

# Bilirubin (Urine)

## Interpretive Summary

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**Description:** Bilirubinuria is an indicator of conjugated bilirubin in the urine. Excessive bilirubinuria in a dog or any bilirubinuria in a cat is an indication to evaluate serum bilirubin concentrations.

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### Decreased Bilirubin

#### Common Causes

- Normal
- Artifact
  - Exposure to UV light or room air
  - Delayed analysis
  - Centrifugation of urine prior to analysis
  - Ascorbic acid (Vitamin C)

### Increased Bilirubin

#### Common Causes

- Normal dogs (especially males with concentrated urine)
- Liver disease, bile duct obstruction
- RBC destruction (hemolysis)
  - Immune-mediated hemolytic anemia
  - Zinc or onion toxicity
  - RBC parasites

#### Uncommon Causes

- Hemoglobinuria
- Fever
- Prolonged anorexia
- False positive reactions due to medications
  - Phenothiazines (e.g., chlorpromazine)
  - Etodolac

#### Related Findings

- Liver disease, biliary obstruction
  - Increased serum bilirubin, ALT, ALP, GGT, AST
  - Increased serum bile acids
  - Decreased albumin, cholesterol, BUN and glucose in severe cases
  - Abnormalities in liver and/or biliary tract on abdominal ultrasound
- RBC destruction
  - Decreased hematocrit, RBC, hemoglobin
  - Increased reticulocytes, increased MCV and decreased MCHC, polychromasia
  - Increased serum bilirubin
  - Spherocytosis (in dogs), autoagglutination
  - Hemoglobinuria
  - Positive Coombs or saline agglutination test may or may not be present with IMHA

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## Additional Information

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### Physiology

- Conjugated bilirubin passes freely through the glomerular filtration barrier and is excreted in urine.
- Unconjugated bilirubin is bound to albumin and does not normally pass through the glomerular filtration barrier. Therefore, it is not detectable in urine (unless albuminuria or glomerular disease is present).
- Bilirubinuria usually precedes hyperbilirubinemia and icterus
- Dogs: Clinically normal dogs (especially males) may have detectable bilirubinuria in concentrated urine due to a low renal threshold for bilirubin.
  - Canine renal tubular epithelial cells can also produce conjugated bilirubin from resorbed hemoglobin (hemoglobinuria).
- Cats: Normally do not have detectable bilirubinuria so any positive result is significant

### Diagnostic Methodology

- Bilirubin is detected with a diazonium salt reagent
  - More sensitive for conjugated bilirubin; insensitive to unconjugated bilirubin
- Dipstick (reagent strips)
  - False positives and false negatives possible
- Ictotest (tablet test)
  - Higher sensitivity compared to dipstick
    - Often used to confirm dipstick results
  - False positives and false negatives possible

### References

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