# Albumin/Globulin (Alb/Glob) Ratio

## Interpretive Summary

**Description:** The albumin/globulin ratio is the amount of albumin in the serum divided by the globulins. The ratio is used to try to identify causes of change in total serum protein.

### Decreased Albumin/Globulin Ratio

#### Common Causes

- Decrease in albumin (without decrease in globulins)
  - Decreased production
    - Severe liver disease
    - Compensatory (with hyperglobulinemia)
    - Maldigestion (EPI)
    - Inflammation (negative acute phase protein)
  - Increased loss
    - Protein-losing nephropathy (PLN)
    - Addison's disease
- Increased globulins (without increase in albumin)
  - Infection
  - Inflammation (especially chronic)
  - Neoplasia
    - Multiple myeloma/other plasma cell tumors
    - Some lymphomas

#### Uncommon Causes

- Decreased albumin (without decrease in globulins)
  - Decreased production
    - Compensatory (with hyperglobulinemia)
    - Small intestinal disease (malabsorption)
    - Maldigestion (EPI)
    - Malnutrition
    - Neonates
  - Increased loss
    - Protein-losing enteropathy (PLE)
    - Protein-losing dermatopathy
- Increased globulin (without increase in albumin)
  - Parasitism (ectoparasites, heartworms)
  - Immune-mediated disease
  - Near-term during pregnancy
  - Lactation

#### Related Findings

- Decreased albumin
  - Liver disease
    - Increased or normal liver enzymes, increased bilirubin
    - Decreased BUN, cholesterol, glucose
    - Increased fasting and post prandial bile acids and fasting ammonia
  - Small intestinal disease/PLE
    - Decreased or increased folate, decreased cobalamin
  - EPI

        - Decreased TLI
    - Protein-losing nephropathy
        - Increased urine protein:creatinine ratio
        - Dilute urine
        - Increased BUN, creatinine, phosphorus with secondary tubular damage
        - Systemic hypertension
    - Addison's disease
        - May have decreased sodium and chloride, increased potassium, decreased Na:K ratio
        - Lack of a stress leukogram on CBC
        - Low baseline cortisol, abnormal ACTH stimulation test
- Increased globulin
    - Infection
        - Positive bacterial/fungal culture
        - Positive serology/PCR for other infectious agents
    - Inflammation (especially chronic)
        - Inflammatory leukogram, monocytosis
    - Neoplasia
        - Monoclonal gammopathy on serum protein electrophoresis
        - Monoclonal gammopathy on urine protein electrophoresis/Bence Jones proteinuria (myeloma)
        - Hypercalcemia
        - Bone lesions on radiographs (myeloma, mostly in dogs)
        - Abnormal cytology/histopathology on masses, enlarged lymph nodes, bone, bone marrow

## Increased Albumin/Globulin Ratio

### Common Causes

- Increased albumin/globulin ratio is not a common finding
- Artifact:  hemolysis resulting in increased albumin with some methodologies

### Uncommon Causes

- Increased albumin
    - Hemoconcentration (rare without concurrent increase in globulins)
- Decreased globulin
    - Neonates (failure of passive transfer of colostrum)
    - Decreased production
        - Severe combined immunodeficiency disease (SCID)
        - Agammaglobulinemia, transient hypogammaglobulinemia

### Related Findings

- Increased albumin due to hemoconcentration
    - Increased hematocrit
    - Rarely seen without increased globulin
- Decreased globulin
    - Rarely seen without decreased albumin.
    - Most conditions that cause low globulins are related to increased loss from the body and there is concurrently decreased albumin

## Additional Information

### Physiology

- The albumin/globulin ratio is a calculated value.
- The albumin/globulin ratio is used to try to identify causes of change in total serum protein. It will go out of the normal range if one component increases or decreases relative to the other. Hence it is important to look at changes in the individual components (albumin and globulins) as well as the ratio.
- The albumin/globulin ratio remains constant (in the normal range) if both protein components of the blood change together. This occurs with:
    - Loss of both albumin and globulin
        - Acute blood loss
        - Exudative skin disease
        - Gastrointestinal disease
        - Acute vasculitis or third space loss
    - Dehydration (increased albumin and globulin)
    - Hemodilution (decreased albumin and globulin)

### References


- Ettinger SJ, Feldman EC, eds. *Textbook of Veterinary Internal Medicine*, 6th ed. St. Louis, MO: Elsevier Saunders; 2005.
- Kaneko JJ, Harvey JW, Bruss ML. *Clinical Biochemistry of Domestic Animals*, 6th ed. San Diego, CA: Academic Press; 2008.
- 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.


Last updated 11/1/2013