

Harmful Algal Bloom Facts for Veterinarians

Cyanobacteria (Blue-green Algae)

Cyanobacteria, commonly known as blue-green algae, are frequently found in freshwater systems. The bacteria prefer calm, sunny weather conditions, nutrient-rich water, and water temperatures higher than 75° F. When conditions are right, the bacteria can multiply rapidly, creating a bloom. Cyanobacterial blooms are often described as looking like pea soup or spilled green paint. They are often found on the downwind side of a lake or in a secluded bay or shoreline. Blooms are not always large and dense and can sometimes cover small portions of a lake with little visible algae. Blooms can also produce a swampy odor when the cells decompose.

Cyanotoxins and Harmful Algal Blooms (HABs)

Cyanobacteria can produce toxins, called cyanotoxins that primarily affect the liver or nervous system. Exposure to cyanotoxins has been associated with illness in humans and severe illness and death in animals, most commonly dogs and cattle. While not all cyanobacterial blooms produce toxins, it is impossible to tell if a bloom is toxic or not just by looking at it. Because of their harmful impacts on health, cyanobacteria blooms are often referred to as harmful algal blooms (HAB).

HABs in Minnesota

Cyanobacteria have been found in lakes everywhere in Minnesota, but are most common in warm, shallow, nutrient-rich lakes often found in central and southern Minnesota. Blooms usually occur during summer and early fall, but can occur other times of the year if conditions are right. Microcystin is the primary cyanotoxin detected in Minnesota lakes. Other cyanotoxins, including anatoxin-a and cylindrospermopsin have also been detected.

Exposure

Animals can be exposed when they drink from, swim in, or lick fur or hair containing toxic water or algae. Animals are more likely than humans to be exposed because they do not always avoid entering and ingesting green, foul-smelling water.

Clinical Features

Symptoms and severity vary depending on the toxin and dose the animal was exposed to. Animal deaths related to microcystin and anatoxin-a exposure have been reported in Minnesota. See the table, "Veterinary Reference for Cyanotoxin Exposures," on page 3 for toxin-specific information.

Treatment Options

There are no specific antidotes to these toxins. Treatment is symptomatic and supportive. Inducing vomiting within the first 2 hours of ingestion can help minimize absorption of ingested toxins. Activated charcoal slurry may be useful to bind toxins in the gut and reduce absorption. Liver function should be monitored, and animals should be aggressively treated with fluids and corticosteroids to support liver function and prevent shock. Neurologic symptoms may require seizure control and ventilator support. Case reports have suggested that cholestyramine may be effective at treating microcystin poisoning, but this treatment is considered experimental. Milk thistle (*Silybum marianum*) has also been used intravenously for general liver protection; this is also experimental.

Prevention Measures

There is no way to tell if a blue-green algal bloom is toxic just by looking at it. People and animals should avoid contact with water with blue-green algae. The risk of illness after a bloom goes away is low; however, toxins can persist in the water after the bloom has cleared up. Watch for signs of recent blooms, such as green scum on the shoreline and keep animals from eating debris that has washed up on the shore. Caution should always be taken when a bloom occurs. Advise your clients, **“When in doubt, stay out.”** Animals that go into water where a bloom may be should be washed off with fresh water immediately. If an animal becomes ill, veterinary care should be sought as soon as possible.

Reporting

To better understand the incidence and geographic distribution of HAB-related illnesses in Minnesota, **we request veterinarians report confirmed and suspected cases of HAB-related illness to the MDH Waterborne Diseases Unit.** Identification and reporting of animal cases can also help identify a toxic bloom and prevent future animal and human illnesses.

Complete a Veterinary HAB Small or Large Animal Reporting Form available at: <http://www.health.state.mn.us/divs/idepc/diseases/hab/vet/index.html>. Report cases by phone to 651-201-5414 or 877-676-5414 or by fax to 651-201-5743.

Veterinary Reference for Cyanotoxin Exposures

Toxin	Exposure Route	Onset to Symptoms	Likely Symptoms	Differential Diagnosis	Possible Laboratory or Other Findings
Hepatotoxins Cyindrospermopsins Microcystins Nodularins	Ingestion	Minutes to days	<ul style="list-style-type: none"> • Acute depression • Weakness & incoordination • Loss of appetite • Excessive drooling • Vomiting & diarrhea • Abdominal tenderness • Jaundice • Dark urine 	<ul style="list-style-type: none"> • Acetaminophen • Nonsteroidal anti-inflammatories • Aflatoxin • Mushrooms • Sago/cycad palm • Metals: copper, zinc, iron • Xylitol (dogs only) • Rodenticides • Other hepatotoxins 	<ul style="list-style-type: none"> • Elevated bile acids & liver enzymes • Hypoglycemia • Hyperkalemia • Proteinuria • Prolonged clotting times • Presence of toxin in biological specimens (liver, stomach contents, stool) collected from animals that became ill • Blue-green staining of fur or hair
Neurotoxins Anatoxin-a Anatoxin-a(s) Saxitoxins	Ingestion	Minutes to hours	<ul style="list-style-type: none"> • Excessive drooling • Apprehension & anxiousness • Vomiting • Muscle twitching • Seizures • Respiratory failure 	<ul style="list-style-type: none"> • Organophosphates • Carbamates • Chlorinated hydrocarbon • Bromethalin • Metaldehyde • Mushrooms • Other neurotoxins 	<ul style="list-style-type: none"> • Presence of toxin in biological specimens (stomach contents, urine, serum) collected from animals that became ill • Blue-green staining of fur or hair
Dermatotoxins Aplysiatoxin Lyngbyatoxin-a	Skin contact	Minutes to hours	<ul style="list-style-type: none"> • Rash • Hives • Allergic reaction 	<ul style="list-style-type: none"> • Other dermal allergens 	<ul style="list-style-type: none"> • Blue-green staining of fur or hair

Notes: Information about health effects from exposure to cyanobacteria and toxins is derived from reports of animal poisonings. For more information, see the Merck Veterinary Manual.

Minnesota Department of Health
 Waterborne Diseases Unit
 PO Box 64975
 St. Paul, MN 55164
 651-201-5414 or 1-877-676-5414
www.health.state.mn.us

To obtain this information in a different format, call: 651-201-5414.