

Blue-Green Algae: A Veterinarian Reference

IDENTIFYING ILLNESS DUE TO BLUE-GREEN ALGAE

✓ Exposure History ✓ Clinical Signs ✓ Diagnosis ✓ Treatment ✓ Reporting

DESCRIPTION OF THE PROBLEM

Blue-green algae (also known as cyanobacteria) are non-pathogenic photosynthetic bacteria that grow in outdoor water bodies and produce toxins such as microcystins, cylindrospermopsin and anatoxin-a. They can grow quickly and form large blooms, especially in warm weather.

Scope of the problem in California:

- Toxic blooms occur throughout California and are increasing in number, frequency and severity.
- Dog and livestock deaths in California have been linked to blue-green algal toxins.

EXPOSURE

Animals can be exposed to blue-green algae and its toxins by:

- Contacting any infected water body including lakes, rivers, ponds, etc. Because animals are attracted to blue-green algae, they drink the water and eat algal material. Dogs in particular lick algae caught in their fur after being in the water.
- Consuming water and algae from residential pools or decorative ponds.
- Ingesting blue-green algae health supplements.

CLINICAL SIGNS, DIAGNOSIS and TREATMENT: See page 2. *Limited funding may be available to cover physical examination of ill dogs with suspected poisoning (see page 3).*

BIOSPECIMEN COLLECTION, HANDLING and SHIPPING: See pages 3 and 4. *Limited funding may be available to collect and analyze some of the suggested canine specimens (see page 3).*

REPORTING: Reporting confirmed or suspected cases will help prevent other animal and human exposures to blue-green algal toxins. Please complete the Illness Information Section on the Report Form available at <https://drinc.ca.gov/cyanohab/>. For questions call the State Water Resources Control Board at (844) 729-6466.



From the California Cyanobacteria and Harmful Algal Blooms Network. For more information see: www.mywaterquality.ca.gov/habs/

Prepared by:



OEHHA
SCIENCE FOR A HEALTHY CALIFORNIA



Blue-Green Algae Poisoning Veterinary Reference

EXPOSURE HISTORY	CLINICAL SIGNS	DIFFERENTIAL DIAGNOSIS	LABORATORY DIAGNOSTICS	TREATMENT OPTIONS
<p>Access to any outdoor water body up to 48 hours prior to onset of symptoms. Includes bays, lakes, rivers, streams, ponds, etc. Also includes residential pools and ponds containing algae.</p> <p>Potential for ingestion of water or algal material (including dried material near shore or on land). Includes cleaning algae off fur.</p> <p>Ingestion of blue-green algae health supplements.</p>	<p>Hepatotoxin (microcystin) <i>Onset within minutes to days:</i></p> <ul style="list-style-type: none"> • Vomiting, diarrhea • Lethargy, depression, anorexia • Jaundice, abdominal tenderness • Dark urine, tarry stools 	<p>Acetaminophen overdose; rodenticide, mushroom toxin, aflatoxin and other hepatotoxin poisonings, other hepatopathy</p>	<p>Elevated ALP, AST, ALT, GGT, bile acids, bilirubin</p> <p>Coagulopathy</p> <p>Hypoglycemia</p> <p>Hypoproteinemia</p> <p>Toxin present in clinical specimens[†]</p>	<p>Remove access to contaminated water, clean fur</p> <p>Emesis induction and oral activated charcoal slurry may be helpful</p> <p>Oral cholestyramine has been effective up to 7 days post exposure[‡]</p> <p>Cyclosporin A, rifampin and intravenous silybinin may be helpful*</p> <p>Supportive therapy</p>
	<p>Nephrotoxin, hepatotoxin (cylindrospermopsin) <i>Onset within minutes to days:</i></p> <ul style="list-style-type: none"> • Similar to microcystin and • Excessive thirst • Increased urination • Ataxia 	<p>NSAID overdose, ethylene glycol, grape/raisin ingestion, other nephrotoxin poisonings, other nephropathy or hepatopathy</p>	<p><i>Similar to microcystin and</i></p> <p>Proteinuria, glycosuria, hematuria</p> <p>Elevated BUN and creatinine</p> <p>Hypokalemia</p> <p>Toxin present in clinical specimens[†]</p>	<p>Remove access to contaminated water, clean fur</p> <p>Emesis induction and oral activated charcoal slurry may be helpful</p> <p>Supportive therapy</p>
	<p>Neurotoxin (anatoxin-a) <i>Within minutes to hours:</i></p> <ul style="list-style-type: none"> • Ataxia • Seizures, paralysis • Respiratory arrest, sudden death 	<p>Pesticide poisoning, mycotoxins penitrem A and roquefortine, other toxin poisoning, myasthenia gravis</p>	<p>Toxin present in clinical specimens[†] (Anatoxin-a can be measured in serum and urine)</p>	<p>Remove access to contaminated water, clean fur</p> <p>Emesis induction and oral activated charcoal slurry may be helpful</p> <p>Supportive therapy</p> <p>Artificial ventilation</p>
<p>Skin contact with water bodies containing blue-green algae or toxins.</p>	<p>Dermal toxins <i>Within minutes to hours:</i></p> <ul style="list-style-type: none"> • Rash, hives • Allergic reaction 	<p>Other dermal allergens</p>		<p>Remove algae and clean fur</p>

[†]Stomach, rumen or GI contents, water and, for anatoxin-a only, serum and urine. See the following pages for details. Necropsy is encouraged when applicable.

[‡]Rankin et al., 2013, *Toxins*, 5, 1051-63 (78.4 mg/lb, mixed with water, PO, q 24 h).

*Merck Veterinary Manual

ANIMAL BIOSPECIMEN COLLECTION, HANDLING & SHIPPING

DOMESTIC ANIMALS – DIAGNOSTIC TESTING OF TISSUES FROM ANIMALS WITH SUSPECTED BLUE-GREEN ALGAE TOXICOSIS IS AVAILABLE AT THE CALIFORNIA ANIMAL HEALTH & FOOD SAFETY LABORATORY SYSTEM (CAHFS), WITH THE EXCEPTION OF SMALL ANIMAL LIVER HISTOPATHOLOGY (SEE THE TABLE ON THE NEXT PAGE)

For current fees & analysis turn-around times: contact CAHFS - <http://cahfs.ucdavis.edu> or (530) 752-8700.

Live Animal: For biological specimen submission, download and complete the [standard CAHFS submission form](#). See text below for possible funding.



Specimen	Minimum Amount	Preservative	Submit for	Cost (3/2017)	Comments*
Stomach contents if available	100 g	Chilled/frozen	Toxin analysis	\$125-150	Vomitus or gastric lavage prior to charcoal administration
Serum	5 mL	Chilled/frozen	Toxin analysis	\$125-150	Anatoxin-a only
Urine	20 mL	Chilled/frozen	Toxin analysis	\$125-150	Anatoxin-a only
Water	1 L	Chilled/frozen	Toxin analysis	\$125-150	From algal bloom site – include some algal scum if available

*Turn-around time for analysis is approximately 10-14 days for all samples. Contact CAHFS staff for current information. Submit samples on ice for overnight delivery to CAHFS.

Potential Funding Source for Canine Cases: *For California Veterinary Medical Association members ONLY when testing is conducted at CAHFS.* Funding may be available to cover costs of all the following:

- live canine physical examination
- canine necropsy at your clinic
- algal toxin analysis
- canine clinical specimen collection
- specimen shipment to CAHFS

Apply for funding by completing the Illness Information Section of the Freshwater Bloom Incident Report Form at <https://drinc.ca.gov/cyano hab/>

Dead Animal: Necropsy

Necropsy is highly recommended to assist diagnosis. For necropsies done at a private veterinary clinic, include on the CAHFS submission form the description of any gross abnormalities. CAHFS will conduct large animal necropsies and histopathology. CAHFS does not conduct canine histopathology (see next page for alternatives).

Contact CAHFS (530-752-8700, <http://cahfs.ucdavis.edu>) for non-livestock species necropsy availability, cost and turn-around time. CAHFS does not return carcasses to owners post-necropsy.

Dead Animal: For specimen submission download and complete the [standard CAHFS submission form](#).

Specimen	Minimum Amount	Preservative	Submit for	Cost (3/2017)	Comments*
Stomach, rumen or GI contents	100 g	Chilled/frozen	Toxin analysis	\$125-150	
Serum	5 mL	Chilled/frozen	Toxin analysis	\$125-150	Anatoxin-a only
Urine	20 mL	Chilled/frozen	Toxin analysis	\$125-150	Anatoxin-a only
Water	1 L	Chilled/frozen	Toxin analysis	\$125-150	From algal bloom site – include algal scum, if available
Liver	10 g	Formalin - do not freeze	Histo-pathology	Check with the lab	Include any lesions: Large animal – send to CAHFS Small animal – send to IDEXX, Antech or other private vet lab

* Analysis turn-around time is approximately 10-14 days for all samples. Contact CAHFS staff for current information.

For samples sent to CAHFS, submit samples on ice with overnight delivery.

For small animal liver samples, contact private lab such as: IDEXX — www.idexx.com/smallanimal/ or 888-433-9987

Antech — www.antechdiagnostics.com or 888-397-8378

NON-DOMESTIC ANIMALS - CAHFS CAN ANALYZE ONLY THE GASTRIC CONTENTS OF WILDLIFE SUSPECTED OF BLUE-GREEN ALGAE POISONING. Blue-green algal toxin analysis is not available through any other California State Agency at this time.

Download and complete the [standard CAHFS submission form](#).

Specimen	Minimum Amount	Preservative	Submit for	Cost (3-2017)	Comments
Stomach, rumen or intestinal contents	100 g	Chilled/frozen	Toxin analysis	\$125-150	Vomitus or gastric lavage prior to charcoal administration

Clinical Case Consultation

For additional assistance contact the ASPCA Animal Poison Control Center: (888) 426-4435. Available 24 hours/day, 365 days/year.

There is a \$65 consultation fee.

Technical information in this fact sheet was reviewed by veterinarians from the California Department of Public Health Veterinary Public Health Section, California Department of Food and Agriculture Animal Health Branch and CAHFS Toxicology Laboratory.