

Harmful Algae

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Blue green algal (cyanobacterial) toxins, surface drinking water, and liver cancer in Florida

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Abstract

The blue green algae or cyanobacteria represent a diverse group of organisms that produce potent natural toxins. There have been case reports of severe morbidity and mortality in domestic animals through drinking water contaminated by these toxins. Microcystins, in particular, have been associated with acute liver damage and possibly liver cancer in laboratory animals. Although, there has been little epidemiologic research on toxin effects in humans, a study by [Yu \(1995\)](#) found an association between primary liver cancer and surface water. Surface water drinking supplies are particularly vulnerable to the growth of these organisms; current US drinking water treatment practices do not monitor or actively treat for blue green algal toxins including the microcystins.

After a monitoring survey in Florida found organisms and microcystins (among other cyanobacterial toxins) in surface water drinking sources, a pilot ecological study was performed using a Geographic Information System (GIS) to evaluate the risk of primary hepatocellular carcinoma (HCC) and proximity to a surface water treatment plant at cancer diagnosis. The study linked all HCC cancers diagnosed in Florida from 1981 to 1998 with environmental databases.

A significantly increased risk for HCC with residence within the service area of a surface water treatment plant was found compared to persons living in areas contiguous to the surface water treatment plants. However, this increased risk was not seen in comparison to persons living in randomly selected ground water treatment service areas or compared to the Florida cumulative incidence rate for the study period, using various comparison and

GIS methodologies. Furthermore, these findings must be interpreted in light of significant issues of latency, high population mobility, and the lack of individual exposure information. Nevertheless, the issue of acute and chronic human health effects associated with the consumption of surface waters possibly contaminated by blue green algal toxins merits further investigation.