

Instructional Objectives / Learning Outcomes
DMP 775, Veterinary Clinical Pathology
Department of Diagnostic Medicine/Pathobiology
College of Veterinary Medicine, Kansas State University

Chapter 13: Liver function

249. If given appropriate values for assays that indicate decreased hepatic function (e.g., serum [bilirubin], [bile acid], plasma [ammonium]) and other supportive information or laboratory data,
- a. List or classify abnormalities using appropriate terms.
 - b. Propose appropriate ideas or conclusions (i.e., diseases, syndromes, or pathologic states) that might cause the defined abnormalities.
 - c. Based on your conclusions or ideas, explain the pathogenesis of each defined abnormality if the abnormality could be caused by the disorder.
250. Explain the similarities and differences between hepatocellular disease, biliary disease, and hepatic insufficiency. Identify laboratory data that indicate or suggest the presence of each.
251. Explain the pathogenesis of the following in animals with liver disease (in your explanations, describe how liver disease causes the abnormality).
- a. CBC results: anemia, codocytosis, acanthocytosis, microcytosis
 - b. Chemistry results
 - 1) hypercholesterolemia, hyperglycemia, increased hepatic enzymes (ALT, AST, etc), lipemia
 - 2) decreased serum [UN], hypoglycemia, hypoproteinemia, hypoalbuminemia, hypocholesterolemia
 - c. Urinalysis results: lower than expected USG_{ref}, bilirubinuria, ammonium biurate crystalluria, urate crystalluria
 - d. Coagulation assays: prolonged PTT, prolonged PT
252. List and recognize the appropriate methods of handling and processing samples for the analysis of bilirubin, bile acid, and ammonium concentrations.
253. State the form(s) of bilirubin which is/are represented by the following terms: total bilirubin, unconjugated bilirubin, conjugated bilirubin, direct bilirubin, indirect bilirubin, and delta bilirubin.
254. List the five major processes that produce hyperbilirubinemia.
255. Explain or recognize the pathogenesis of hyperbilirubinemia that may be found in the following conditions.
- a. Hemolytic disorders, especially extravascular hemolysis
 - b. Fasting or anorexia in horses
 - c. Obstructive cholestasis
 - d. Functional cholestasis
256. Compare and contrast obstructive cholestasis and functional cholestasis. Which laboratory test results may be increased when they are present? Why?
257. List the two major processes that produce an increased fasting [BA].
258. Explain and recognize the pathogenesis of increased [BA] that may be found with the following.
- a. Diffuse hepatocellular disease such as cirrhosis
 - b. Portosystemic shunts
 - c. Obstructive cholestasis

- d. Functional cholestasis
 - e. Postprandial sample
259. Explain why a bile acid challenge test may be a better assessment of hepatic function than a fasting [BA].
260. List the three major processes that produce hyperammonemia.
261. Explain and recognize the pathogenesis of hyperammonemia that may be found with the following.
- a. Diffuse hepatocellular disease
 - b. Portosystemic shunts
 - c. Postprandial sample
 - d. Urea toxicosis in cattle
262. Explain why an ammonium tolerance test has better diagnostic sensitivity for hepatic insufficiency than a fasting ammonium concentration.
263. Explain why the following are not recommended.
- a. Serum bile acid concentration in an icteric animal that is not anemic or has a very mild anemia.
 - b. Plasma ammonium concentration for a sample that must be shipped to a reference laboratory.
264. By using results from the analysis of blood, serum, or urine, explain how we can differentiate hyperbilirubinemias due to hemolysis from those due to cholestasis (or anorexia in horses).
265. Interpret the following information.
- a. For dogs
 - 1) Serum ALP activity of 10xURL and serum bilirubin WRI
 - 2) Serum ALP activity of 10xURL and hyperbilirubinemia
 - 3) Serum ALP activity WRI and hyperbilirubinemia
 - b. For cats
 - 1) Serum ALP activity of 3xURL and serum bilirubin WRI
 - 2) Serum ALP activity of 3xURL and hyperbilirubinemia
 - 3) Serum ALP activity WRI and hyperbilirubinemia
 - c. For horses
 - 1) Serum GGT activity of 3xURL and a serum bilirubin WRI
 - 2) Serum GGT activity of 3xURL and a hyperbilirubinemia
 - 3) Serum GGT activity WRI and hyperbilirubinemia
266. Extra credit
- a. Icterus index (p 475)
 - b. Dye excretion tests (p. 484)