

Brevetoxin Accumulation in Fish: Toxin and Toxicity Assessment for Potential Human Health Threat

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by

University of North Carolina, Wilmington
Center for Marine Science
and

Florida Fish and Wildlife Research Institute

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Personnel

- **Jerome Naar, PhD: PI, Center for Marine Science, UNCW**
- **Jan Landsberg, PhD: Co-PI, Florida Fish and Wildlife Research Institute**
- **Leanne Flewelling, MS: Co-PI, FWRI**
- **Daniel Baden, PhD: UNCW**
- **Karen Steidinger, PhD: FWRI**

Objectives

- **Assess presence of brevetoxins in fish during and after red tides in Florida**
- **Identify brevetoxins and/or brevetoxin metabolites in fish tissue**
- **Evaluate toxicity of the brevetoxins and/or brevetoxin metabolites found in fish tissue**
- **Assess the toxicity of fish collected during and after red tide for potential human health threat**
- **Identify toxins (ciguatoxins vs. brevetoxins) in fish implicated in suspected cases of ciguatera**

Year 1 Accomplishments

- **Findings**

- Ichthyotoxicity of brevetoxin in solution (e.g. fish kill during red tides) does not preclude toxin accumulation in fish by dietary transfer
- Carnivorous and herbivorous/planktivorous fish can accumulate toxins when feeding on contaminated food source (i.e. shellfish, *K. brevis* cells)
- Toxins accumulated in fish tissues include parent brevetoxins and recently identified brevetoxin-metabolites
- Fish can accumulate toxic levels of brevetoxins in their tissues leading to marine mammal mortalities (i.e. dolphin mortality of 2004)

Year 1 Accomplishments

Neurotoxic Fish Poisoning, Mortality of 107 Dolphins, Spring 2004 St. Joe Bay, Florida Panhandle

Public Health Significance

Results reveal that fish have potential to accumulate high levels of brevetoxins in tissues and therefore, have potential to be a source of brevetoxicoses in higher trophic levels including humans. Mortality of sentinel species associated with neurotoxic fish poisoning clearly indicate public health significance of these findings



(photo credits & additional information, see: <http://www.nmfs.noaa.gov/>)

Year 1 Accomplishments

- **Public Health Significance**

Since only a single putative case of human exposure to brevetoxin via consumption of fish (whole planktivorous mullet caught during a *K. brevis* bloom) has been reported despite an annual occurrence of red tides in Florida, and since brevetoxin-related dolphin mortalities are rare, it is likely that brevetoxin accumulation and persistence in fish to such extent is a short-lived and unusual phenomenon. Nevertheless, these findings clearly identify a need to define the parameters leading to toxin accumulation or transfer in fish.

Remaining questions

- **What fish species are the most likely to present a human health threat (herbivorous/planktivorous vs carnivorous)?**
- **What environmental mechanism is leading to accumulation of high levels of brevetoxins in the edible tissues of fish?**
- **What is the risk of neurotoxic fish poisoning in humans?**

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FLORIDA DEPARTMENT OF
HEALTH



Aquatic Toxins Program
Division of Environmental Health
Bureau of Community Environmental Health
4052 Bald Cypress Way
Tallahassee, Florida 32399-1712