

# TOXICOLOGY AND APPLIED PHARMACOLOGY

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## Toxicity and toxins of the greater blue-ringed octopus *Hapalochlaena lunulata* from Ishigaki Island, Okinawa Prefecture, Japan

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**Statement of the Problem:** Bites by several species of octopuses cause not only pain in the area around the wound, but also occasionally also fatal lesions in humans due to a venom from their posterior salivary glands. The blue-lined octopus *Hapalochlaena fasciata*, lesser blue-ringed octopus *H. maculosa* and greater blue-ringed octopus *H. lunulata* are particularly famous for their toxicity, all of which are distributed in the tropical to subtropical zone. Ishigaki Island, Okinawa Prefecture, Japan is included in the subtropical zone. However, there is no information on the toxicity and toxins contained in the *H. lunulata*.

**Methodology & Theoretical Orientations:** Five specimens of *H. lunulata* collected in shallow coral and tide pool, Ishigaki Island in November, 2015 and 2016. They were dissected and examined on the anatomical distribution of the toxicity. Attempts were made to identify the paralytic toxins in the octopus. Paralytic toxins were partially purified by extraction with 0.1% AcOH and Sep-Pak C18 cartridge. The unbound toxic fraction was analyzed by selected ion-monitored LC-MS.

**Findings:** The maximum toxicity (as tetrodotoxin, TTX) was 9.276 MU/g for posterior salivary glands and 145.4 MU/g for the hepatopancreas (Table-1). One MU (mouse unit) is defined as the amount of toxin that can kills a ddY strain male mouse in 30 minutes after intraperitoneal injection. The toxin was identified as TTX as the main components along with 4-epi TTX, 4,9-anhydroTTX and 6-epiTTX.

**Conclusion & Significance:** A food poisoning incident including two victims due to ingestion of TTX-bearing octopus *H. fasciata* occurred in Taiwan on December, 2010. From food hygienic point of view, it is important to prevent accidental eating by misidentification of the toxic octopus as an edible octopus. To our knowledge, this is the first report on the toxicity and toxin compositions of the *H. lunulata* from Ishigaki Island, Okinawa Prefecture, Japan.

### Biography

Manabu Asakawa has expertise on biotoxins of hydrosphere accumulated over many years. He discovered toxic substance responsible for the food poisoning due to ingestion of gallbladders of cyprinid fish. He concluded that the structure of carp toxin to be 5 $\alpha$ -cyprinol sulfate (5 $\alpha$ -cholestane-3 $\alpha$ , 7 $\alpha$ , 12 $\alpha$ , 26, 27-pentol 26-sulfate).

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