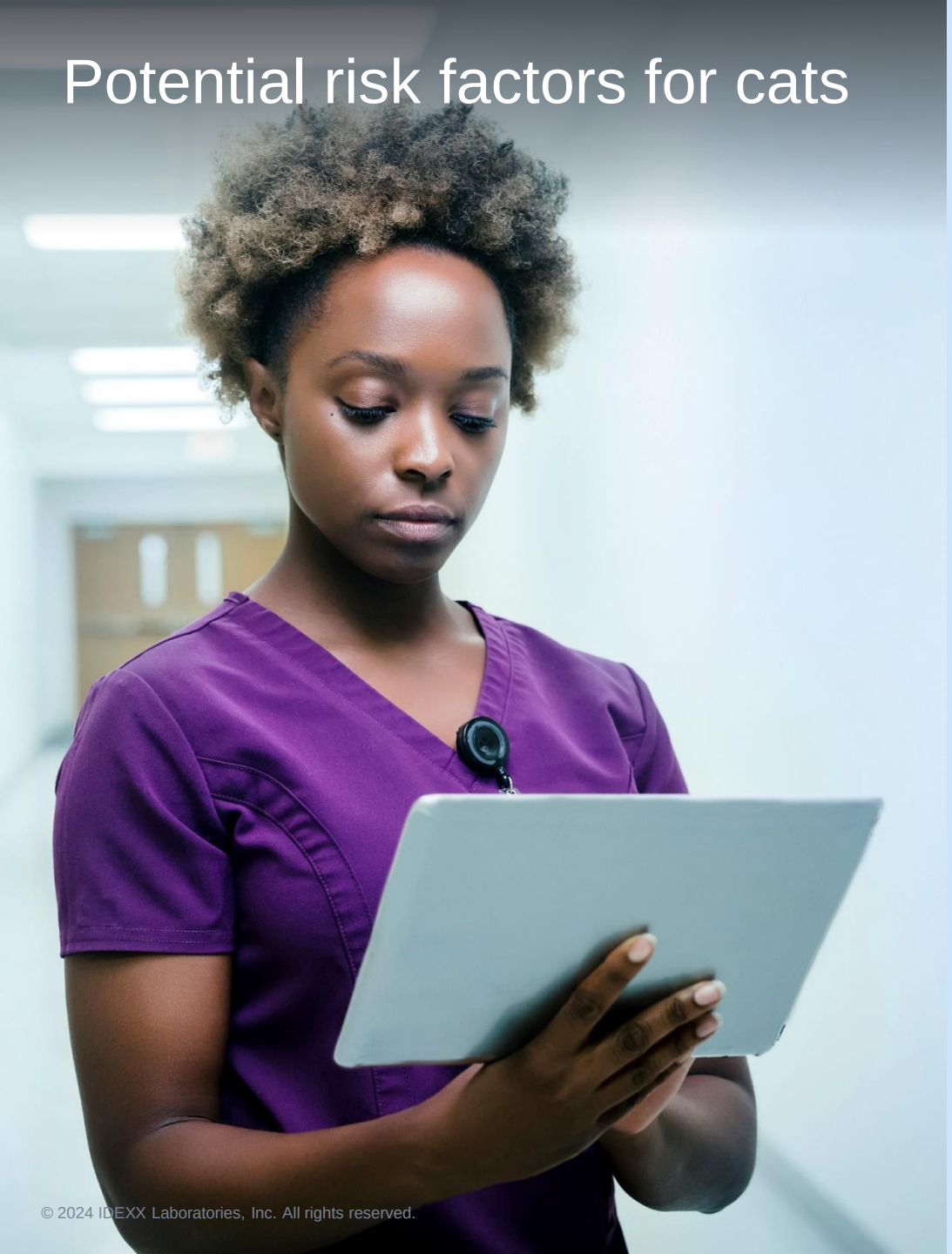
Potential risk factors for cats



IDIOPATHIC !

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Presentation

Clinical signs

+ Lethargy
+ Anorexia
+ Vomiting
+ Weight loss
+ Diarrhea
+ Dyspnea

Physical Exam

+ Dehydration
+ Hypothermia
+ Icterus
+ Apparent abdominal pain
+ Hyperthermia/fever
+ Abdominal mass/cranial organomegaly

Forman MA, Steiner JM, Armstrong PJ, et al. ACVIM consensus statement on pancreatitis in cats. *J Vet Intern Med*. 2021;35(2):703–723. doi:10.1111/jvim.16053.
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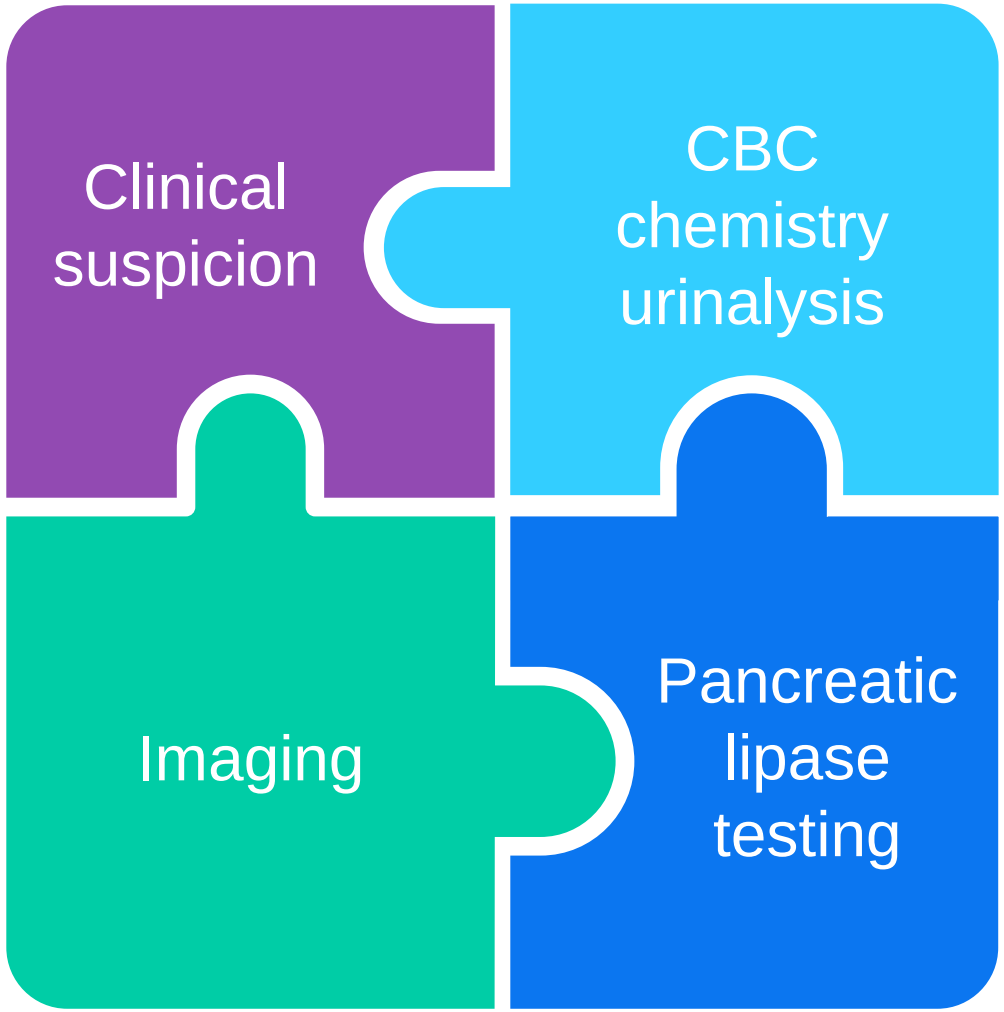
Diagnosis

Diagnosis



- Clinical suspicion
  - History
  - Physical examination
- Suggestive laboratory results
- Serum biomarkers
- Imaging
- (Cytology, histopathology)

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Possible clinicopathologic abnormalities

Hematology

+ Nonregenerative anemia or hemoconcentration
+ Neutrophilia with a left shift or neutropenia
+ Thrombocytopenia if disseminated intravascular coagulation (DIC)

Chemistry

+ Increased liver enzymes
+ Increased serum bilirubin
+ Hypoalbuminemia
+ Azotemia, elevated SDMA
+ Hypokalemia, hypochloremia, hyponatremia
+ Hypoglycemia or hyperglycemia
+ Ionized +/- total hypocalcemia

Urinalysis

+ Variable urine specific gravity
+ Proteinuria
+ Bilirubinuria

Forman MA, Steiner JM, Armstrong PJ, et al. ACVIM consensus statement on pancreatitis in cats. *J Vet Intern Med*. 2021;35(2):703–723. doi:10.1111/jvim.16053.

Harley L, Langston C. Proteinuria in dogs and cats. *Can Vet* J. 2012;53(6):631-8. PMID: 23204582; PMCID: PMC3354822.

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Serum biomarkers for pancreatitis

Lipase

Lipases: enzymes that are used to break down lipids

Sources:

- Pancreatic
- Lipoprotein
- Endothelial
- Hepatic
- Renal
- Gastrointestinal

There are several different diagnostic methods for measuring lipase

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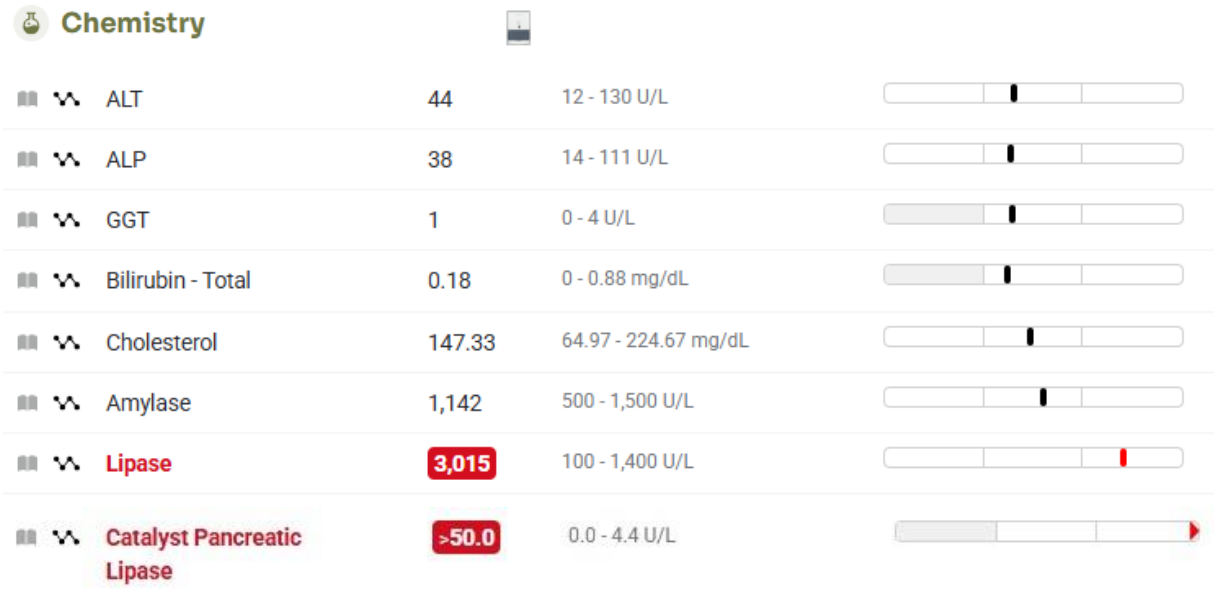
Lipase assays

- Activity assays
  - Lipase on Catalyst®
  - Lipase at IDEXX Reference Laboratories
  - Catalyst® Pancreatic Lipase
- Immunoassays
  - Feline pancreatic lipase immunoreactivity (fPLI)
    - Spec fPL® Test
    - SNAP® fPL™ Test



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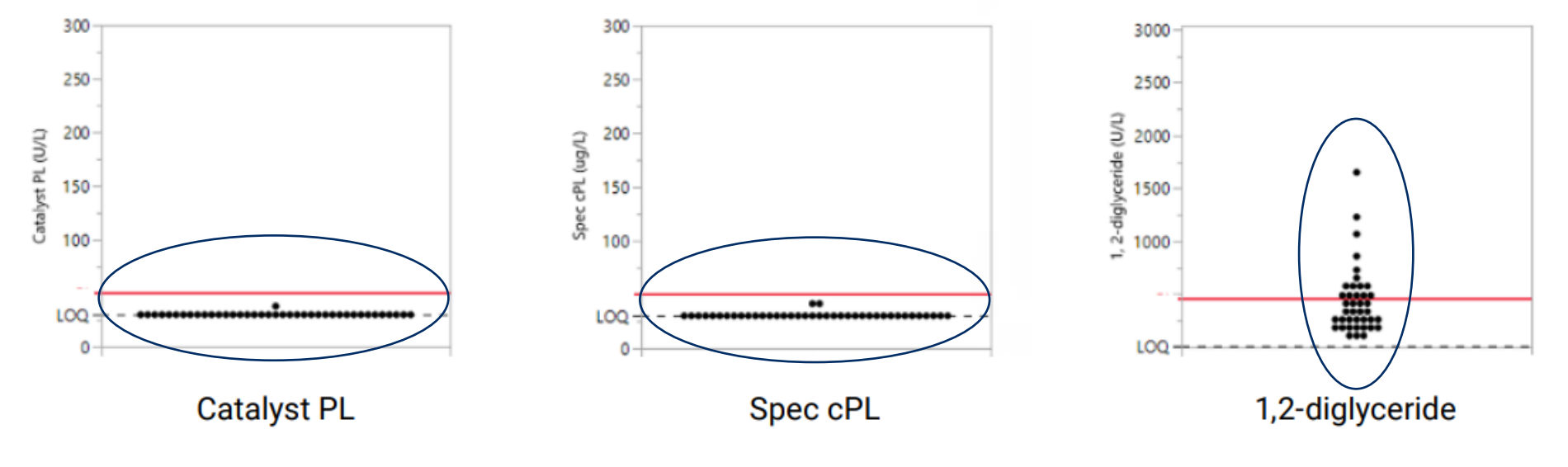
Measurement of lipase in dogs with exocrine pancreatic insufficiency



Catalyst® Pancreatic Lipase Test: an in-house quantitative pancreatic lipase test for dogs and cats., 2024. https://www.idexx.com/files/catalyst-pancreatic-lipase-whitepaper-en.pdf.

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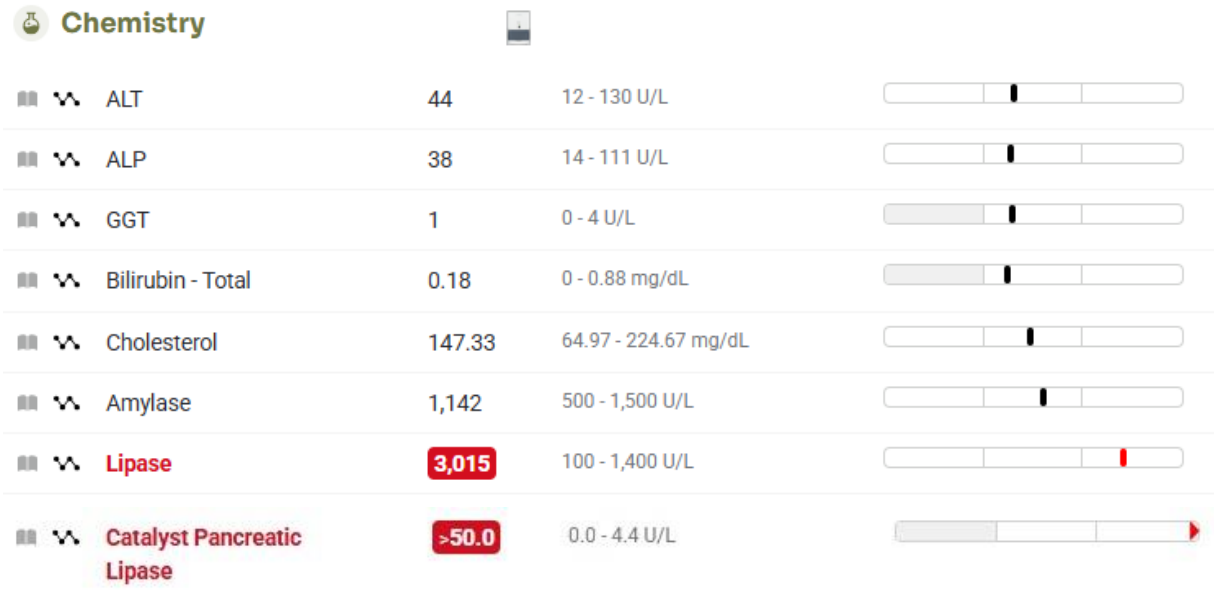
Lipase assays

- Activity assays
  - Lipase on Catalyst®
  - Lipase at IDEXX Reference Laboratories
  - Catalyst® Pancreatic Lipase
- Immunoassays
  - Feline pancreatic lipase immunoreactivity (fPLI)
    - Spec fPL® Test
    - SNAP® fPL™ Test



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Comparison of different pancreatic lipase tests

SNAP® fPL™

+ Feline specific assay
+ Good qualitative screening test to rule out pancreatitis
+ Higher sensitivity than specificity
+ **If abnormal recommend quantifying pancreatic lipase**

Spec fPL®

+ Feline specific assay
+ High specificity and sensitivity, especially for acute and severe disease
+ Less sensitive and specific for chronic disease

Catalyst® Pancreatic Lipase

+ Cats or dogs on one slide (DGGR based)
+ Same decision threshold as with Spec fPL
+ Excellent correlation with Spec fPL

Wu Y, Steiner JM, Huisinga E, Beall MJ, Buch J, Fosgate GT, Lidbury JA. Analytical validation of an ELISA for the measurement of feline pancreatic-specific lipase and reevaluation of the reference interval and decision threshold for diagnosing pancreatitis. *Vet Clin Path* 2023;52:482-492. doi:10.1111/vcp.13283.

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Amylase

- Hydrolysis of complex carbohydrates
- Secreted by various different tissues (pancreas, intestines, liver)
- Elevated amylase
  - Pancreatitis
  - Intestinal diseases/obstruction
  - Reduced glomerular filtration rate (GFR)

Nonspecific for the detection of pancreatitis

Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med*. 2021; 35(6):2572-2587. doi: 10.1111/jvim.16292.

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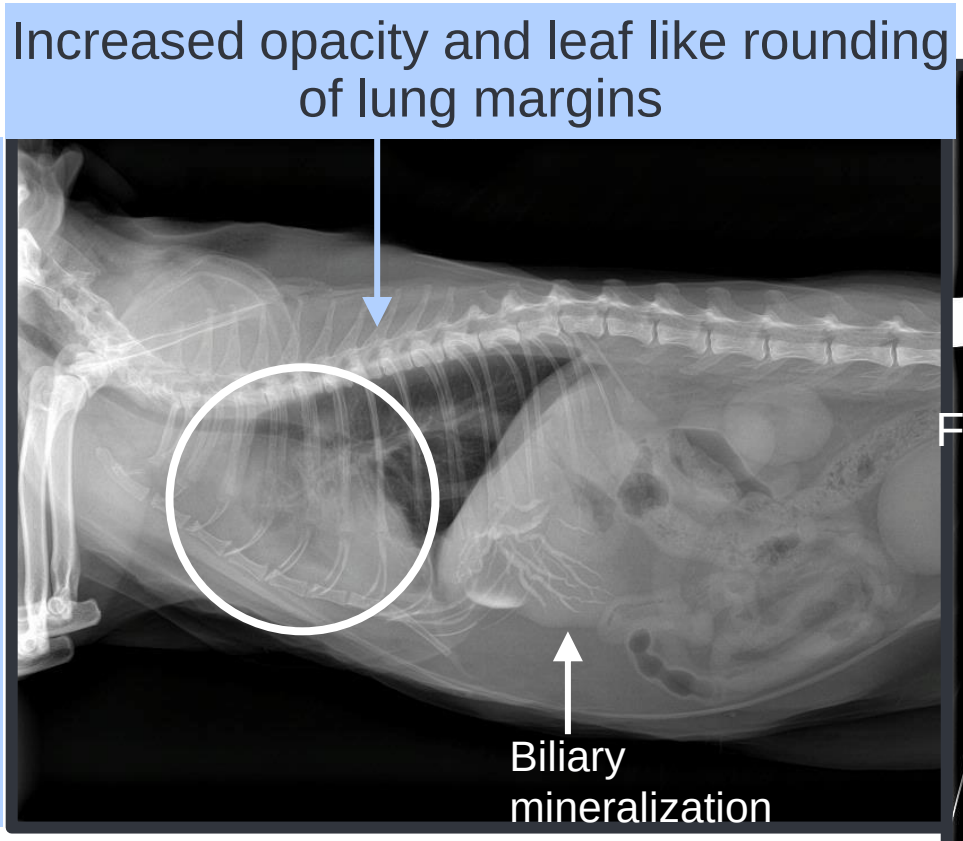
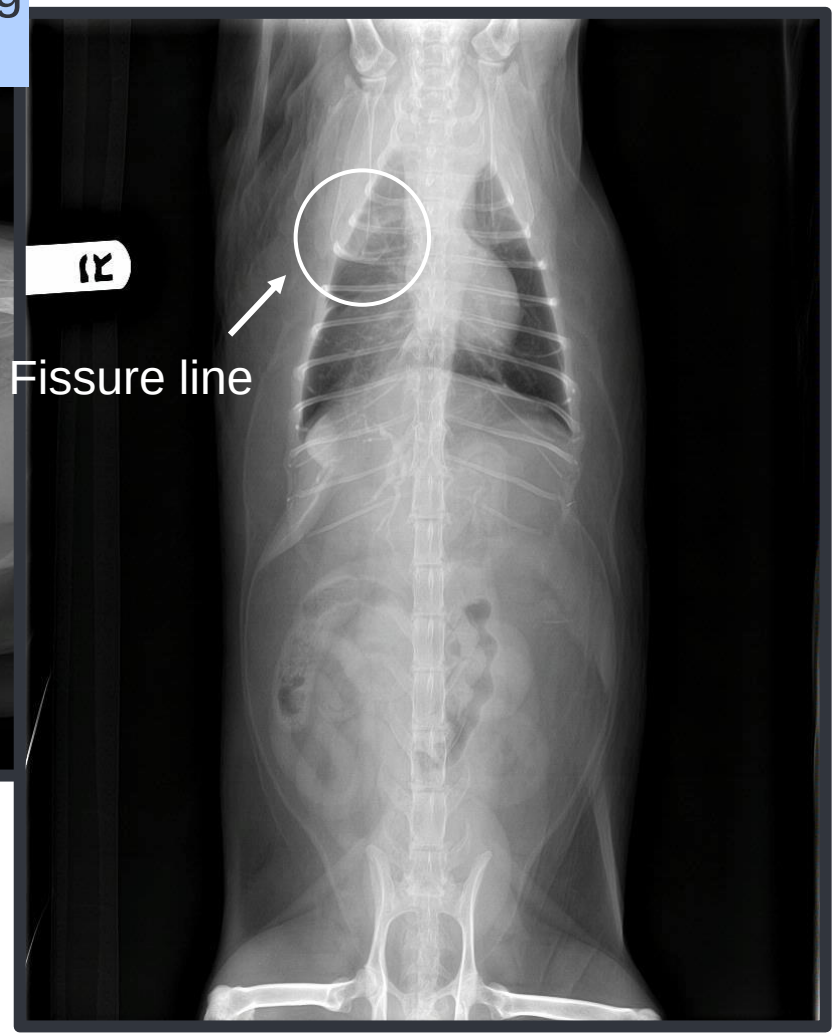
Imaging

Abdominal radiographs

- Focal loss of serosal detail in the cranial abdomen
- Mass effect
- Can be used to screen for other causes of clinical signs or complications





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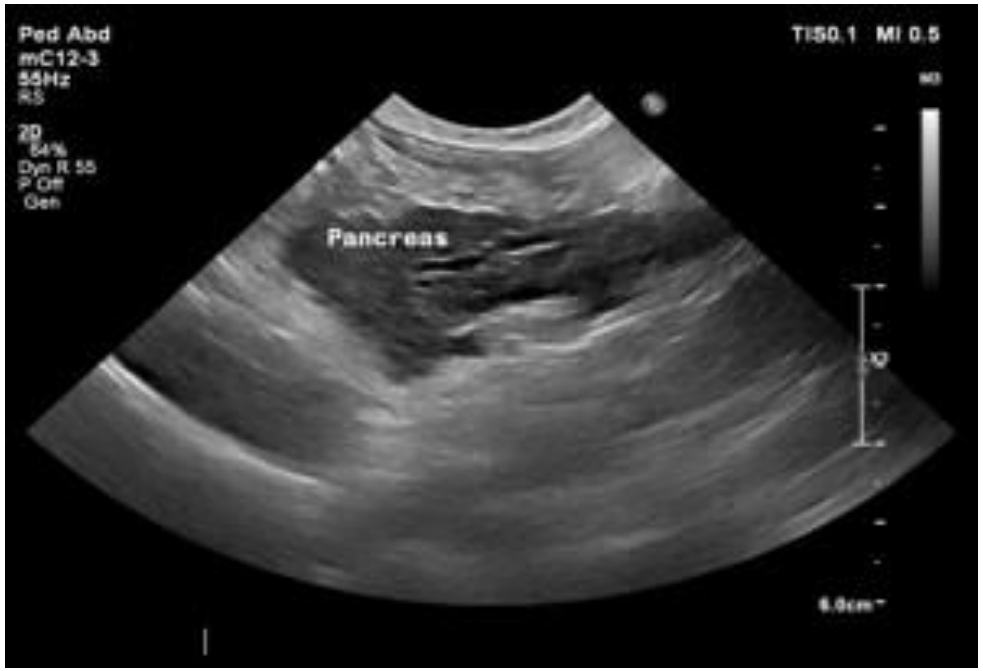
Abdominal ultrasound – overlap between acute and chronic pancreatitis

Acute pancreatitis

+ Pancreatic enlargement
+ Hypoechoic with hyperechoic peripancreatic mesentery
+ Focal effusion
+ Possible duodenal distension or corrugation
+ Possible dilation of the common bile duct (CBD)

Chronic pancreatitis

+ Hypoechoic or mixed echoic pancreas
+ Normal or mildly hyperechoic peripancreatic mesentery
+ Shadowing hyperechoic foci due to fibrosis and calcification
+ Possible dilation of the CBD
+ Abnormal pancreatic thickness, nodules



US image courtesy of Dr. Celeste Clements

Forman MA, Steiner JM, Armstrong PJ, et al. ACVIM consensus statement on pancreatitis in cats. *J Vet Intern Med*. 2021;35(2):703–723. doi:10.1111/jvim.16053

Griffin S. Feline abdominal ultrasonography: What's normal? What's abnormal? The Pancreas. J Fel Med Surg. 2020;22(3):241-259. doi.org:10.1177/1098612X20903599

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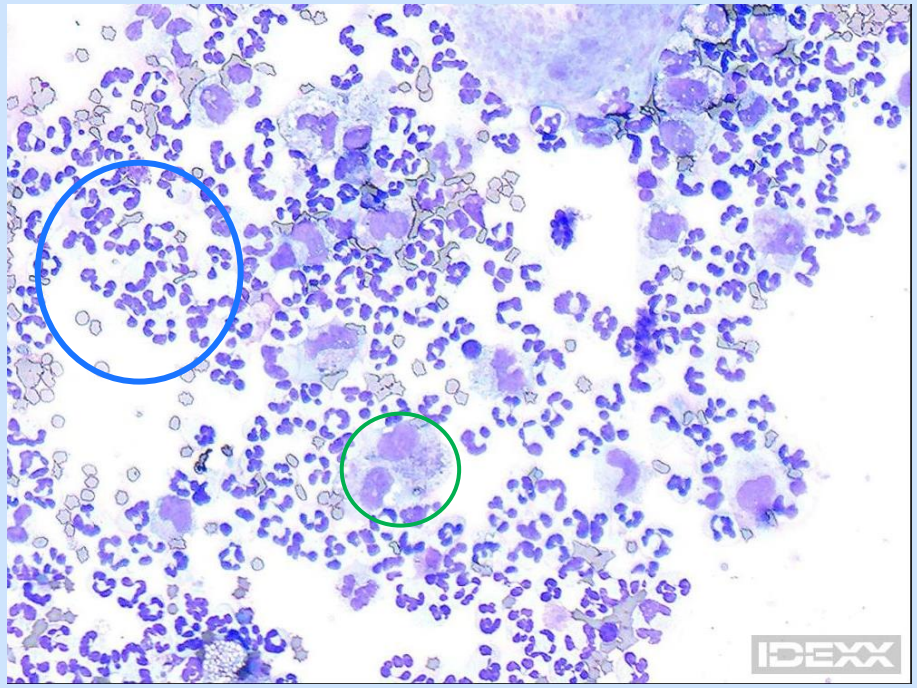
Fine needle aspiration and biopsy

- Fine needle aspirate
  - Pancreas
    - Acute pancreatitis: neutrophilic inflammation supports the diagnosis
    - Chronic pancreatitis: FNA often poorly cellular due to fibrosis
  - Fluid
    - Neutrophilic inflammation
- Biopsy
  - Gold standard
  - Disease may be multifocal, so can miss the diagnosis
  - Appearances can be deceiving



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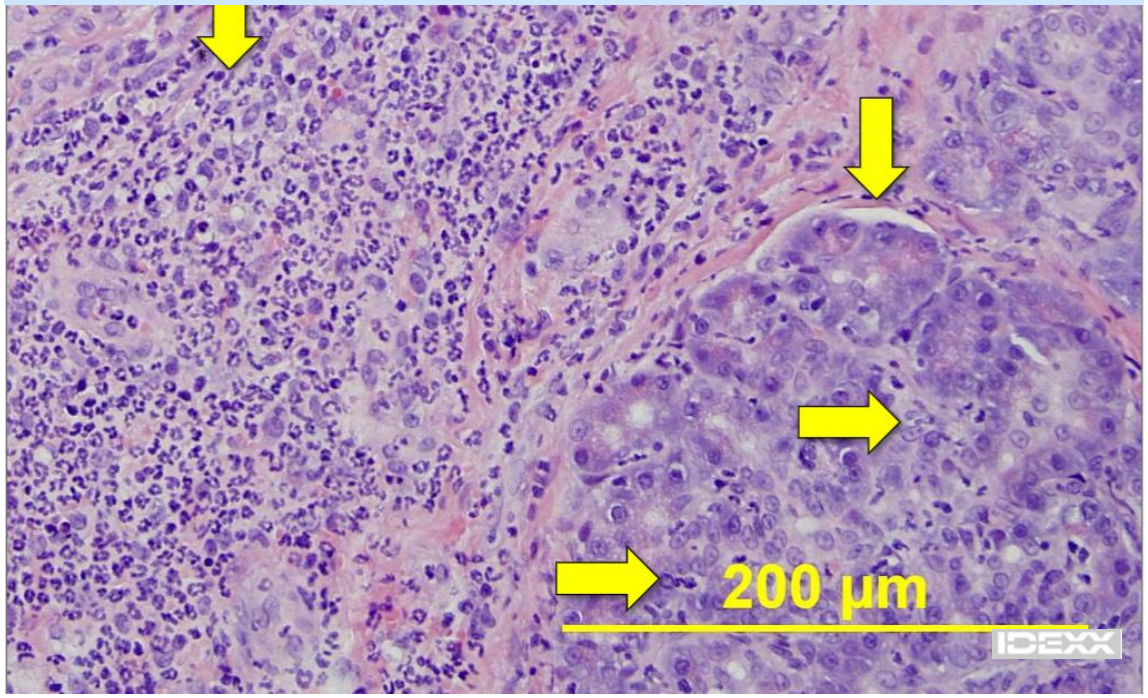
Histopathology of pancreatitis

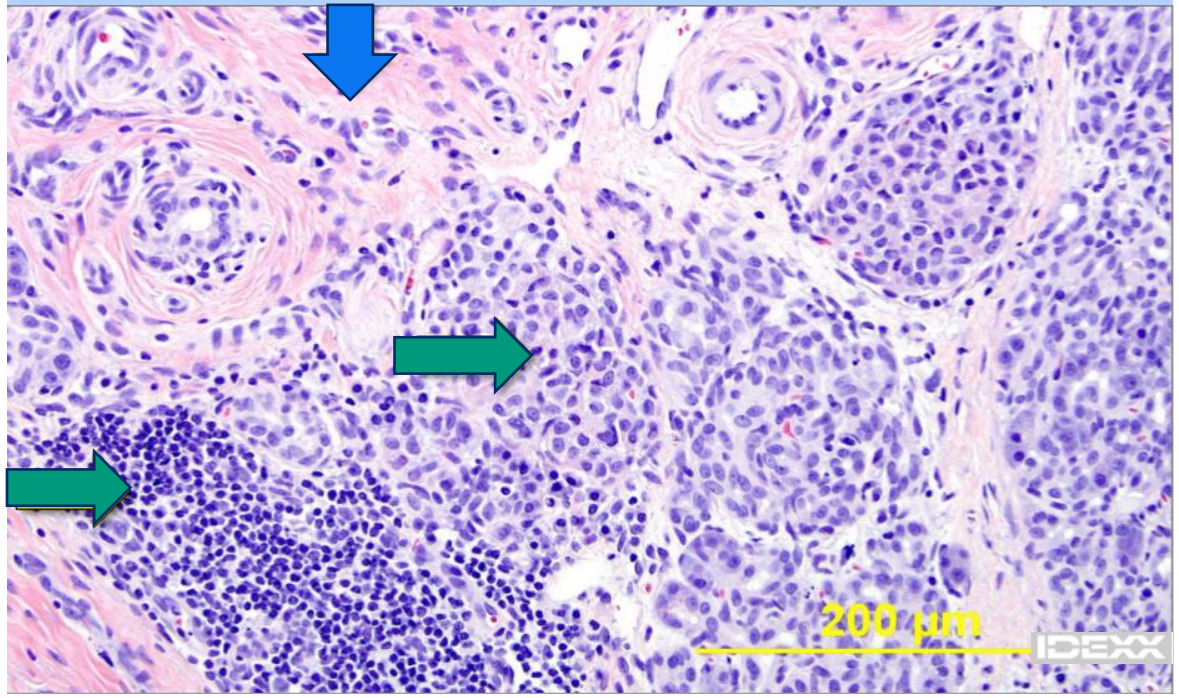
Acute

Suppurative inflammation



Chronic

Lymphoplasmacytic inflammation with fibrosis



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IDEXX

Potential complications and sequelae

Local and Regional

+ Pancreatic cysts and abscesses
+ Pancreatic necrosis
+ Local peritonitis
+ Diabetes mellitus (DM)
+ Exocrine pancreatic insufficiency (EPI)

Systemic

+ Acute kidney injury/acute tubular necrosis
+ Hepatic lipidosis
+ Cholestasis
+ Pneumonia
+ Vasculitis, fluid third spacing
+ Acute lung injury/acute respiratory distress syndrome (ALI/ARDS)
+ Thromboembolism and disseminated intravascular coagulation (DIC)
+ Systemic inflammatory response syndrome (SIRS) and multiorgan dysfunction syndrome (MODS)

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Common concurrent diseases

+Chronic enteropathy

+Cholangitis/cholangiohepatitis

+Hepatic lipidosis

+Diabetes mellitus/diabetic ketoacidosis (DKA)

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Treatment

Photo courtesy of Dr. Suzanne LeGrange

Treatment – inpatient

- Eliminate inciting cause
- Fluid therapy
  - IV crystalloid
    - Correct dehydration and electrolyte imbalances
    - Improve pancreatic perfusion
    - Reverse metabolic acidosis and prerenal azotemia if present
- Supportive care/symptomatic
  - Antiemetics and GI prokinetics
    - Maropitant
    - Ondansetron
    - Metoclopramide CRI
    - Cisapride

Forman MA, Steiner JM, Armstrong P, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. *J Vet Int Med.* 2021;35:703-723. doi:10.1111/jvim.16053.

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Treatment – inpatient

- Pain management
  - Injectable
    - Buprenorphine adequate for most
    - Methadone or fentanyl with severe pain
    - Maropitant possible visceral analgesia
  - Oral
    - Buprenorphine
    - Gabapentin
    - Tramadol
    - Maropitant
- Appetite stimulants
  - Mirtazapine – transdermal may improve tolerance
  - Capromorelin

Forman MA, Steiner JM, Armstrong P, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. *J Vet Int Med.* 2021;35:703-723. doi:10.1111/jvim.16053.

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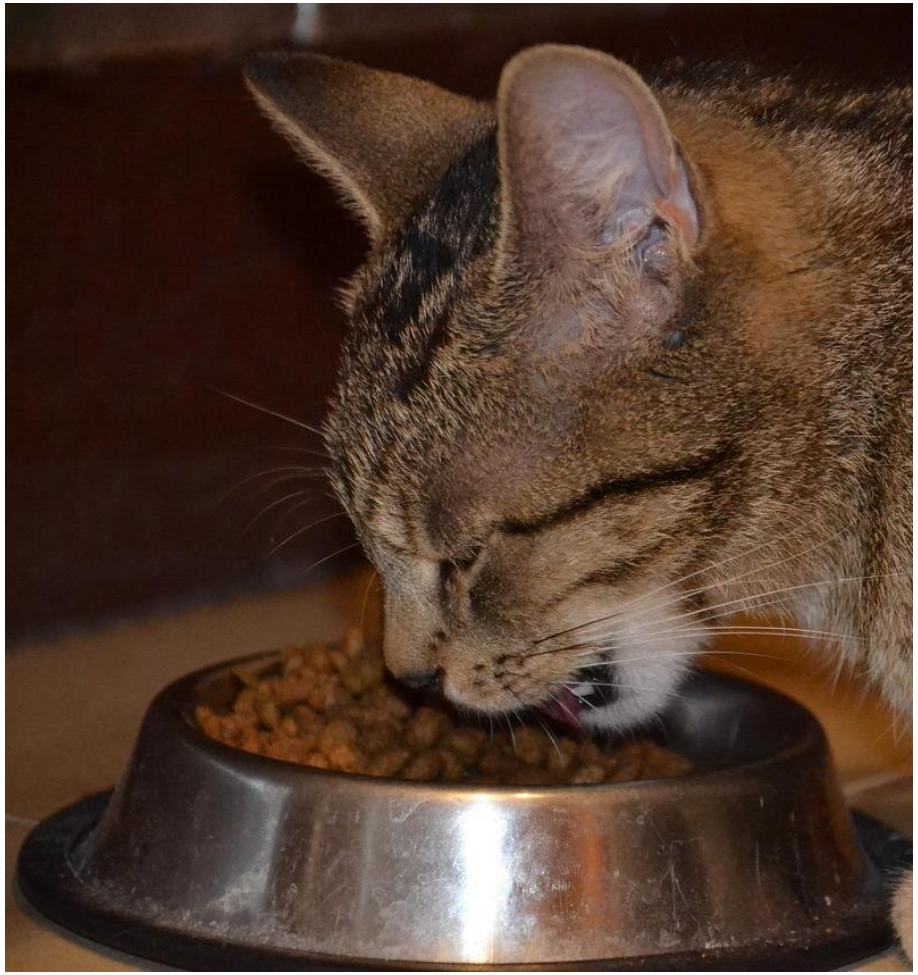
Treatment – inpatient: nutrition

- Early enteral feeding critical
- Type of diet: highly digestible GI diet recommended during recovery
- Force feeding is not recommended
  - Exacerbates nausea, promotes food aversion
- Enteral feeding tube indicated within 48 hours of presentation if no response to appetite stimulants or prolonged anorexia at home
  - Nasoesophageal tube for short-term
  - Esophagostomy tube if long-term feeding is anticipated
  - Start at 25% resting energy requirement (RER)



Forman MA, Steiner JM, Armstrong P, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. *J Vet Int Med.* 2021;35:703-723. doi:10.1111/jvim.16053.

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Treatment – inpatient: other therapies

- Other Therapies
  - Fresh frozen plasma if coagulopathy
  - Synthetic colloids?
  - Vasopressors
  - Antibiotics?
  - Corticosteroids?
  - Management of respiratory complications
- Treat concurrent illness if present
  - Chronic kidney disease
  - Diabetes mellitus

Photo courtesy of Dr. Allison Cannon

Forman MA, Steiner JM, Armstrong P, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. *J Vet Int Med.* 2021;35:703-723. doi:10.1111/jvim.16053.

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Treatment – outpatient

- Supportive care
  - Pain management
    - Buprenorphine
    - Gabapentin
    - Tramadol
    - Maropitant
  - Antiemetics and appetite stimulants
    - Maropitant
    - Ondansetron
    - Mirtazapine, capromorelin
  - Antibiotics
    - Not indicated unless concurrent conditions or infectious complications

Forman MA, Steiner JM, Armstrong P, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. *J Vet Int Med.* 2021;35:703-723. doi:10.1111/jvim.16053.

Nivy R, Kaplanov A, Kuzi S, et al. A retrospective study of 157 hospitalized cats with pancreatitis in a tertiary care center: Clinical, imaging and laboratory findings, potential prognostic markers and outcome. *J Vet Int Med.* 2018;32:1874-1885. doi:10.1111/jvim.15317.

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Treatment – chronic pancreatitis

- Anti-inflammatory and immunosuppressive therapy
  - Prednisolone
    - If not hyperglycemic, may benefit
      - Anti-inflammatory dosages on a tapering schedule
      - Or immunosuppressive dosages then tapered after 6 weeks based on clinical exam and fPL monitoring
  - Cyclosporine
    - Can be considered if hyperglycemia or steroid contraindicated
    - Risk of unmasking latent toxoplasmosis
  - If no response, discontinue

Forman MA, Steiner JM, Armstrong P, Camus MS, Gaschen L, Hill SL, Mansfield CS, Steiger K. ACVIM consensus statement on pancreatitis in cats. *J Vet Int Med.* 2021;35:703-723. doi:10.1111/jvim.16053.

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Prognosis and Monitoring

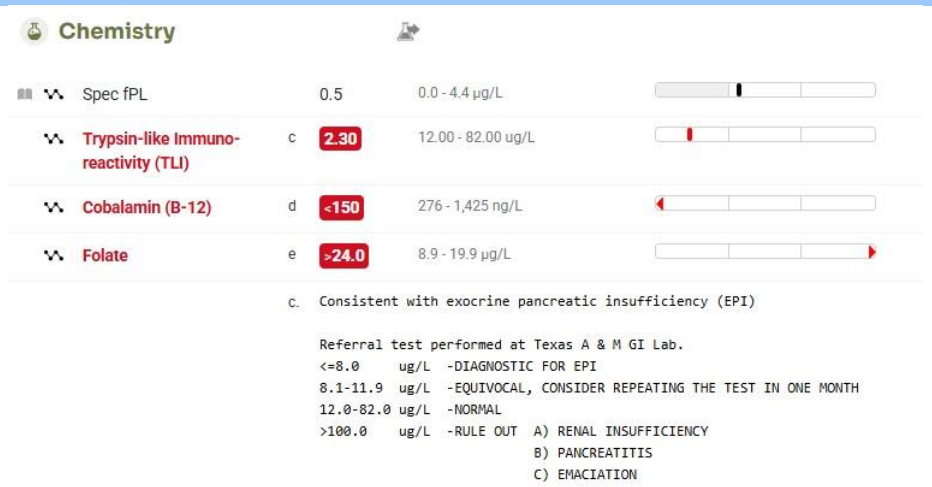
Prognosis and monitoring

Prognosis

- Acute pancreatitis
  - Good to guarded or poor
    - Mortality rate ranges from 9% to 41%
- Hospitalized patients
  - Negative prognostic factors
    - Lethargy, pleural effusion, hypocalcemia (ionized), hypoglycemia, azotemia, persistent anorexia, parenteral nutrition, withholding of antibiotics
- Chronic
  - Prognosis generally good
  - May lead to diabetes mellitus or EPI

Monitoring

- If pancreatic lipase is elevated at time of diagnosis
  - Can be monitored along with clinical variables
  - Sensitivity is lower with mild disease
  - Should not be used in isolation
- Monitor for sequelae of pancreatitis



Chemistry

Spec fPL		0.5	0.0 - 4.4 µg/L	
Trypsin-like Immuno-reactivity (TLI)	c	2.30	12.00 - 82.00 ug/L	
Cobalamin (B-12)	d	<150	276 - 1,425 ng/L	
Folate	e	>24.0	8.9 - 19.9 µg/L	

c. Consistent with exocrine pancreatic insufficiency (EPI)

Referral test performed at Texas A & M GI Lab.
<=8.0 ug/L -DIAGNOSTIC FOR EPI
8.1-11.9 ug/L -EQUIVOCAL, CONSIDER REPEATING THE TEST IN ONE MONTH
12.0-82.0 ug/L -NORMAL
>100.0 ug/L -RULE OUT A) RENAL INSUFFICIENCY
B) PANCREATITIS
C) EMACIATION

Nivy R, Kaplanov A, Kuzi S, et al. A retrospective study of 157 hospitalized cats with pancreatitis in a tertiary care center: Clinical, imaging and laboratory findings, potential prognostic markers and outcome. *J Vet Int Med.* 2018;32:1874-1885. doi:10.1111/jvim.15317.

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Oliver

Bailey

Signalment

Oliver	Bailey
+ 7yo MN DSH	+ 11yo FS DLH

History

Oliver	Bailey
+ Progressive hyporexia + Weight loss + Lethargy x 1 week + Intermittent vomiting and diarrhea x 6 months	+ History of pancreatitis and chronic enteropathy + Recent flare up of gastrointestinal signs including vomiting, diarrhea and now stopped eating

Physical examination

Oliver	Bailey
+ TPR: within normal limits + +/- hydrated + Abdomen: mass effect in cranial abdomen, non-painful	+ T 103.5, P 220 bpm, R 80 bpm + 5% dehydrated + Quiet in the exam room + BCS 6/9 with dorsal muscle wasting

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Oliver – 7yo MN DSH

History

+ Progressive hyporexia, weight loss
+ Lethargic for 7 days
+ Occasional vomiting and diarrhea for 6 months

Physical examination

+ Quiet
+ Normal vital signs
+ +/- hydrated
+ Cranial abdominal mass effect, non-painful

Plan

+ CBC, Chemistry panel, Catalyst® PL, abdominal ultrasound

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Oliver – blood work

Hematology

TEST	RESULT	REFERENCE VALUE	
RBC	7.50	6.54 - 12.20 M/µL	
Hematocrit	33.8	30.3 - 52.3 %	
Hemoglobin	10.5	9.8 - 16.2 g/dL	
MCV	45.1	35.9 - 53.1 fL	
MCH	14.0	11.8 - 17.3 pg	
MCHC	31.1	28.1 - 35.8 g/dL	
RDW	22.3	15.0 - 27.0 %	
% Reticulocytes	0.0	%	
Reticulocytes	3.0	3.0 - 50.0 K/µL	
Reticulocyte Hemoglobin	14.2	13.2 - 20.8 pg	
WBC	*7.27	2.87 - 17.02 K/µL	
% Neutrophils	*85.0	%	
% Lymphocytes	*5.8	%	
% Monocytes	*2.6	%	
% Eosinophils	*3.4	%	
% Basophils	*3.2	%	
Neutrophils	*6.18	2.30 - 10.29 K/µL	
Lymphocytes	***0.42**	**0.92 - 6.88 K/µL**	L
Monocytes	*0.19	0.05 - 0.67 K/µL	
Eosinophils	*0.25	0.17 - 1.57 K/µL	
Basophils	*0.23	0.01 - 0.26 K/µL	
Nucleated RBCs	*Suspected		
Platelets	**18**	**151 - 600 K/µL**	L
MPV	15.6	11.4 - 21.6 fL	
Plateletcrit	**0.03**	**0.17 - 0.86 %**	L

Chemistry

Glucose	120	71 - 159 mg/dL
Creatinine	1.6	0.8 - 2.4 mg/dL
BUN	34	16 - 36 mg/dL
BUN: Creatinine Ratio	21	
Phosphorus	4.1	3.1 - 7.5 mg/dL
Calcium	9.1	7.8 - 11.3 mg/dL
Sodium	**166.0**	150.0 - 165.0 mmol/L
Potassium	3.5	3.5 - 5.8 mmol/L
Chloride	120.0	112.0 - 129.0 mmol/L
Anion Gap	28	mmol/L
Total Protein	7.2	5.7 - 8.9 g/dL
Albumin	2.9	2.3 - 3.9 g/dL
Globulin	4.3	2.8 - 5.1 g/dL
Albumin: Globulin Ratio	0.7	
ALT	121	12 - 130 U/L
ALP	25	14 - 111 U/L
GGT	0	0 - 4 U/L
Bilirubin - Total	0.3	0.0 - 0.9 mg/dL
Cholesterol	99	65 - 225 mg/dL
Amylase	1,007	500 - 1,500 U/L
Lipase	730	100 - 1,400 U/L

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Oliver – white blood cell dot plot

WBC	*7.27	2.87 - 17.02 K/µL
% Neutrophils	*85.0	%
% Lymphocytes	*5.8	%
% Monocytes	*2.6	%
% Eosinophils	*3.4	%
% Basophils	*3.2	%
Neutrophils	*6.18	2.30 - 10.29 K/µL
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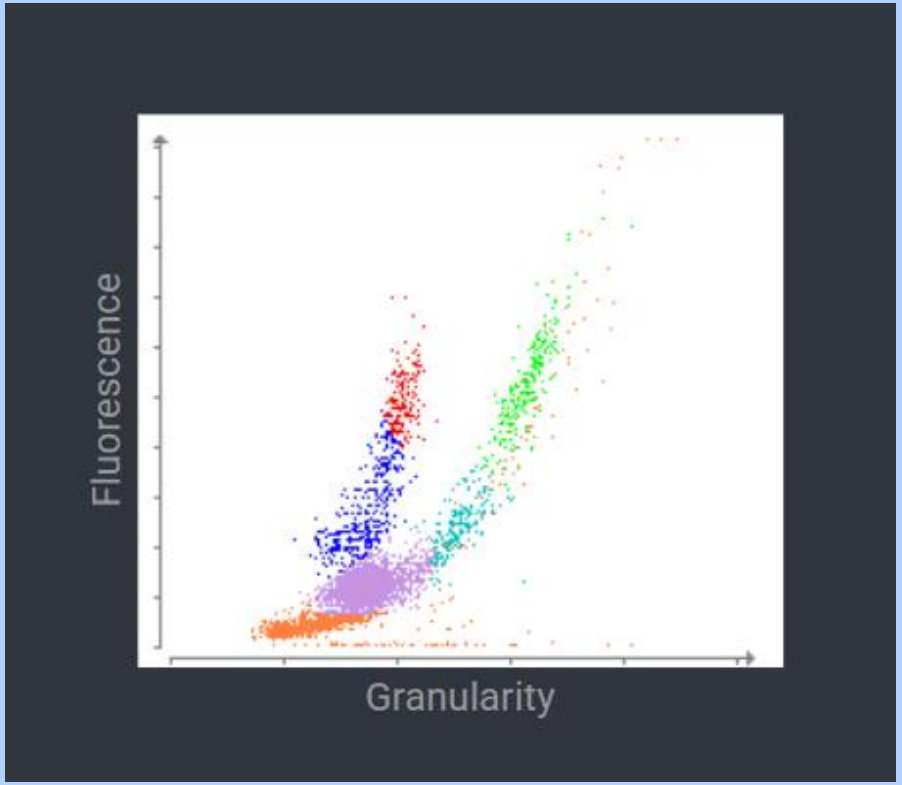
Basophils	*0.23	0.01 - 0.26 K/µL
Nucleated RBCs	*Suspected	
Platelets	**18**	**151 - 600 K/µL**

Oliver

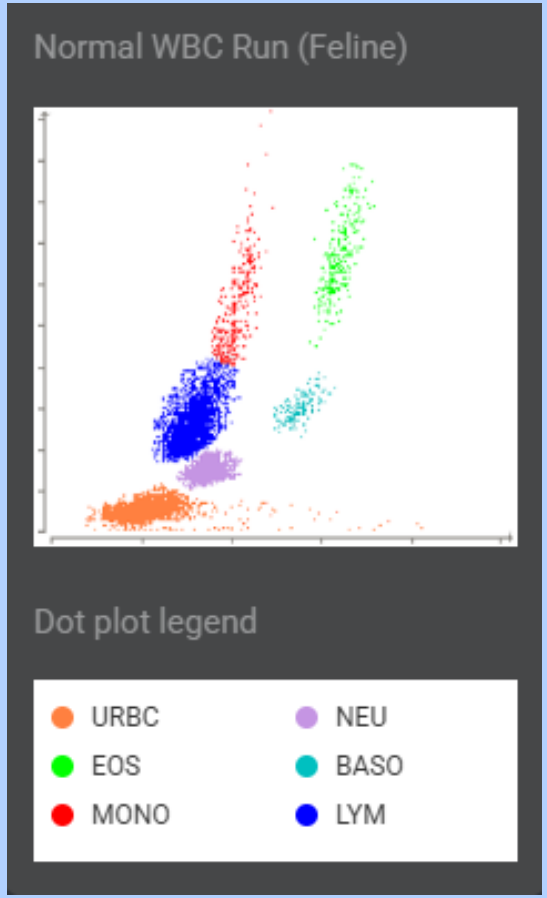


ProCyte Dx

PLT Aggregates Detected

* Confirm with dot plot and/or blood film review.

Normal



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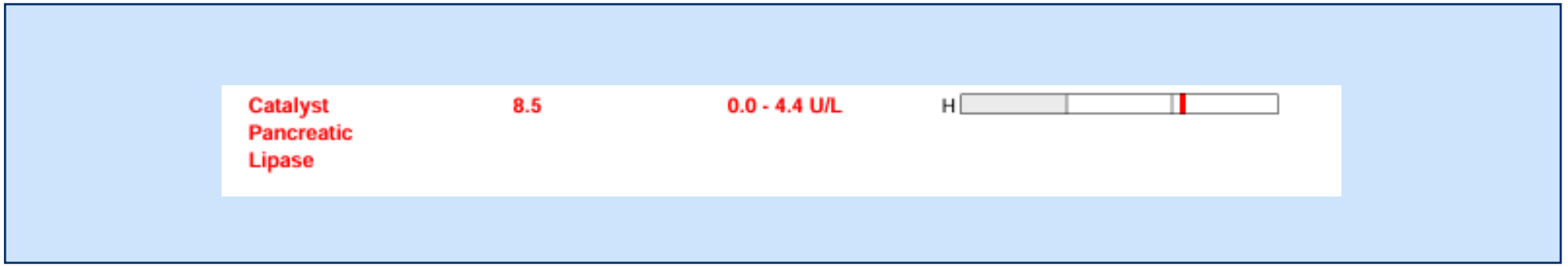
Oliver – pancreatic lipase



Catalyst Pancreatic Lipase	8.5	0.0 - 4.4 U/L	H

- **≤ 4.4 U/L:** Normal reference interval
- **4.5-8.7 U/L:** **Pancreatic lipase concentration is in the equivocal range**, and pancreatitis is possible. Investigate for other diseases and consider additional diagnostics and/or treatment if clinical signs or other evidence of disease exist. Recheck with the Catalyst Pancreatic Lipase Test in 2-3 weeks.
- **≥ 8.8 U/L:** Pancreatic lipase is consistent with pancreatitis**.** If clinical signs are present, treat appropriately and investigate for risk factors and concurrent diseases, including enteritis, cholangitis, hepatic lipidosis and diabetes mellitus. Monitor with the Catalyst Pancreatic Lipase Test to assess response to treatment. If clinical signs are not present, consider additional diagnostics, instruct owner to monitor closely and recheck with the Catalyst Pancreatic Lipase Test in 2-3 weeks.

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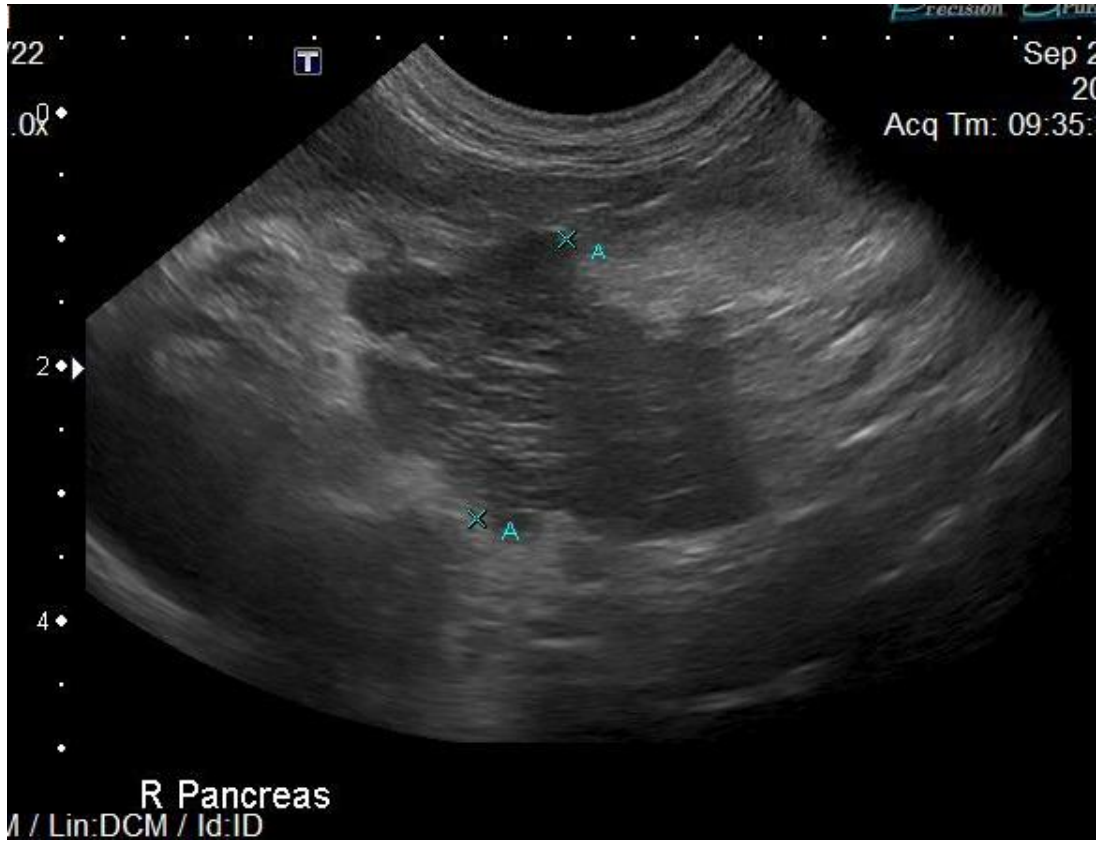
Oliver – abdominal ultrasound



Ultrasound images courtesy of Dr. Suzanne LeGrange

- Kidneys bilaterally symmetric, normal
- Liver homogeneous, normal size and echogenicity
- Gallbladder distended, common bile duct normal
- Pancreas enlarged, hypoechoic, irregular, with increased echogenicity of peripancreatic fat
- Small intestine normal wall layering and thickness

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Treatment and outcome

- Treatment
  - Subcutaneous fluids
  - Mirtazapine transdermal
  - Palatable, highly digestible diet
- Outcome
  - Improved over the next few days
  - Overall decrease in vomiting and diarrhea
    - Changed to hypoallergenic diet with more improvement

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Bailey – 11yo FS DLH

- Presented for a flare up of pancreatitis and/or chronic enteropathy
- Previous work up for chronic weight loss and vomiting 10 months ago
  - CBC, biochemistry, T4, UA: unremarkable
  - Abdominal Ultrasound
    - Small intestinal thickening, enlarged mesenteric lymph nodes
    - Hypoechoic pancreas with hyperechoic mesentery
  - GI Panel
    - TLI – 73.5 µg/L (12-82)
    - Spec fPL – 9.2 µg/L (<3.5)
    - Cobalamin – 289 ng/L(290-1499)
    - Folate – 17.3 µg/L (9.7-21.6)

- Diagnosis
  - Pancreatitis and chronic enteropathy
- Treatment
  - Owner declined biopsies
  - Started on prednisolone
  - Hypoallergenic diet
  - Oral B12 supplementation

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IDEXX

Bailey – 10 Months Later

- 2 weeks ago started having soft stools and decreased appetite
  - Treated at urgent care
- Medications
  - Prednisolone (chronic)
  - Mirtazapine (started recently)
  - Metronidazole (started recently)
- Lethargic with soft stools, one episode of vomiting and stopped eating

- Physical exam
  - T = 103.5, P = 220, R = 40
  - 5% dehydrated
  - BCS 6/9 with dorsal muscle wasting
    - Has lost 0.4kg
  - Rest of exam unremarkable
- Plan
  - CBC, chemistry panel
  - Abdominal ultrasound
  - Catalyst® Pancreatic Lipase

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Bailey – blood work

Hematology

RBC	10.61	6.54 - 12.20 M/µL
Hematocrit	43.2	30.3 - 52.3 %
Hemoglobin	14.2	9.8 - 16.2 g/dL
MCV	40.7	35.9 - 53.1 fL
MCH	13.4	11.8 - 17.3 pg
MCHC	32.9	28.1 - 35.8 g/dL
RDW	25.5	15.0 - 27.0 %
% Reticulocytes	0.1	%
Reticulocytes	7.4	3.0 - 50.0 K/µL
Reticulocyte Hemoglobin	14.1	13.2 - 20.8 pg
WBC	*22.21	2.87 - 17.02 K/µL
% Neutrophils	*60.4	%
% Lymphocytes	*35.3	%
% Monocytes	*2.6	%
% Eosinophils	*0.1	%
% Basophils	- --.--	%
Neutrophils	*13.41	2.30 - 10.29 K/µL
Bands	*Suspected	
Lymphocytes	*7.85	0.92 - 6.88 K/µL
Monocytes	*0.57	0.05 - 0.67 K/µL
Eosinophils	*0.03	0.17 - 1.57 K/µL
Basophils	- --.--	0.01 - 0.26 K/µL
Platelets	*2	151 - 600 K/µL
Platelet Estimate		
MPV	*22.0	11.4 - 21.6 fL
Plateletcrit	*0.00	0.17 - 0.86 %

Chemistry

TEST	RESULT	REFERENCE VALUE
Glucose	130.25	71.16 - 159.25 mg/dL
IDEXX SDMA	7	0 - 14 µg/dL
Creatinine	0.9	0.8 - 2.4 mg/dL
BUN	19.05	15.97 - 36.13 mg/dL
BUN: Creatinine Ratio	21	
Phosphorus	4	3.1 - 7.49 mg/dL
Calcium	8.86	7.82 - 11.34 mg/dL
Sodium	158	150 - 165 mmol/L
Potassium	4.3	3.5 - 5.8 mmol/L
Na: K Ratio	37	
Chloride	117	112 - 129 mmol/L
Total Protein	6.8	5.7 - 8.9 g/dL
Albumin	3.2	2.3 - 3.9 g/dL
Globulin	3.7	2.8 - 5.1 g/dL
Albumin: Globulin Ratio	0.9	
ALT	43	12 - 130 U/L
ALP	38	14 - 111 U/L
GGT	0	0 - 4 U/L
Bilirubin - Total	0.29	0 - 0.88 mg/dL
Cholesterol	245.55	64.97 - 224.67 mg/dL H
Amylase	577	500 - 1,500 U/L
Lipase	680	100 - 1,400 U/L
Osmolality	315	mmol/kg

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Bailey – white blood cell dot plot

Neutrophils	*13.41	2.30 - 10.29 K/µL
Bands	*Suspected	
Lymphocytes	*7.85	0.92 - 6.88 K/µL
Monocytes	*0.57	0.05 - 0.67 K/µL
Eosinophils	*0.03	0.17 - 1.57 K/µL
Basophils	- --.--	0.01 - 0.26 K/µL
Platelets	*2	151 - 600 K/µL

ProCyte Dx

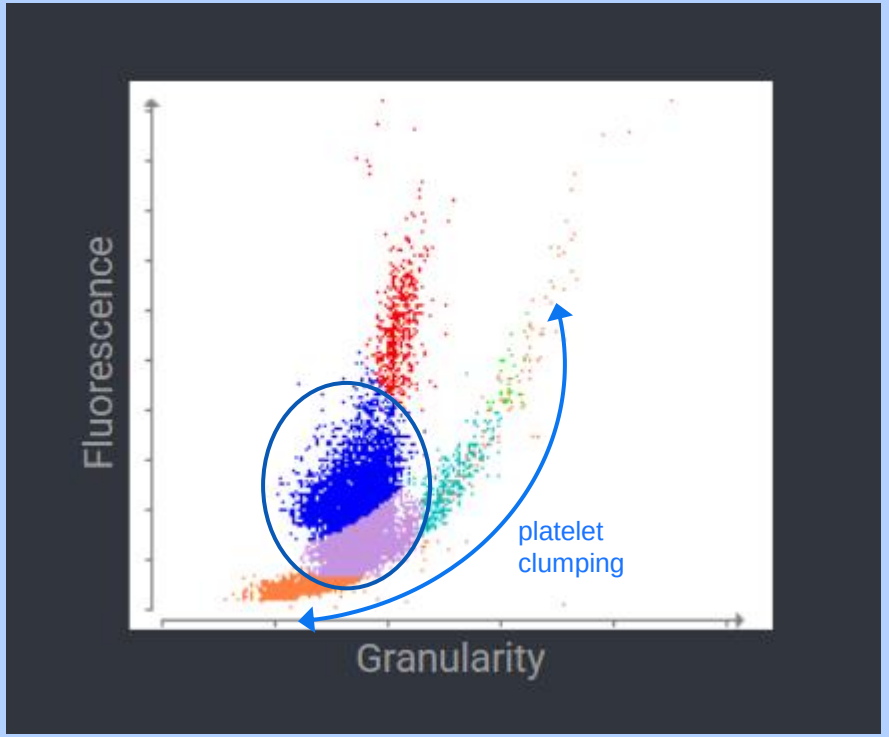
PLT Aggregates Detected

* Confirm with dot plot and/or blood film review.

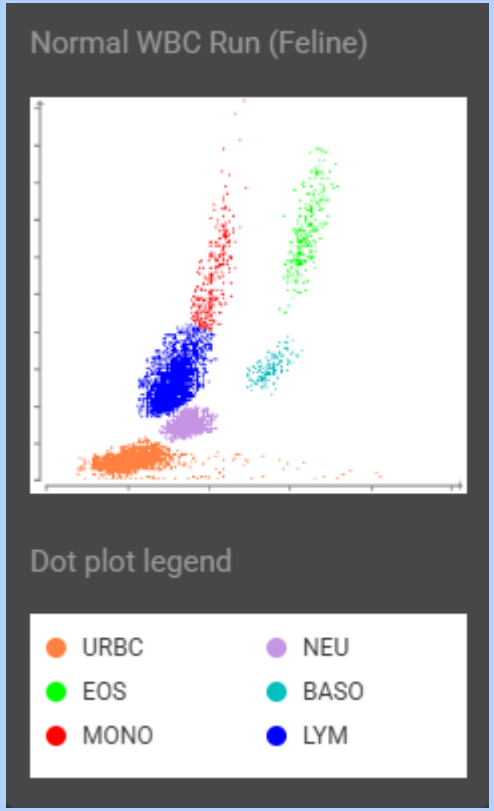
Immature and/or toxic neutrophils likely present - Consider inflammation.

Platelet aggregates are detected. Platelet count may be higher than reported.

Bailey



Normal



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Bailey – inVue Dx Analyzer

inVue Dx

Hematology				
RBC		10.61	6.54 - 12.20 M/µL	
Hematocrit	a	43.2	30.3 - 52.3 %	
Hemoglobin				
MCV				
MCH				
MCHC				
RDW				
% Reticulocytes		0.1	%	
Reticulocytes		7.4	3.0 - 50.0 K/µL	
Reticulocyte Hemoglobin				
WBC	b	22.21	2.87 - 17.02 K/µL	
% Neutrophils		88.3	%	
% Lymphocytes		7.8	%	
% Monocytes		3.9	%	
% Eosinophils		0.1	%	
% Basophils		0.0	%	
Neutrophils		19.60	2.30 - 10.29 K/µL	
Bands				
Lymphocytes		1.73	0.92 - 6.88 K/µL	
Monocytes		0.87	0.05 - 0.67 K/µL	
Eosinophils		0.01	0.17 - 1.57 K/µL	
Basophils		0.00	0.01 - 0.26 K/µL	
Platelets				
Platelet Estimate		>150 K/uL (Adequate)		

	inVue Dx	Procyte Dx
Neutrophils	19.60	*13.41
Bands		*Suspected
Lymphocytes	1.73	*7.85
Monocytes	0.87	*0.57
Eosinophils	0.01	*0.03
Basophils	0.00	- --.--
Platelets		*2
Platelet Estimate	>150 K/uL (A...	

Diagnostic Considerations	This platelet estimate incorporates enumeration of individual platelets and platelets within clumps. Platelet count is above 150 K/uL.

IDEXX inVue Dx

a. Results imported from ProCyte.

b. WBC results imported from ProCyte. The white blood cell differential has been updated based on cellular analysis.

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Bailey – pancreatic lipase

- **≤ 4.4 U/L:** Normal reference interval
- **4.5-8.7 U/L:** Pancreatic lipase concentration is in the equivocal range, and pancreatitis is possible. Investigate for other diseases and consider additional diagnostics and/or treatment if clinical signs or other evidence of disease exist. Recheck with the Catalyst Pancreatic Lipase Test in 2-3 weeks.
- **≥ 8.8 U/L: Pancreatic lipase is consistent with pancreatitis.** If clinical signs are present, treat appropriately and investigate for risk factors and concurrent diseases, including enteritis, cholangitis, hepatic lipidosis and diabetes mellitus. Monitor with the Catalyst Pancreatic Lipase Test to assess response to treatment. If clinical signs are not present, consider additional diagnostics, instruct owner to monitor closely and recheck with the Catalyst Pancreatic Lipase Test in 2-3 weeks.

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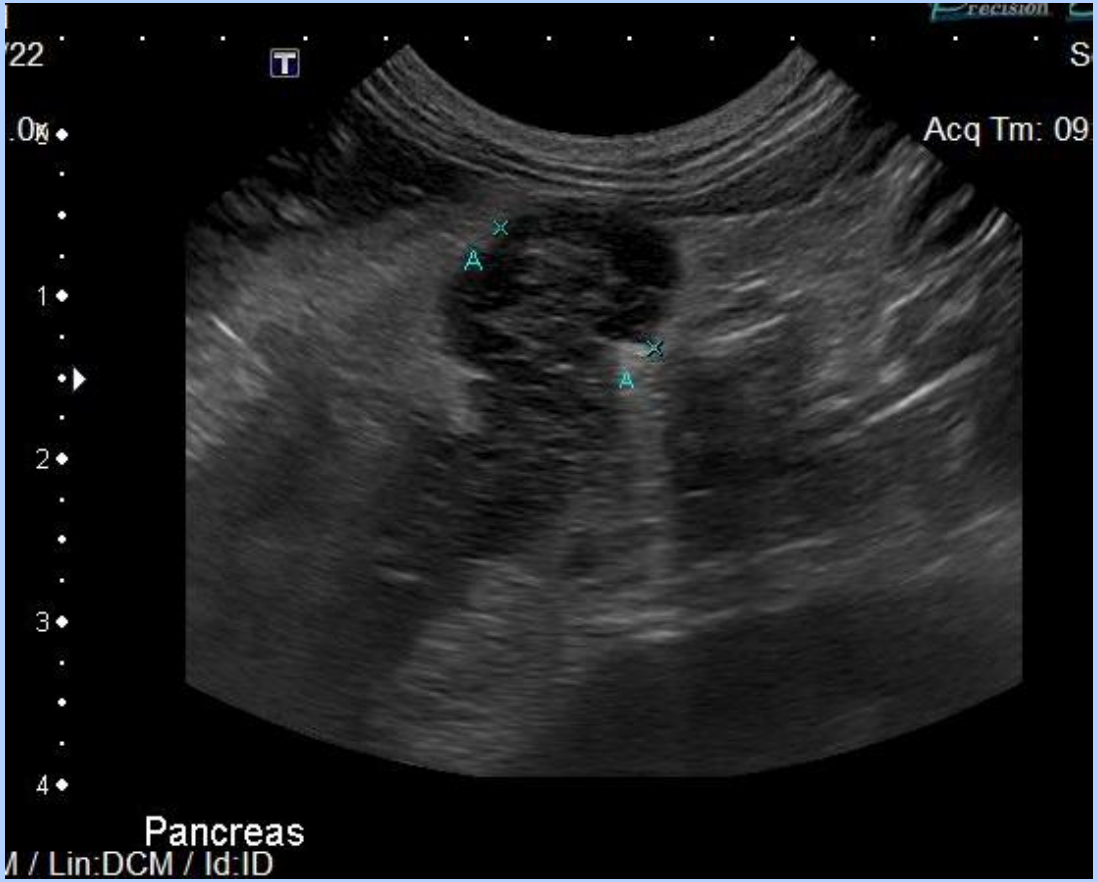
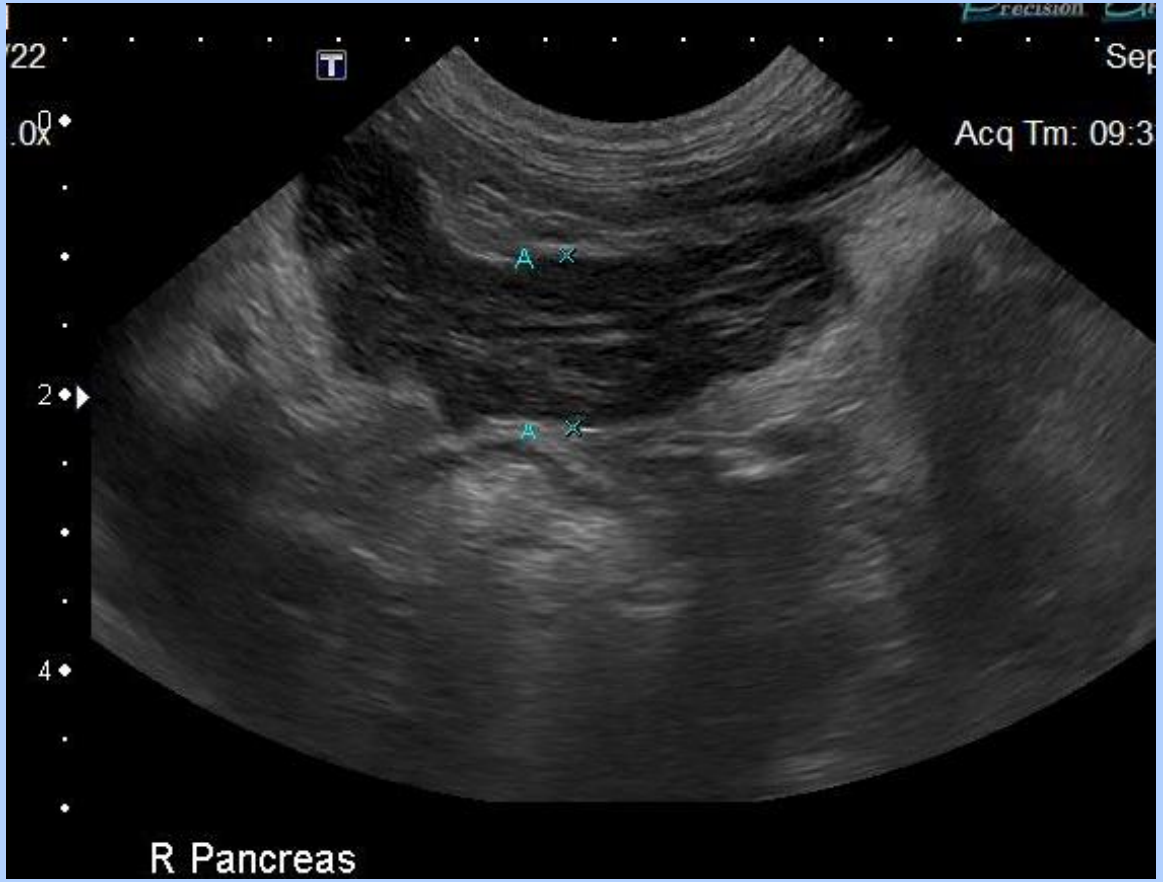
Bailey – abdominal ultrasound





Ultrasound images courtesy of Dr. Suzanne LeGrange

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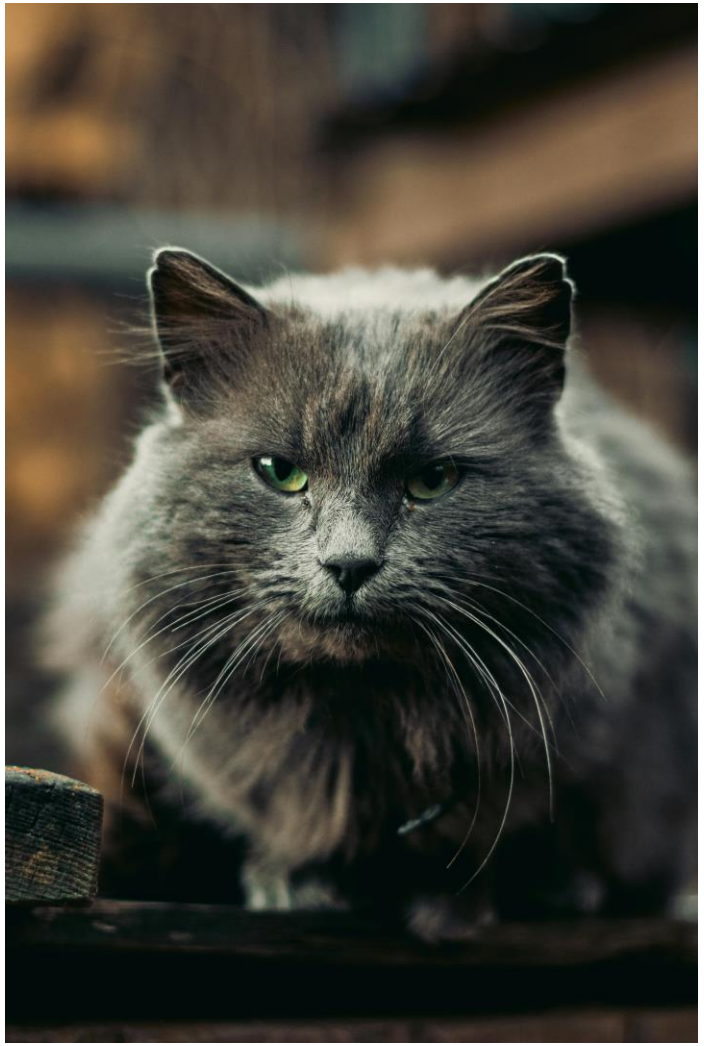
Bailey – treatment

- Treatment
  - IV fluids
  - IV ondansetron
  - IV buprenorphine
  - IV dexamethasone
  - IV ampicillin/sulbactam
- Outcome
  - Responded well to treatment
    - Fever resolved with antibiotics
    - Hospitalized for 3 additional days
    - Discharged on buprenorphine, ondansetron, mirtazapine, amoxicillin-clavulanic acid, prednisolone



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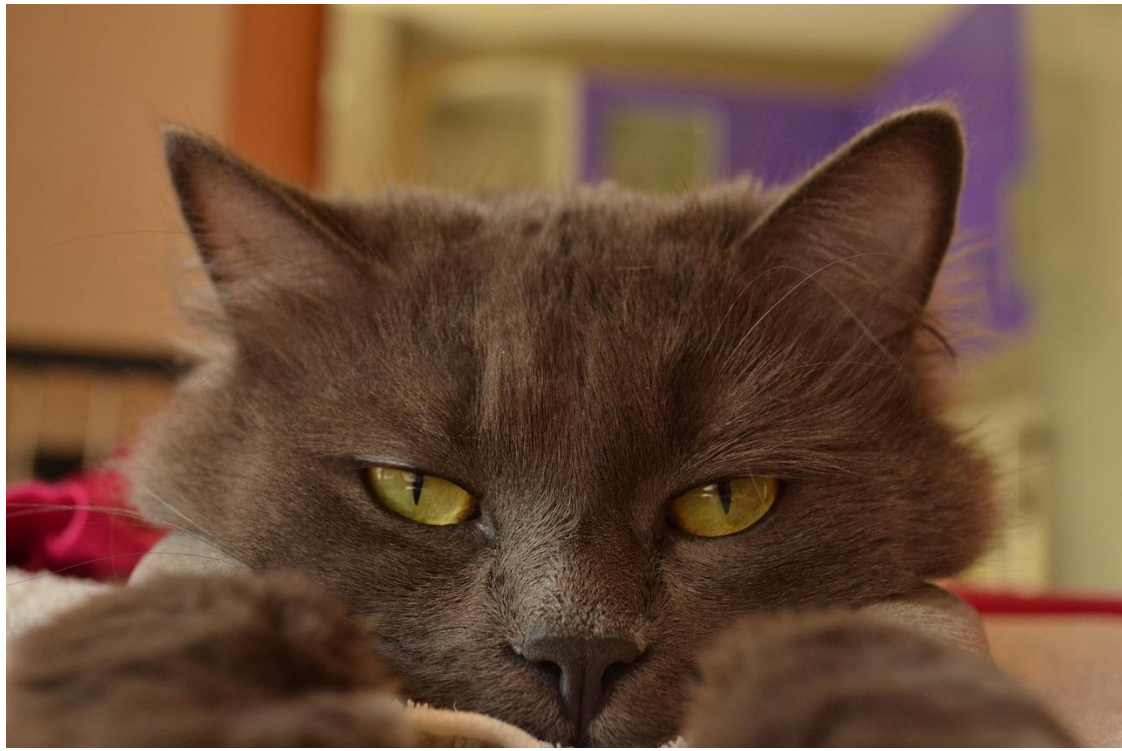
Bailey – the adventure continues…and gets stickier

Recheck 3 weeks later

- Better at home, soft stool resolved when antibiotic was stopped
- Eating and drinking well, spending more time at the water bowl
- Current medications
  - Prednisolone
  - Mirtazapine
  - Ondansetron
- Plan
  - Recheck blood work, urinalysis



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Bailey – the adventure continues…and gets stickier

- Diagnostics
  - CBC
    - Leukocytosis resolved
  - Chemistry panel
    - Blood glucose high at 378 mg/dl
  - Urinalysis
    - Glucosuria 1000 mg/dl
    - Ketones negative
- Treatment
  - Decreased prednisolone to once daily

Urinalysis

TEST	RESULT	
Collection	Cystocentesis	
Color	Straw	
Clarity	Clear	
Specific Gravity	1.048	
pH	7.0	
Urine Protein	TR	
Glucose	**1,000**	**mg/dL**
Ketones	neg	
Blood / Hemoglobin	neg	
Bilirubin	neg	
Urobilinogen	norm	
White Blood Cells	<1 /HPF	
Red Blood Cells	<1 /HPF	
Bacteria, Cocci	None detected	
Bacteria, Rods	None detected	
Squamous Epithelial Cells	None detected	
Non-Squamous Epithelial Cells	<1 /HPF	

TEST	RESULT
Hyaline Casts	None detected
Non-Hyaline Casts	None detected
Calcium Oxalate Dihydrate Crystals	None detected
Struvite Crystals	None detected
Ammonium Biurate Crystals	None detected
Bilirubin Crystals	None detected
Unclassified Crystals	None detected

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Bailey – the adventure continues…and gets stickier

- Recheck 1 week later
  - BG: 347 mg/dl
  - Persistent glucosuria (>1000 mg/dl)
  - Fructosamine: 478 (142-450)
- Started insulin
- Diagnosis
  - Diabetes mellitus – secondary to:
    - Chronic pancreatitis with acute flare-up
    - Insulin resistance from prednisolone

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Oliver

Bailey

Signalment

Oliver	Bailey
+ 7yo MN DSH	+ 11yo FS DLH

History

Oliver	Bailey
+ Progressive hyporexia + Weight loss + Lethargy x 1 week + Intermittent vomiting and diarrhea x 6 months	+ History of pancreatitis and chronic enteropathy + Recent flare up of gastrointestinal signs including vomiting, diarrhea and now stopped eating

Physical examination

Oliver	Bailey
+ TPR: within normal limits + +/- hydrated + Abdomen: mass effect in cranial abdomen, non-painful	+ T 103.5, P 220 bpm, R 80 bpm + 5% dehydrated + Quiet in the exam room + BCS 6/9 with dorsal muscle wasting

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Summary

- Diagnosis of pancreatitis in cats is based upon combination of:
  - Clinical picture
  - Laboratory results
  - Diagnostic imaging
  - Level of suspicion/intuition
- There is no specific treatment for pancreatitis in cats; tailor treatment to each patient
- Nutrition is a very important part of therapy
  - Diet should be digestible, amount of fat is less important in cats
- Prognosis is variable for acute pancreatitis and generally good for chronic pancreatitis; flare ups are possible

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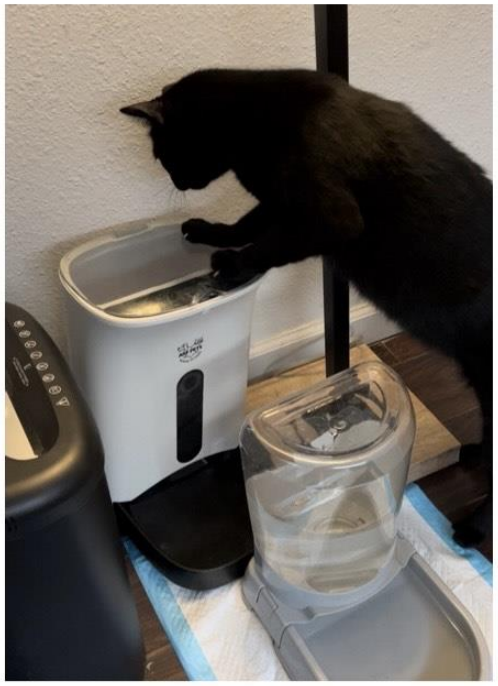
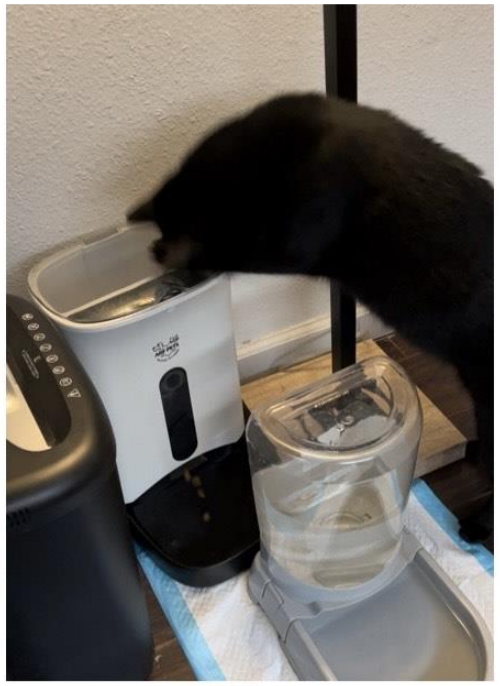
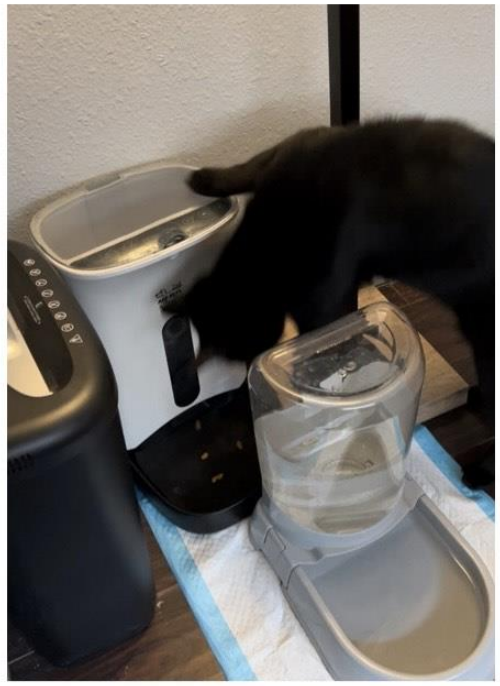
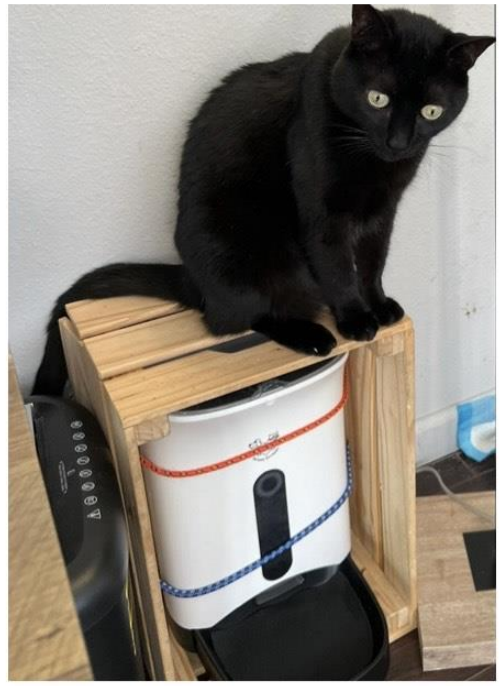
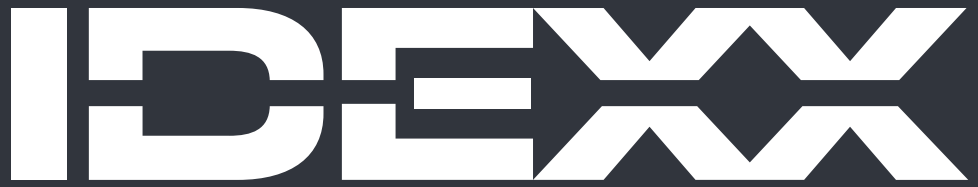
Questions?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