Copper Toxicosis

What is Copper Toxicosis

Copper is an important trace mineral involved in many bodily functions, including the nervous system, skin health and respiration. The liver helps regulate copper levels. When copper accumulates excessively, it becomes toxic and causes liver inflammation and chronic hepatitis. This condition is known as Copper Toxicosis or Copper Storage Disease (CSD). If untreated, chronic hepatitis can progress to cirrhosis, which may be fatal.

Symptoms

Clinical signs typically only appear after significant liver damage – typically when **two-thirds of the liver is no longer functioning**. Symptoms may include decreased appetite, weight loss, jaundice, fever, diarrhea, increased thirst, abdominal pain and bleeding tendencies.

The more advanced the disease, the harder it is to treat effectively.

Early Detection

Copper toxicosis is often discovered incidentally when routine bloodwork shows an increase in ALT (Alanine Transaminase), a liver enzyme that rises with liver injury. ALT may still fall within the "normal" range even when trending upward.

Your veterinarian may recommend an abdominal ultrasound to rule out other causes of elevated ALT. In copper toxicosis, ultrasound findings may be normal until the disease is advanced.

If copper toxicosis is suspected, the **only definitive diagnostic test is a histological liver biopsy**. Needle biopsies do not collect enough tissue to accurately measure copper levels or assess inflammation.

My Dog's ALT has been rising, what's next?

The ALT rises with any liver damage, which does not indicate the actual problem with the liver.

Your veterinarian might recommend an ultrasound of the abdomen to determine if there are other reasons for the elevated ALT. With Copper Toxicosis, the ultrasound may come back normal, depending on how far along the disease has progressed.

If your veterinarian suspects copper toxicosis then a histological liver biopsy must be done to verify (this cannot be done via a needle biopsy). A piece of the liver must be taken and sent to a lab for processing.

Written by Ruth Thompson

Copper Toxicosis

Liver Biopsy Results

Normal liver copper levels range from 130 – 400 ppm. In the study of Labrador Retrievers, levels as high as 5084 ppm were reported.

Pathologists also assign a copper score from 0 to 5, with scores greater than 2 considered abnormal.

What happens next

Once copper toxicosis is confirmed, treatment focuses on removing excess copper and preventing re-accumulation.

Chelation therapy: The primary medication is D-penicillamine, which binds to copper and allows it to be excreted in urine. Treatment duration depends on the measured copper level.

Dietary management: A low-copper diet reduces ongoing copper intake. After chelation, veterinarians may add zinc, which helps block copper absorption.

Monitoring: A repeat liver biopsy 6–12 months after treatment may be recommended to evaluate how quickly copper is returning to the liver.

Source Material

The Functional Dog Collaborative Podcast, March 25, 2025, Episode 68 with Dr. Hille Fieten, Copper Toxicity. The Functional Breeding Podcast.

Listen to the podcast here: *https://podcasts.apple.com/ca/podcast/dr-hille-fieten-copper-toxicity/id1513602865?i=1000700773087*

The Veterinary Journal 311 (2025) 106335
Serum miR-30b is increased in Labrador Retrievers with elevated copper levels
Yara S. Roelen [a], Bart Spee [b], Monique E. van Wolferen [b], Hille Fieten [b], Elise R. den Boer [b]
[a] Anicura 'De Tweede Lijn', Zwolle, the Netherlands
[b] Department of Clinical Sciences, Faculty of Veterinary Medicine, Utrecht University, the Netherlands

This handout is for educational purposes only and does not replace professional veterinary advice.