



Research: Health Effects Associated with Inhaled Florida Red Tide Toxins

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Disease/Condition: Impaired Immune Function

Florida Red Tides occur in the Gulf of Mexico almost annually and less frequently in the Atlantic, from Florida to North Carolina. Generally Red Tides occur in the late fall and winter seasons, and it also is associated with an influx of seasonal and generally aged visitors to Florida. The marine algae responsible for this Florida Red Tide produces a family of extremely potent neurotoxins, called brevetoxins, that can be aerosolized by the action of wind and surf. People living or working near beaches during a Florida Red Tide event may experience tearing and coughing when winds blow the toxins onshore. Asthmatic individuals may experience an attack. Further, epidemiological studies have shown an increase in incidence of admission to emergency rooms for pulmonary symptoms during Red Tide events, compared to the same seasonal time period when no Red Tide was present.

Our laboratory participates in a Program Project awarded by the National Institutes of Environmental Health Sciences to examine the health effects of inhaled Florida Red Tide. Our research focus is to examine the possible long-term consequences associated with inhalation exposure to the Florida Red Tide toxins. Our studies in rats suggested that repeated brevetoxin inhalation may impair immune function. Recently, we examined the effects of repeated brevetoxin inhalation on the ability of the lung to respond to infection with human influenza A. Rats were exposed to the toxin for 2 hours per day for 6 days, challenged with influenza, and then exposed to the toxin for an additional 7 days. Our data showed that in animals not inhaling brevetoxin, influenza was almost totally cleared from the lung 7 days after infection. However, significantly more virus was present in the lungs of animals that had inhaled brevetoxin. These animals also had more lung inflammation remaining at 7 days compared with animals not inhaling brevetoxin. The results suggest that brevetoxin exposure may slow the recovery from influenza infection. The consequences are of importance considering that Red Tides occur at approximately the same time as seasonal flu and seasonal visitors to the area.