Lipase

Interpretive Summary

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

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 activity 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

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