In vitro studies on the hemolytic effect of *Catostylus tagi* jellyfish in humans and dolphins

New Zealand Marine Sciences Society and Australian Marine Sciences Association
Sharing Ocean Resources – Now and in the future
4-7 July 2016 · Wellington · New Zealand
nzmss.org/events

Zilda Morais[1], Rita Soeiro[1], Mário Godinho[1], Sónia Matias[2] & Arlete Sogorb[2]

[1]Centro de Investigação Interdisciplinar Egas Moniz, CiiEM, Campus Universitário Quinta da Granja, 2829-511 Caparica, Portugal
[2]Lisbon Zoo – Praça Marechal Humberto Delgado, 1549-004 Lisboa, Portugal

Introduction

The jellyfish *Catostylus tagi* (Fig.1) occurs in estuaries of the Tagus and Sado rivers of Portugal during the summer, so, because there are also swimmers and dolphins (*Tursiops truncatus)* in these areas, some casual interactions between them and *C. tagi* may happen; however, there are no reports with systematic data about the effect of its toxins.

Fig 1. *C. tagi* .(photo M. Morais)

Methods

After *C. tagi* collection, the oral arms were excised manually and treated according to Xiao *et al* [1] before storage at −70 ºC. *In vitro* assays were performed on 3 captive dolphins (*T. truncatus*) (Fig. 2) and on 7 human volunteers. The assay consisted of incubating a suspension of erythrocytes with the toxin extract – obtained by rupturing the nematocysts. The opening of nematocysts (Fig. 3) followed Wiebring *et al* [2], no more than two hours before the hemolytic assay. The hemolytic activity (Fig. 4) was evaluated by spectrophotometry, regarding the hemoglobin released from the cells to the solution.

Fig.2. Collecting blood of *T. truncatus*.

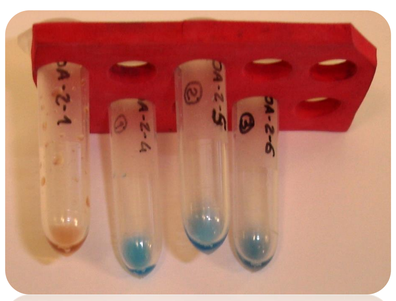


Fig.3. Opening nematocysts: brown negative control; blue positive.

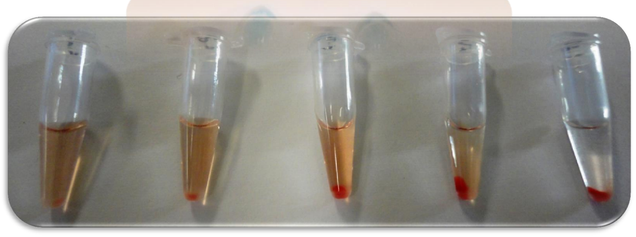


Fig. 4. Increasing hemolysis of erythocytes, due to increasing *C. tagi* concentration.

Results and Discussion

The individual IC_{50} results of toxin from nematocyst of *C. tagi* varied from 2.5 to 3.5 µg/mL in humans and from 1.8 to 4.0 µg/mL in dolphins. The estimated IC_{50} by average results was approximately 3.0 µg/mL for both humans and dolphins (Fig.5). A comparison of the hemolytic activity of the *C tagi* with the other Atlantic scyphozoas shows close vicinity to *Cassiopea xamachana*, 7.0 µg/mL, and much lower toxicity than *Pelagia noctiluca* 0.1 µg/mL [3].

.

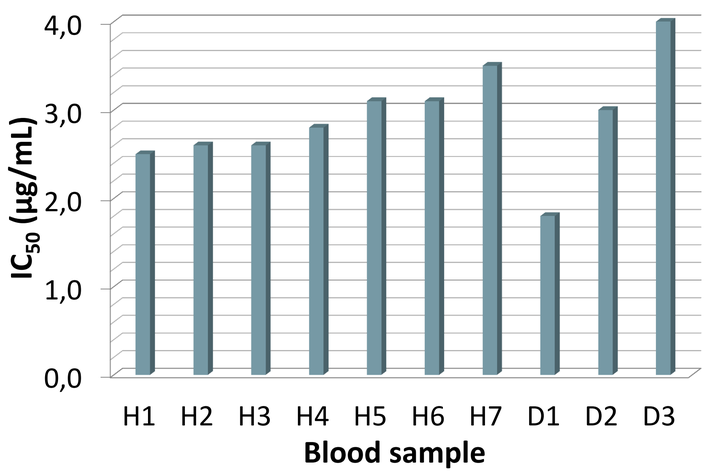
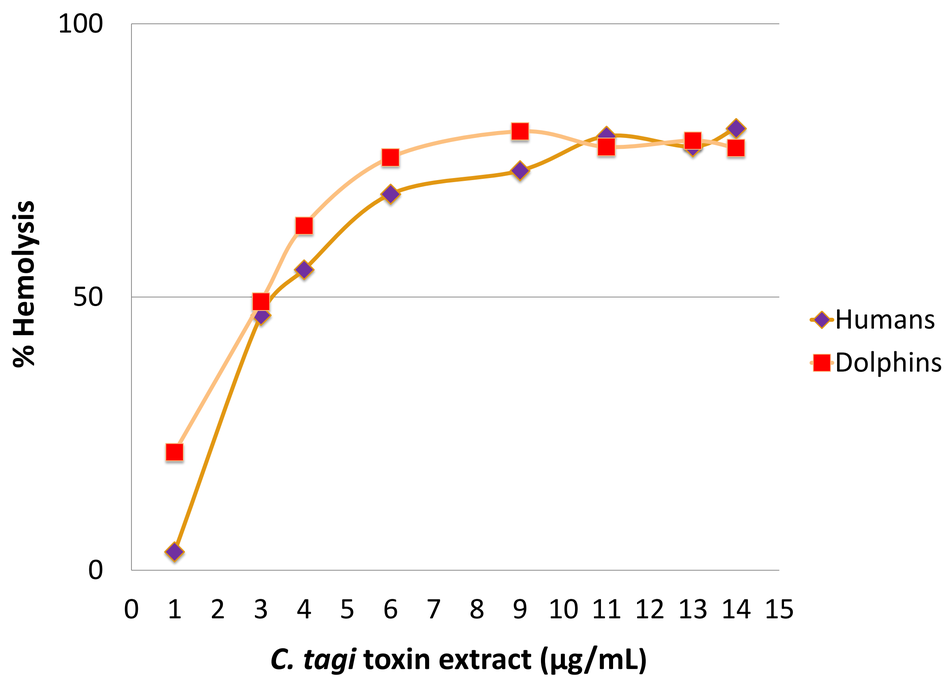


Fig. 5. Hemolytic effect of *C. tagi* toxin extract on erythrocytes of humans and dolphins.

Left: individual results of IC_{50} (µg/mL) .

Right: relationship between toxin concentration and % hemolysis.



Conclusions

The *in vitro* results for *C. tagi* agree with the fishermen common sense about the low danger of its *in vivo* hemolytic action. In the case of a bloom, however, the high toxin concentration could exacerbate the effects. Studies on other toxicological data of *C. tagi,* as the cardiotoxic and neurotoxic effects, are currently under development.

References

[1] Xiao L *et al*. (2011) *Marine drugs* **9**: 526.
[2] Wiebring A *et al.* (2010) *Hydrobiologia* **645:** 203.
[3] Mariottini G. (2014) *Journal of venom research* **5**: 22.

Acknowledgements

We thank Sandra Ribeiro for collecting the blood of humans volunteers. This research was supported by Egas Moniz Coop Ensino Superior crl, project EM-ZM-03/04.