

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

Chapter 7: Proteins

119. Given pertinent historical or physical findings and serum or plasma protein concentrations,
 - a. List and 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.
120. Describe the common analytical methods for serum or plasma proteins (including units of measurement) and explain the purposes or potential values of the analytical procedures. Specifically,
 - a. List two methods of determining serum total protein concentration and recognize the major analytic principles of the methods.
 - b. State the common assay that is used to measure serum albumin concentration and recognize its major analytic principle.
 - c. State the common method that is used to determine serum globulin concentration.
 - d. List the two methods of measuring plasma fibrinogen concentration.
121. List and recognize the substances in plasma that can give falsely increased $[TP_{ref}]$.
122. List the 2 major processes that produce hyperproteinemia. For each, list the major pathologic states that produce the hyperproteinemia and explain the pathogenesis of the hyperproteinemia.
123. Compare and contrast polyclonal and monoclonal gammopathies including the diseases that produce them and the types of proteins found.
124. Define and describe Bence Jones proteins.
125. List the 4 major processes that produce hypoproteinemia. For each, list the major pathologic states that produce the hypoproteinemia and explain the pathogenesis of the hypoproteinemia.
126. List the 2 processes that produce a true hyperalbuminemia. State a cause of pseudohyperalbuminemia and briefly describe the reason for its occurrence.
127. List the 3 major processes that produce hypoalbuminemia. For each, list the major pathologic states that produce the hypoalbuminemia and explain the pathogenesis of the dysproteinemia.
128. List the 2 processes, and their associated pathologic states, that produce hyperfibrinogenemia.
129. List the 2 processes, and their associated pathologic states, that produce hypofibrinogenemia.
130. List and recognize the categories or types of disorders that cause these findings.
 - a. Hyperproteinemia due to a monoclonal gammopathy in either the β_2 or γ region
 - b. Hyperproteinemia due to a polyclonal gammopathy
 - c. Hyperproteinemia due to panhyperproteinemia
 - d. Hyperproteinemia due to increased α_2 globulins

- e. Hyperproteinemia with increased α_2 -globulins, a polyclonal gammopathy and concurrent hypoalbuminemia
 - f. Dysproteinemia with a normal [total protein], hypoalbuminemia, and a monoclonal gammopathy
 - g. Hyperproteinemia with hypoalbuminemia and hyperglobulinemia
 - h. Hyperproteinemia with hyperalbuminemia and hyperglobulinemia
 - i. Dysproteinemia with a normal [total protein], hypoalbuminemia, and hyperglobulinemia
 - j. Hypoproteinemia, hypoalbuminemia, hypoglobulinemia, and a regenerative anemia
 - k. Hypoproteinemia, hypoalbuminemia, hypoglobulinemia, and a microcytic hypochromic anemia
 - l. Hypoproteinemia, hypoalbuminemia, and proteinuria
 - m. Hypoproteinemia, hypoalbuminemia, and a small liver
 - n. Hypoproteinemia, hypoalbuminemia, and hypoglobulinemia in a clinically healthy 3-month-old calf
 - o. Hypoproteinemia and hypoalbuminemia in a dog with weight loss and chronic small bowel diarrhea
 - p. Hypoproteinemia and hypoalbuminemia in a cat with a neoplasm
131. Define the following and give one or two examples of each.
- a. Acute phase proteins
 - b. Positive acute phase proteins
 - c. Negative acute phase proteins
 - d. Delayed response proteins
 - e. M-proteins
132. Explain the differences between a selective and a non-selective hypoproteinemia; give examples of each in your explanations. Explain why an animal with a concurrent hypoalbuminemia and hypoglobulinemia may not have a non-selective hypoproteinemia or panhypoproteinemia.
133. Explain why an animal may develop hypoalbuminemia in the following conditions: inflammatory disease, hepatic insufficiency, malabsorption or maldigestion, cachectic states, malnutrition and starvation, marked hyperglobulinemia, external or internal hemorrhage, immune-complex glomerulonephritis or renal amyloidosis, small intestinal disorders, and thermal burn. Of these disorders, state those in which you expect to find concurrent hypoproteinemia.
134. Extra credit material
- a. PP:F or (TP:Fib)_p ratios (p. 270-271)
 - b. IgG (272-275)
 - c. SPE interpretations (Plate 5; between Chapters 3 & 4)