



# Cyanobacterial Blooms and Phosphorus In Utah Lakes



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## Why Does This Matter?

- Cyanobacteria blooms occur in lakes and depending on the species in the blooms may produce cyanotoxins causing neurological diseases, liver failure, or/and rashes.
- Cyanobacteria blooms tend to grow in areas with high amount of phosphorus; however, multiple factors may interact to generate blooms.

**Table 1.** Common cyanobacterial species in Utah lakes and the toxin they produce

Cyanobacteria	Toxins
<i>Dolichospermum flos-Aquae</i>	Nerutoxin
<i>Aphanizomenon flos-Aquae</i>	Nerotoxin, Dermatotoxin, Heptatoxin,
<i>Microcystis aeruginosa</i>	Nerotoxin, Dermatotoxin,
<i>Psuedanabaena species</i>	Nerutoxin Dermatotoxin, Heptatoxin
<i>Phormidium aormosum</i>	Nerutoxin, Dermatotoxin
<i>Nodularia spumigena</i>	Dermatotoxin, Heptatoxin
<i>Oscillatoria</i>	Neurotoxin, Hepatotoxins,

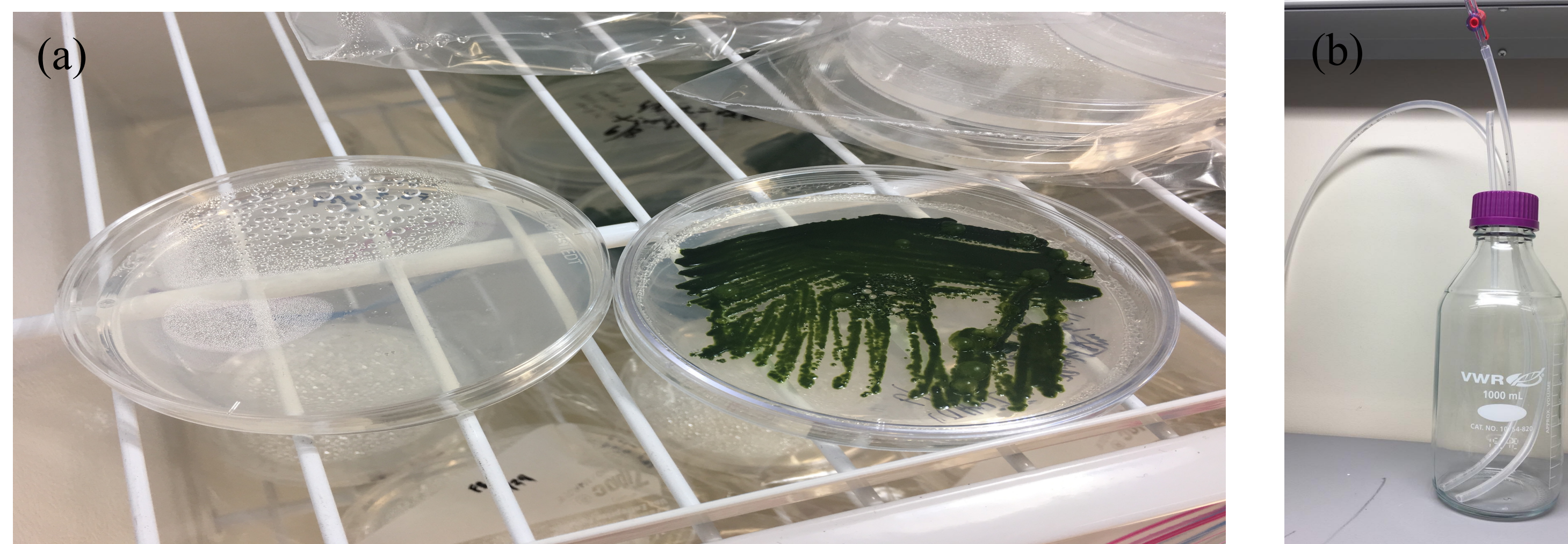
Neurotoxin-Damage to Brain; Heptatoxin- Damage to Liver; Dermatotoxin- Damage to Skin



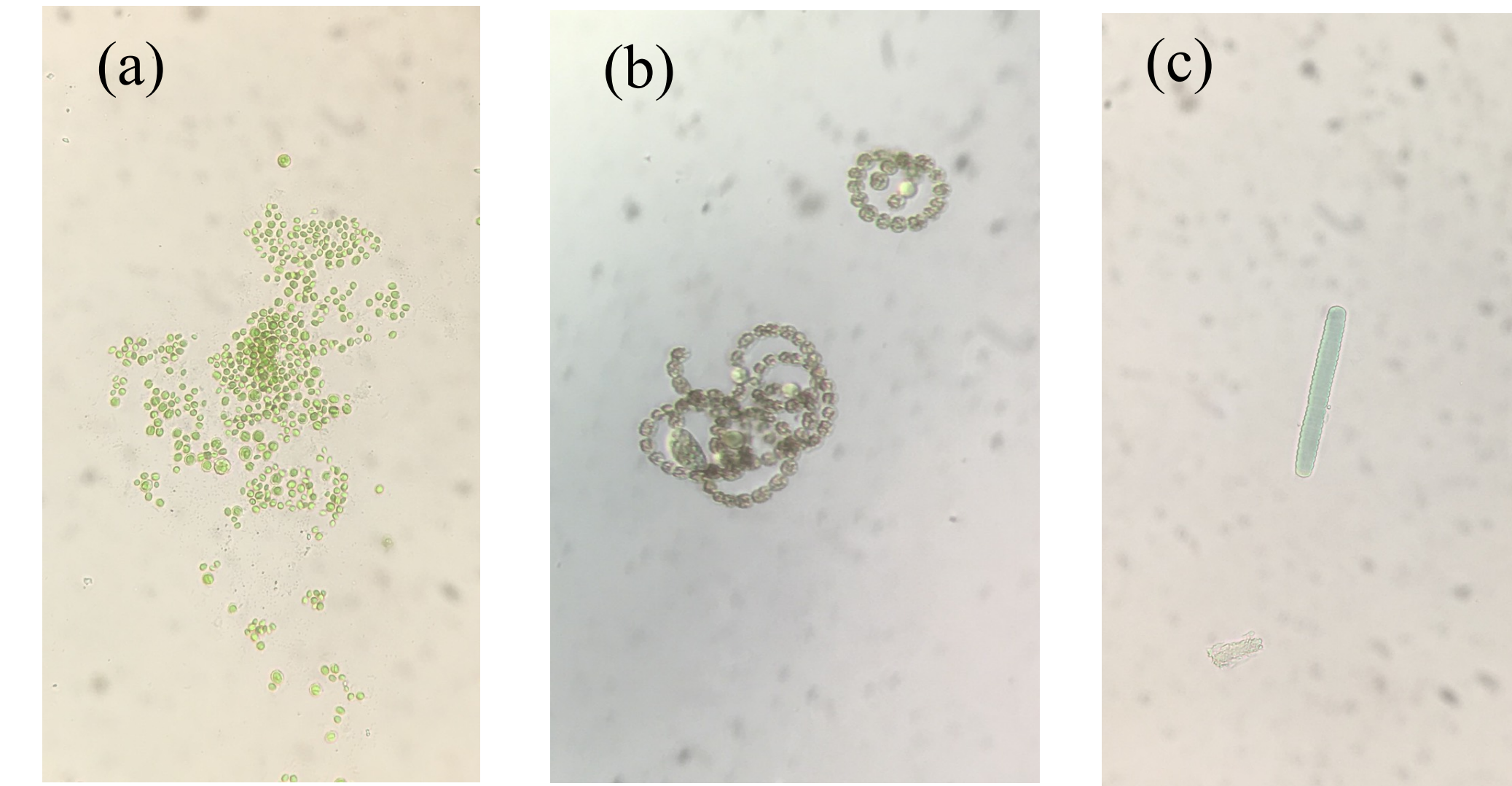
**Photo 1.** Cyanobacterial Bloom in Utah Lake

## Research Methods

- To identify cyanobacterial species, I isolated cyanobacteria from Utah Lake, Deer Creek, and Farmington Bay waters on BG-11 agar. I classified each species under the microscope using a key I created from green water laboratories.
- Currently, I am running individual cyanobacterial species under varying levels of phosphorus based on lake levels (0.01, 0.05, and 0.1) in microcosms.
- We will use chlorophyll A concentrations and 16S rRNA gene copy numbers via quantitative polymerase chain reaction to quantify cyanobacteria growth.



**Photo 2.** Cyanobacterial species growing on BG-11 agar (a) and microcosm (b)



**Photo 3.** *Microcystis* (a) *Dolichospermum flos-aquae* (b) and *Oscillatoria* (c) from recent blooms on Utah Lake

## Goals

- My research will identify the species-specific levels of phosphorus that trigger blooms.
- Our findings will help lake managers and the Utah Department of Water Quality to better predict blooms as phosphorus varies during the season and across lakes.



**Photo 4.** Sign at Utah Lake warning boaters about the toxins present.

**IFELLOWS UNDERGRADUATE RESEARCH PROGRAM**

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