

# Lipase

## Interpretive Summary

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**Description:** Lipase is an enzyme produced primarily in the pancreas to break down dietary fats in the small intestine.

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### Decreased Lipase

#### Common Causes

- Artifact
  - Hemolysis directly inhibits lipase activity in the assay
- Decreased lipase is not clinically significant.

### Increased Lipase

#### Common Causes

- Pancreatic acinar cell damage
  - Inflammation
  - Necrosis
  - Neoplasia
  - Pancreatic duct obstruction
- Gastrointestinal inflammation
- Decreased renal clearance/inactivation (any condition that reduces glomerular filtration rate [GFR])
  - Pre-renal conditions
    - Shock
    - Dehydration
    - Poor cardiac output
  - Renal disease
  - Post-renal disorders
    - Urinary tract obstruction or rupture
- Glucocorticoid treatment

#### Uncommon Causes

- Hepatic neoplasia (dogs)
- Peritonitis
- Bowel obstruction
- Widespread steatitis

#### Related Findings

- Pancreatic acinar cell damage
  - Increased amylase
  - Increased Spec cPL®/Spec fPL®.
  - Increased ALP +/- bilirubin
  - Increased glucose
  - Inflammatory leukogram on CBC
- Gastrointestinal inflammation
  - Increased BUN with gastric bleeding
- Decreased renal clearance/inactivation
  - Pre-renal
    - Increased hematocrit and total protein

- Increased BUN, creatinine, and possibly phosphorous
- Increased urine specific gravity
- Decreased blood pressure (shock, poor cardiac output)
- Renal
  - Increased BUN, creatinine, phosphorus
  - Isosthenuria
- Post-renal
  - Increased BUN, creatinine, and possibly phosphorus
  - Abnormalities on urinalysis (blood, inflammation, crystals, etc.)
  - Abnormalities associated with urinary tract obstruction/rupture on abdominal ultrasound or contrast studies

## Additional Information

### Physiology

- Lipase is a cytoplasmic enzyme produced by the pancreas and released into the small intestine to catalyze the hydrolysis of triglycerides for absorption into the lacteals and gastrointestinal blood vessels.
- In addition to pancreatic acinar cells, lipase is produced by gastric mucosal cells, hepatocytes, and many extrahepatic cells (including adipocytes and myocytes).
- Lipase is often increased in dogs and cats with pancreatic inflammation.
  - Lipase is not as sensitive or specific an indicator of pancreatic inflammation as Spec cPL®/Spec fPL®.
- In dogs with pancreatitis, serum lipase activity usually increases within 24 hours and peaks (at a higher level of activity compared to amylase) at 2-5 days.
  - Lipase activity can remain within reference intervals in dogs with pancreatitis.
- In cats with pancreatitis, serum lipase is usually increased, but can also be within reference intervals
- In horses serum lipase activity is not diagnostically useful.
- The kidneys excrete or inactivate lipase. Hence serum lipase tends to increase with acute and chronic kidney disease as well as pre and post renal conditions that reduce GFR.
  - Diseases that reduce GFR usually do not result in more than 2- to 3- fold increase in serum lipase activity.
  - Serum lipase activity tends to parallel serum amylase activity when renal blood flow or functional renal tissue is decreased.
- Glucocorticoid administration may cause up to 5-fold increase in serum lipase activity. The mechanism is unknown.

### Diagnostic Methodology

- The assay measures lipase activity through consumption of substrate, not the quantity of lipase.

### References

- Ettinger SJ, Feldman EC eds. *Textbook of Veterinary Internal Medicine*, 6th ed. St. Louis, MO: Elsevier Saunders, Inc.; 2005.
- Latimer KS, Mahaffey EA, Prasse KW, eds. *Duncan and Prasse's Veterinary Laboratory Medicine: Clinical Pathology*, 4th ed. Ames, IA: Blackwell; 2003
- Stockham SL, Scott MA. *Fundamentals of Veterinary Clinical Pathology*, 2nd ed. Ames, IA: Blackwell; 2008.
- Willard MD, Tvedten H, eds. *Small Animal Clinical Diagnosis by Laboratory Methods*, 4th ed. St. Louis, MO: Saunders; 2004.

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