Results of a 20 Year Erysipelas Vaccination Program in a Dolphin (*Tursiops truncatus*) Population Through Analysis of the Antibody Response in a Dolphin Specific ELISA

IAAAM 2013

Geraldine Lacave[1*]; Yi Cui[2]; Edith Stuyven[2]; Bruno Goddeeris[2]; Ana Salbany[3]; Luis Roque[3]; Carla Flanagan[3]; Nuno Silva[3]; and E. Cox[2]

[1]Marine Mammal Veterinary Services, Brugge, Belgium; [2]Laboratory of Immunology, Faculty of Veterinary Medicine, Ghent University, Belgium; [3]Zoomarine, Mundo Aquatico, Albufeira, Portugal

Erysipelas is found worldwide in different species. Most of the knowledge about erysipelas in dolphins has been extrapolated from studies with swine. The infection in dolphins happens mainly through ingestion of contaminated fish. Two major forms of the disease can be found in dolphins: an acute septicaemic form, with hyperacute death without previous or very little symptoms other than a very high WBC count, and a subacute form, with very typical rhomboid lesions on the skin. If identified on time, which is seldom the case for the acute situation, the disease can be controlled by antibiotics and general support. The other protection mean is immunization through vaccination. In the past, in America, South Africa and Australia, with the use of attenuated live or inactivated dead vaccines, people have experienced reversion or anaphylactic (allergic) shock, followed by the death of the animal very shortly after the immunization, which had prompted the cessation of vaccination in many facilities. Nowadays animals are vaccinated, when vaccinated, with a swine dead vaccine.

To better understand Erysipelas in dolphins a research project was started in 1993 at the Laboratory of Immunology from the Ghent Faculty of Veterinary Medicine in Belgium. The research covered the epidemiology of the disease in dolphins,[6,8,9] a worldwide survey (1989–2000) on erysipelas cases,[5,8] the collection of cetacean specific erysipelas strains and the identification of their serotype,[7] the identification of cross-reacting immunoglobulins of several species with dolphins immunoglobulins,[4,8] the study of cross-protection in mice against dolphins erysipelas isolates with a swine commercial vaccine,[1,3,8] the development of procedures for handling calves early on after birth and methods for determining immunoglobulin concentrations in dolphins,[5,6] the decrease and disappearance of the passive immunity,[5] the identification of transient hypogammaglobulinemia in a calf[9] and the development of a vaccination protocol.

The ultimate goal of this erysipelas research was the development and identification of the best vaccination protocol against Erysipelas in dolphins (*Tursiops truncatus*) with the use of a commercially available swine vaccine by analyzing the erysipelas-specific antibody response of vaccinated animals by ELISA. Hereto a dolphin-specific ELISA was developed using dolphin *Erysipelothrix rhusiopathiae* isolates from fatal cases. The present study concentrates on the immunization of a dolphin population (a total of 7 wild and 19 captive born animals) - at different ages, with different backgrounds and with different schedules - with two swine vaccines, the European "Eurovac Ery®" vaccine, used until May 2010 and then the American "Er Bac® Plus" vaccine, and its immunological profile results over a 20 year time span.[11,12]

The general protocol (after a control blood sample) was a primo-vaccination at 3–5 months of age for captive born animals, a booster one month post primo-vaccination and bi-yearly vaccination since 2000, with a continued yearly vaccination for animals in the program prior to 2000. Until 2012, each time 18 mg of the anti-histaminic Dexchlorpheniramine maleate, in coated tablets, was administered 1.5 hour before vaccination (aside from the non-yet-eating calves). Since 2012 Dexchlorpheniramine maleate was switched to 240 mg Fexofenadine. Animals were vaccinated with 2ml of the vaccine. They were closely monitored by the veterinarian for 15 minutes, kept in a pool with platform for an hour post vaccination and emergency drugs were prepared, ready to be

used in case of anaphylactic shock. Sera were collected prior to vaccination, 2 weeks post vaccination and every month. Vaccination of dolphins with an unsatisfactory blood result was postponed.

The ELISA results suggest that animals born in the wild have enough with a vaccination every two years (possibly because of their exposure in the wild to subclinical pathological infection). Young animals born in captivity seem to need a bi-yearly vaccination (their reaction to the vaccine is short lived, maybe due to the overprotection in a controlled environment). In older animals born in captivity, a yearly vaccination seems appropriate. The cut-off, for captive born animals, between bi-yearly and yearly vaccination, where possibly the humoral immunity or other factors come into account, still has to be better defined. There has been no allergic/anaphylactic reaction and no case of erysipelas infection was observed in this population during the vaccination period.

A second survey (2001–2012) and the fine tuning of the vaccination protocol are on-going at this stage.

Literature Cited

1. Lacave G, Cox E, Hermans J, Devriese L and Goddeeris B. 2001. Induction of cross-protection in mice against dolphin erysipelas isolates with a swine commercial vaccine. *Veterinary Microbiology* 80:247–253.
2. Lacave G. 1994. Handling and medical treatment in a newborn bottlenose dolphin. *IAAAM 25th Annual Conference Proceedings,* Vallejo, CA; Pp. 5–9.
3. Lacave G, Hermans J, Cox E and Goddeeris B. 1997. Protection of mice against dolphin Erysipelas isolates following vaccination with a commercial Erysipelas vaccine. *IAAAM 28th Annual Conference Proceedings*, Harderwijk, The Netherlands; Pp. 82–86.
4. Lacave G, Cox E and Goddeeris B. 1997. Cross-reaction of antisera against immunoglobulins of several species with dolphins immunoglobulins. *IAAAM 28th Annual Conference Proceedings*, Harderwijk, The Netherlands; Pp. 87–90.
5. Lacave, G. 1999. Handling and Erysipelas vaccination in young *Tursiops truncatus* calves. *Report from the Bottlenose dolphin reproduction workshop*, San Diego, CA, Pp. 27–31.
6. Lacave G and Cox E. 2000. Erysipelas in cetaceans, more particularly the handling and vaccination in young *Tursiops truncatus* calves. *EAAM 28th Annual Symposium Abstract book,* Mundomar, Spain; p10.
7. Lacave G, Schlater L, Fedorka-Cray P, Cox E and Goddeeris B. 2000. Identification of the serotypes of *Erysipelothrix rhusiopathiae* strains isolated from different cetaceans species. *IAAAM-AAZV Joint Conference Proceedings*, New Orleans, LA; p341.
8. Boehm J, Lacave G and R Patterson. Ed. 2000. Proceedings of the first international workshop on Erysipelas in cetaceans, June 30–July 2, 2000, Chicago, Illinois, USA.
9. Lacave G, Salbany A, Roque L and E Cox. 2005. Immunodeficiency in a *Tursiops truncatus* dolphin calf. *EAAM 33rd Annual Symposium Abstract book,* Harderwijk, The Netherlands; p12.
10. Boehm J, Lacave G and R Pattersson. 2001. Advancing the study and control of Erysipelas in cetaceans. *IAAAM 32nd Annual Conference Proceedings,* Tampa, FL; Pp. 101–103.
11. Cui Yi. 2011. Vaccinatie tegen vlekziekte - literatuur studie - (*Erysipelas vaccination - a literature review).* Promoter: Cox E. Co-promotor: Lacave G. *Master thesis dissertation*
12. Cui Yi. 2012. Vaccinatie tegen vlekziekte bij dolfijnen - populatie studie - (*Erysipelas vaccination - population study)*. Promoter: Cox E. Co-promotor: Lacave G. *Master thesis dissertation.*

Speaker Information

(click the speaker's name to view other papers and abstracts submitted by this speaker)

Geraldine Lacave
Marine Mammal Veterinary Services
Brugge, Belgium