Jellyfish Sting Newsletter

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Significant Papers Published

1. Zlotnick B.A., Hintz S., Park D.L., and Auerbach P.S. *Ciguatera* poisoning after ingestion of imported jellyfish: diagnostic application of serum immunoassay. Wilderness and Environmental Medicine 6:288-294;1995.

A 12-year-old Tongan female ingested a jellyfish (no tentacles) which had been imported from Samoa in a water jar one hour prior to the beginning of *ciguatera* poisoning. Nine other people also ate the jellyfish without symptoms. *Ciguatera* toxin was chemically isolated from the patient's serum. She recovered without sequelae.

2. Kaufman MB. Portuguese man-of-war envenomation. Pedi atric Emergency Care. 8:27-28, 1992.

A 14-year-old girl in southern Florida was stung by the Portuguese man-of-war. As she left the water, she dragged her right lower leg and subsequently had both motor and sensory deficit in that limb. The condition stabilized within six hours and spontaneously resolved within several weeks. Once again, this is a female who suffers from the neurologic defects.

3. Laing J.H.E. and Harrison D.H. Envenomation by the box - jellyfish - an unusual cause of ulnar palsy. J of the Royal Society of Medicine. 84;115-116:1991.

A 21-year-old British student was stung by *Chironex fleckeri* off Phuket, Thailand. The pain appeared across his back and on the right arm down to the elbow. He was initially treated for circulatory collapse but recovered with discoloration of his right elbow. The patient had both motor and sensory deficits and surgical exploration of the ulnar nerve at the elbow was carried out but a compression was not confirmed. Healing was progressive at least for four months.

4. Marques A.C., Morandini A. C. and Pinto M.M. Cnidome of *Chiropsalmus quadrumanus* (*Cnidaria, Cubozoa*) from Brazil. In Proceedings of VII Colacmar Congresso Latino-Americano Sobre Ciencias Do Mar 136-138;1997.

A description of the cnidome of the Brazilian variant of *Chiropsalmus quadrumanus* is included.

5. Morandini A. C. and Marques A. C. "*Morbaaka*" Syndrome: First Report of Envenomation by *Cubozoa* (*Cnidaria*) in Brazil. VII Colacmar Congresso Latino-Americano Sobre Ciencias Do Mar. 188-189;1997.

The first case of envenomation by the *morbaaka* jellyfish in Brazil is reported.

6. da Silveira F.L. and Morandini A. C. *Nausithoe aurea* n. sp. (*Scyphozoa*: *Coronatae*: *Nausithoidae*), a species with two pathways of reproduction after strobilation: sexual and asexual. Contributions to Zoology. 66:235-246;1997.

Both the sexual and asexual reproduction of phases of *Nausithoe* are described in this publication.

7. Sanchon C.G. Picaduras de medusas. Revista ROL de Enfermeria. 215-216:58-60;1996.

The Portuguese description of the diseases produced by medusae is included in this paper.

8. Kyburz D. A Case from practice jellyfish sting neurotoxic activity on the sensory nerves. Schweiz Rundsch Med Prax. 85:1596-1597;1996.

A 26-year-old female suffered from a jellyfish sting leaving her with pain and paralysis under the right arm, which spontaneously resolved.

9. Tahmassebi J.F. and O'Sullivan E.A. A case report of an unusual mandibular swelling in a 4-year-old child possibly caused by a jellyfish sting. International Journal of Pediatric Dentistry. 8:51-54;1998.

A 4-year-old female noticed swelling of the left lower jaw one week after being stung by a jellyfish in Greece. The British child noticed pain in addition to her swelling, both of which resolved within one week. Attempts to attribute this edema to other factors were ruled out by radiography.

10. Purcell J.E. Predation on fish larvae by *Physalia physalis*, the Portuguese man of war. Mar Ecol Prog Ser. 19:189-191,1984.

Physalia physalis was found to consume a tremendous amount of fish larvae as determined by stomach contents.

11. Purcell J.E. Pelagic *Cnidarians* and *Ctenophore*s as predators: Selective predation, feeding rates, and effects on prey populations. Am Inst. Oceanogr 73:125-137;1997.

Some *cnidarians* feed upon gelatinous species but others have more broader diets. Their prey depends upon size,

swimming speed, tentacle widths, spacing and water behavior. At high density, gelatinous predators can seriously affect the population of all planktons and may be detrimental to fish because of competition for food, as well as direct predation upon the fish eggs and larvae.

12. Little M. and Mulcahy R.F. Bites and Stings: A year's experience of Irukandji envenomation in far north Queensland. MJA 1998;169:638-641.

Envenomation by the Irukandji jellyfish (*Carukia barnesi*) can result in an array of systemic symptoms known as Irukandji syndrome. In 1996, 62 people presented with Irukandji envenomation: 57 developed systemic symptoms, and 38 required parenteral narcotics. All patients were discharged home within 24.5 hours, except for two with pulmonary oedema. Patients were more likely to be stung on hotter days, with lower-than-average rainfall in the past week, and with north winds of less-than-average speed. A protocol for treating patients with Irukandji envenomation is presented.

Abstracts

1. C.J. Wiltshire, S.K. Sutherland, K.D. Winkel, P.J. Fenner. Comparative studies on venom extracts from three jellyfish: The Irukankji (*Carukia barnesi*), the box jellyfish (*Chironex fleckeri* Southcott) and the blubber (*Catosylus mosaicus*). Toxicon 36:1239:1998.

The objectives of this study were to isolate crude venom from the box jellyfish (*Chironex fleckeri*), the Irukandji jellyfish (*Carukia barnesi*) and the blubber jellyfish (*Catostylus mosaicus*) and to undertake comparative studies of their venom using SDS PAGE. Crude venom from box jellyfish isolated nematocysts, and soluble fractions from whole Irukandji bells and *Catostylus* oral lobes, were obtained in quantity by a simple method involving 10-15 minutes of chilled glass mortar and pestle grinding in phosphate buffered saline. The use of more sophisticated techniques including homogenization, freeze thawing and sonication were not advantageous. Preliminary study of the jellyfish crude venoms and soluble fractions by SDS-PAGE was undertaken and extraction procedures were compared. Box jellyfish crude venom and box jellyfish milked venom SDS PAGE protein profiles were compared. Irukandji and *Catostylus* soluble fractions SDS-PAGE protein profiles have been established for the first time. Box jellyfish antivenom binds to the crude venom of box jellyfish, Irukandji jellyfish and *Catostylus* jellyfish by Western blot. Lethal activity in the Irukandji jellyfish soluble fraction was demonstrated in mice by intravenous LD_{50}. Partial breakdown of the box jellyfish crude venom protein of MW 40,000 was observed with a corresponding increase in protein at MW 17,000 after freeze thawing. The box jellyfish venom component of approximate MW 40,000 (as estimated by SDS PAGE) may be present as a dimer of subunits of approximate MW 17,000. Immunization of rabbits with the Irukandji venom lethal fraction is the next step towards antivenom production.

2. P.J. Fenner, J.A. Williamson and J.W. Burnett. Treatment and prevention of jellyfish envenomation. Toxicon 36:1242;1998.

Data on marine envenomation has been collected for ten years. Chirodropids occur worldwide in tropical and sub-tropical oceans. They cause many human deaths in the Indo-Pacific and have caused one in the western Atlantic; severe envenomation and morbidity is even more common. As their envenomation syndrome appears to cause similar, if not identical symptoms, first aid and medical treatments suggested should prove effective for all chirodropid envenomations, regardless of geographical location. Also, investigation into treatment of envenomation from the north Australian Irukandji (*Carukia barnesi*) should prove effective for similar syndromes. Methods promoting awareness and prevention of jellyfish envenomation have contributed to the reduction of mortality from chirodropid envenomation in Australia by 30%, and even greater reductions of stings causing severe envenomation over the past ten years. Human deaths and severe morbidity from jellyfish envenomation emerge as a significant global medical problem.

3. M. Chàvez, Sh. Gil, A. Fernandez, V. Huerta, I. Pascual, L. Abreu, V. Morera, A. Saroyán, J. Delfin, G. Padrón, M. Cisneros, P. Joseph, J.L. Charli and J. Diaz. Purification and partial characterization of a proteinase inhibitor from sea anemone *Condylactis gigantea*. . Toxicon 36:1275;1998.

A novel proteinase inhibitor was isolated from the sea anemone *C. gigantea* by three purification steps: trichloroacetic acid treatment of the aqueous extract, affinity chromatography on trypsin-Sepharose and gel filtration. The molecular mass of the major inhibitor obtained by gel filtration was approximately 5000-6000 Da. The partial amino acid sequence was determined by automatic sequencing. This sequence was compared with those described for proteinase inhibitors isolated from *Stichodactyla helianthus* and sequences reported in SwissProt-database for other proteinase inhibitors. Similarity to inhibitors belonging to the Kunitz family was observed. The major factor exhibits activity only against serine proteinase, such as trypsin and chymotrypsin.

4. J. Díaz, V. Morera, J. Delfin, V. Huerta, G. Lima, M. Rodríguez de la Vega, B. García, G. Padrón, I. Assfalg-Machleidt and W. Machleidt and M. Chàvez. Purification and partial characterization of a novel proteinase inhibitor from the sea anemone *Stichodactyla helianthus*. Toxicon 36:1275-76;1998.

Isolation of proteinase inhibitors from the sea anemone *Stichodactyla helianthus* was achieved by trichloroacetic acid treatment of the aqueous extract followed by affinity chromatography on trypsin-Sepharose and ion-exchange chromatography on CM-cellulose. The chromatographic profile of the latter reveals two active fractions against trypsin. The first one corresponds to ShPI-1 and the second is heterogenous. Gel filtration or reversed phase HPLC of this fraction allows

the purification to homogeneity of a novel proteinase inhibitor (ShPI-2). The average molecular mass of the inhibitor obtained by fast atom bombardment mass spectrometry (FAB-MS) was 6195 Da. The amino acid sequence was determined by automatic sequencing. The sequence of ShPI-2 (55 aminoacids) was compared with ShPI-1 and those reported in the SwissProt database for several proteinase inhibitors. Significant similarity to ShPI-1 (92%) and proteinase inhibitors belonging to the Kunitz family was observed. ShPI-2 was active against trypsin and chymotrypsin. The dissociation constants of the complexes formed with these enzymes were determined.

5. A. Aneiros, E. Karlsson, L. Beress, A. Garateix, J. Alvarez, E. Soto and E. Salinas. Isolation of toxins from the Caribbean sea anemones *Bunodosoma granulifera* and *Phyllactis floscuifera*. Toxicon 36:1276;1998.

BgK, the first toxin affecting potassium channels isolated from a marine organism, was purified from the exudate of the sea anemone *Bunodosoma granulifera*, and it represents a new structural type of potassium channel peptide toxin. Another compound, a purine derivative isolated also from *Bunodosoma* secretions by Sephadex G-50 gel filtration and HPLC on a C18 reversed phase column, increased I_{CaL} (0.5-1 mg/ml) and I_{K1} (1-10mg/ml) on ventricular mammalian cardiomyocytes. On the other hand, by a combination of gel filtration and ion exchange chromatography, five toxic basic polypeptides of M.W. of 4000-7000 have been isolated from a whole body ethanol extract of *Bunodosoma granulifera*. The toxicity of these peptides have been tested on the shore crab *Carcinus maenas* and on the pharmacological profile of albino mice, where they produce symptoms indicating that this compounds produce an important modification of the central nervous system activity. *Phyllactis flosculifera* is another common sea anemone. A glutamate receptor antagonist in snail and amphibian neurons, has been detected in a chromatographic fraction of the exudate of this anemone. Recently, five peptide toxins were isolated from whole body ethanol extract of this animal by gel filtration on Sephadex G-50, ion exchange chromatography on SP Sephadex C-25, and chromatography on the polystyrene resin Serdolit AD2. They were all toxic to crabs. The characterization of these compounds is subject of research now.

6. Falcon A., Segura-Puertas L., Burnett J. and Heimer de la Cortera E.Isolation and partial characterization of the toxins from the isolated nematocysts of the scyphomedusa *Linuche unguiculata*, the cause of seabather's eruption. Presented at the Pan American Section of the International Society of Toxinology. Margarita Island, Venizuela. September 1992.

Seabather's eruption (SBE) is a highly pruritic eruption in swimmers and divers in the marine waters of the Florida and Caribbean area and its cause has now been attributed to the planula of *Linuche unguiculata*. This organism has also been shown to contain three other forms in its life cycle: the scyphistomae (polyp), ephyra (the first swimming stage) and the adult medusa. We have recently reported that the ephyra as well as the adult stage can also cause SBE. Currently, we have focused our attention towards the isolation and extraction of the nematocysts from both the ephyrae and the adult medusa. With the adult, our methodology employs homogenizing, centrifugation and treatment with 0.025N Na0H for the removal of the zooxanthellae. The isolated nematocysts were then homogenized in water using a glass grinder, centrifuged and subjected to fast protein liquid chromatography (FPLC). The ephyrae where centrifuged and a rapid discharge of the nematocysts was observed and the supernatant chromatographed by FPLC. The major peaks from both preparations showed a high hemolytic

Letters to the Editor

1. Pang K.A. and Schwartz M.S. Guillain-Barr_ syndrome following jellyfish sting (Pelagia noctiluca). J Neurology, Neurosurgery and Psychiatry 1993;56:1133.

A 39-year-old English man stung in the summer off Majorca by a jellyfish described as palm sized, translucent and red developed a classical Guillain-Barr_ syndrome.

2. Hadok J.C. "Irukandji" syndrome: a risk for divers in tropical waters. MJA 167:49-50;1997.

A 28-year old diver who developed Irukandji syndrome while swimming off the shore of Queensland was treated with analgesics and support mechanisms. The differential diagnosis between this disorder and that of decompression syndrome was raised.

3. Fenner P.J. and Heazlewood R.J. Papilloedema and coma in a child: undescribed symptoms of the "Irukandji" syndrome. MJA 167;650:1998.

A 7-year-old boy was obtunded for over two days and had blurred optic disease ten hours post sting. Complete recovery occurred.

4. Burnett J.W. The case for use of verapamil in alarming *Chironex* stings. Anaesthesia and Intensive Care, 26:461-162;1998. Rebuttal on p.462-463 is included.

The debate between our group and Tibballs et al goes on over the use of verapamil in first aid therapy for *Chironex* stings. Our case has been that the Tibballs model is flawed, because it uses verapamil in extreme doses, employed halothane anaesthetized piglets and measured the response prophylactically rather than in a rescue mode. This is a debate currently going on and we have submitted a publication in Toxicon which will be published in the early 1999, showing an enhanced difference between the use of antivenom with and without verapamil.

Correspondences

1. David Dianich has a company called Bay Recreation Incorporated located at P.O. Box 350 Royal Oak, Maryland. These people has produced a circular plastic ring from which jellyfish exclusive nets hang. This device is designed for people to enjoy recreation off their boats.

2. John McAdams and Bud Gillian from South Florida have teamed up to market a topical preparation against the stinging pain of jellyfish envenomation. It appears that this is some type of a "buff-puff" or a mechanical rubbing product filled with a papain like solution to be placed on skin in order to counteract the pain of envenomations. My opinion is that these investigators have misunderstood the difference between nematocyst inhibition and pain alleviation. Moreover, they have not taken into account the effect of placebo or counter irritation. I have heard of similar products in the past and expect I will so again.

3. It appeared that el Niño has several effects on the southeast coast of United States this season. First, a tremendous number of *Aurelia* has come ashore. These animals which have visible tentacles of small length are capable of producing cutaneous pain. Most of the *Aurelia* on the southeast Atlantic coast have no visible tentacles and are inocous. Second, officials on the coast of New Jersey have reported tremendous numbers of *Cyanea capillata*, which have been noxious. Third, night scuba diving by U.S. Army special forces in the Florida Keys has resulted in cases similar to *Irukandji*. I suspect that these are due to a box jellyfish (presumably *Chiropsalmus quadrimanus or alata*) which is a known nocturnal species in that area.

4. A citing of *Gonionemus* and *Carybdea* off the East coast of Florida was reported was reported by Bud Gillian.

5. Alan Eugene Davis reports that in Chuuk Lagoon off Guam, species similar *Obelia* have been seen. *Cassiopeia* was similarly present. He notes that on Prince William Sound in Alaska, there is a jellyfish which swarms in several meters in diameter; but he cannot give a final species diagnosis.

6. Paul Cornelius reports that East Anglian lifeguard stations noticed stings from three jellyfish (*C. hyscella, A. Aurita and C. lamarcki*) which are stronger than seen elsewhere in the UK. This occurs between the their station and other areas even as close as twenty miles distant. Our group has found that the acid test of pain is the local gentle contact of the jellyfish tentacle with the human lip.

7. Paul Yazaki corresponds to tell us that he had a persistent headache for several months following a *Physalia* sting.

8. Chris Lingamfelter reports that in July 1998, he was surfing of the north coast of Penang Island and fell onto the water 800 yards from shore. Subsequently, he was stung on the right arm and shoulder, which resulted in an erythematous rash. He also suffered from minor nausea. The red lesions have persisted for several weeks.

9. Michael S. Thom writes us to state that he has a web site for fresh water jellyfish. The site is Mfgs@grove.iub.edu.

10. Dr. Samuel Angel, Chief Research Scientist of jellyfish research in the state of Israel is trying to discover what jellyfish swarms occur in the Southern Hemisphere. His fax number is 972-9-8851090. His e-mail is marine@netvision.net.il.

11. Dan Minchin (e-mail dminchin@frcie) reports that he has lost over 50,000 fish on farms in the west coast of Ireland due to jellyfish swarms in the last month. The problem appears to be small adult medusae 1-3 cm in diameter. They are capable of entering cages. The fish get stings and behave in distress manner, lose scale and subsequently die.

12. Anthony Smith Flinders University Hospital (Adelaide) reports that he has a patient with renal failure subsequent to a sea anemone sting.

13. S. Power writes that she has a friend in Rangiroa, French Polynesia who has been stung by a Portuguese man-of-war which possessed blue tentacles. The symptoms after the sting included pain in the kidneys and legs and inability to walk or urinate for six hours. The patient had a temperature to 103° and pain for over 15 hours. Further contact have not yield any additional data.

14. Paul Cornelius and Hermes Mianzan report that *Lynchorhiza* and *Chrysaora lactea* have minor stings hardly perceptible to humans.

15. J.C. den Hartog was contacted by Dutch Television Company who were doing a story on a diver in Mauritius. This individual stung by a box jellyfish and locals were surprised that the diver survived. No further species diagnosis could be made and my Australian colleagues think that *C. fleckeri's* habitant is not known to extend as far east as Mauritius.