

Alanine Aminotransferase (ALT)

Interpretive Summary

Description: Alanine Aminotransferase (ALT) is a cellular enzyme released in response to injury of liver cells. ALT can also increase mildly with muscular injury and gastrointestinal disease.

Decreased ALT

Common Causes

- Rarely clinically significant
- End stage liver disease

Related Findings

- End stage liver disease
 - Decreased albumin, ALP, glucose, cholesterol, BUN
 - Increased bilirubin

Increased ALT

Common Causes

- Inflammatory
 - Infectious causes
 - Bacterial cholangiohepatitis
 - Leptospirosis
 - Feline infectious peritonitis (FIP)
 - Histoplasmosis
 - Infectious canine hepatitis
 - Noninfectious causes
 - Chronic hepatitis
 - Cirrhosis
 - Pancreatitis
- Toxic
 - NSAIDs
 - Phenobarbital
 - Corticosteroids
 - Methimazole/carbimazole
- Liver hypoxia or hypoperfusion
 - Anemia
 - Congestive heart failure
 - Shock
- Metabolic disorders
 - Hyperthyroidism (cats)
 - Hepatic lipidosis (cats)
 - Cushing's disease
 - Diabetes mellitus/diabetic ketoacidosis
- Neoplasia
- Trauma

Uncommon Causes

- Portosystemic shunts (usually mild elevations if any)
- Toxic
 - Mushroom
 - Sago palm
 - Aflatoxin
 - Ragwort (horses)
 - Xylitol
 - Tetracycline
 - Idiosyncratic drug reactions
- Inherited
 - Copper storage disease (certain dog breeds, but particularly severe in Bedlington Terriers)
 - Lysosomal storage disorders
- Severe skeletal myopathy, usually mild to moderate increases
- Nutritional hepatopathies
- Gastroenteritis

Related Findings

- Inflammatory
 - Increased AST, ALP, GGT, total bilirubin
 - Decreased albumin, cholesterol, glucose, BUN in severe cases
 - Increased bile acids and ammonia
 - Positive titers or PCR for leptospirosis, feline coronavirus (FIP), histoplasmosis
 - Positive bacterial or fungal culture of liver/bile
 - Histopathology/cytology findings consistent with inflammatory hepatic diseases
 - Increased Spec cPL® or Spec fPL® with pancreatitis
- Metabolic
 - Hyperthyroidism
 - Increased T4, free T4, free T4 by equilibrium dialysis
 - Hepatic Lipidosis
 - Increased ALP
 - GGT usually normal unless concurrent inflammatory disease is present
 - Enlarged liver on radiographs, hyperechoic liver on ultrasound
 - Cytology/histopathology consistent with hepatic lipidosis
 - Cushing's Disease
 - Increased ALP
 - Decreased urine specific gravity
 - Stress leukogram: increased neutrophils and monocytes, decreased lymphocytes and/or eosinophils
 - Adrenal function tests consistent with Cushing's disease
 - Diabetes Mellitus
 - Increased serum glucose and glucosuria
 - Increased fructosamine
 - Ketonuria (in severe cases)
- Neoplasia
 - Enlarged/irregular liver on radiographs and/or ultrasound
 - Cytology/histopathology findings consistent with neoplasia

Additional Information

Physiology

- ALT is a hepatocellular enzyme

- Another name for ALT is serum glutamic-pyruvic transaminase (SGPT)
- The enzyme is almost exclusively found within hepatocytes, so serum increases are highly specific for hepatocellular injury in dogs and cats (there is only a minor contribution from skeletal muscle and red blood cells).
- The magnitude of increase may relate to severity of liver damage but does not predict reversibility.
- The serum half life is 2-3 days for dogs; reductions occur over 1-2 weeks with cessation of hepatic damage.
- The hepatocellular level of ALT in horses is very low, hence ALT is of limited value in this species.

References

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