

Globulin

Interpretive Summary

Description: Globulins are produced in the liver and also by the cells of the immune system (gamma globulins). They have many vital roles in the body including maintenance of osmotic balance, immune system function, and the inflammatory response.

Decreased Globulin

Common Causes

- Hemorrhage (external especially)
- Gastrointestinal disease
 - Protein losing enteropathy (PLE)
 - Parasitism
 - Maldigestion/malabsorption (small intestinal disease)
- Pancreatic disease leading to maldigestion (EPI)

Uncommon Causes

- Failure of passive transfer of colostrum (neonates)
- Congenital
 - Severe combined immunodeficiency disease (SCID)
 - Arabian foals
 - Also seen in other animals
 - Agammaglobulinemia
 - Selective IgM, IgA, and IgG deficiencies
- Transient hypoglobulinemia
- Severe malnutrition
- Severe liver disease

Related Findings

- Hemorrhage
 - Decreased albumin and total protein
 - Albumin:globulin ratio (A:G ratio) is normal
 - Regenerative anemia
- Gastrointestinal disease
 - Decreased albumin and total protein
 - Albumin:globulin ratio (A:G ratio) is normal
 - Positive fecal floatation
 - Increase or decreased folate, decreased cobalamin
- Exocrine pancreatic insufficiency (EPI)
 - Decreased trypsin-like immunoreactivity (TLI)

Increased Globulin

Common Causes

- Hemoconcentration
- Inflammation
 - Chronic inflammatory disease
 - Acute phase reactant proteins
- Infection

- Bacterial
- Viral (feline infectious peritonitis [FIP])
- Fungal
- Rickettsial (e.g. ehrlichiosis)
- Protozoal
- Neoplasia
 - Plasma cell myeloma (“multiple myeloma”)
 - Extra medullary plasma cell tumor
 - Some lymphomas (especially B-cell lymphoma)

Uncommon Causes

- Parasitism
 - Ectoparasites
 - Heartworms
- Immune-mediated diseases
- Compensatory
 - For decreased albumin
- Near-term pregnancy
- Lactation

Related Findings

- Hemoconcentration
 - Increased total protein and albumin
 - Increased hematocrit
 - Increased BUN and creatinine, possibly increased phosphorus
 - Increased urine concentration
- Inflammation
 - Inflammatory leukogram on CBC
 - Serum protein electrophoresis (SPE) shows
 - Increased alpha globulins (acute phase proteins)
 - Polyclonal gammopathy
- Infection
 - Positive cultures for bacterial and fungal disease
 - Positive serology/PCR for fungal, heartworm, viral, rickettsial, protozoal disease
- Neoplasia
 - Myeloma/plasma cell tumors
 - Hypercalcemia
 - Monoclonal gammopathy on SPE
 - Bence Jones protein in urine
 - Abnormal cytology or biopsy of masses, bone lesions, bone marrow
 - Lytic bone lesions (dogs>cats)
 - Lymphoma
 - Hypercalcemia
 - Monoclonal gammopathy on SPE (rare)
 - Abnormal cytology or biopsy of masses, lymph nodes, bone lesions, bone marrow
 - Positive PCR for lymphocyte clonal receptor rearrangement
 - Clonal expansion on immunophenotyping (flow cytometry) on blood/lymph nodes

Additional Information

Physiology

- Alpha- and beta-globulins are produced by the liver. Cells of the immune system such as B lymphocytes and plasma cells make gamma-globulins.
- Globulins have a wide variety of functions in the body. These include:
 - Binding and transporting various molecules
 - Inactivating proteases (anti-inflammatory role)
 - Acute phase proteins (inflammatory role)
 - Immune response (antibodies)
 - Maintenance of colloidal osmotic pressure, along with albumin
 - Enzyme components
 - Pro-coagulants and anti-coagulants

References

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