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AMERICAN ASSOCIATION OF WILDLIFE VETERINARIANS

WINTER 2010

MESSAGE FROM THE PRESIDENT

AAWV Membership Renewal with the New Year

The start of 2010 looks to be another great year for AAWV members, with a slate of opportunities to enhance your career as a professional wildlife veterinarian. However, the one factor that drives our ability to bring opportunities to the membership is member dues. Member dues are the primary source of revenue for AAWV and enable the production of newsletters, provide important AAWV representation for wildlife veterinarians at national meetings, and pay for cutting edge speakers at conferences we jointly organize with the Wildlife Disease Association and American Association of Zoo Veterinarians. Your dues will allow AAWV officers, Advisory Council, and member volunteers to serve you by disseminating important wildlife health announcements, job and internship postings, and timely information related to our profession. In the last couple of years we've increased our earth-friendliness by going to an entirely electronic newsletter, and as a result your dues go a lot farther by avoiding postage and printing costs. AAWV has become increasingly active in national policies, using member-written position statements and resolutions involving animal welfare, wildlife disease, and the ecological



Colin Gillin, President

Our membership is based on the calendar year, so what better time than now to send in your membership renewal and continue receiving all the benefits of your association.

AAWV NEWSLETTER

IS PUBLISHED BY THE
**AMERICAN ASSOCIATION OF
WILDLIFE VETERINARIANS**

Founded in 1979, the AAWV is a national, non-profit organization of veterinarians interested in all aspects of wildlife health.

PRESIDENT

Colin Gillin
colin.m.gillin@state.or.us

VICE-PRESIDENT

Margaret Wild
margaret_wild@nps.gov

SECRETARY

Peri Wolff
pwolff@ndow.org

TREASURER

Mark Drew
mark.drew@idfg.idaho.gov

EDITOR

Jordan Mencher
jmencher@myuw.net

LAYOUT & DESIGN

Nancy Ottum
nancyottum@mac.com

ADVISORY COUNCIL

Kirsten Gilardi (Chair)
John Fischer
Jim Sikarskie
Sonia Hernandez-Divers
Scott Larsen
Steve Osofsky
Tom DeLiberto
Margaret Wild
Jordan Mencher

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MESSAGE continued from front page

connections spanning human, domestic animal, and wildlife health issues. Our elected officers also attend many venues on behalf of the wildlife veterinary profession, including conferences and meetings of the U.S. Animal Health Association, Association of Fish and Wildlife Agencies, The Wildlife Society, and the American Veterinary Medical Association, to name a few.

Our membership continues to increase both in North America as well as internationally. Our greatest membership category increase over the past couple of years has been with students and student chapters. Students serve as the foundation of the future in our profession and the importance of their retention cannot be stressed enough. To this end, over the summer AAWV provided specific comments for the Wildlife and Zoological Veterinary Medicine Enhancement Act, introduced in January by Congressman Alcee L. Hastings (D-Miramar). The legislation as written in the bill summary is designed "...to expand the workforce of veterinarians specialized in the care and conservation of wild animals and their ecosystems, and to develop educational programs focused on wildlife and zoological veterinary medicine." This is just one of the ways membership dues help provide opportunities for the future of our profession.

We have recently provided wildlife-focused comments to the American Veterinary Medical Association as it revises its Guidelines on Euthanasia. This document serves as a benchmark for veterinarians and animal professionals worldwide when performing humane euthanasia. However, we state in our review the importance in understanding the difficulties and challenges of applying practical, feasible, safe euthanasia methods as defined in the document in ending the life of a wild animal in the varied and sometimes unpredictable situations in which we often find ourselves as wildlife professionals.

As part of our ties with the Wildlife Disease Association, we provide AAWV membership on joint committees that share the interests of both associations. For example, AAWV committee members Anne Fairbrother and Paul Barrows are serving as the AAWV representatives on the Tom and Beth Memorial Fund award committee. As part of a new ad hoc committee to review AAWV's role, history and evolution in relation to the WDA, Tom Yuill, Dave Jessup, and Jonathan Sleeman will serve alongside three WDA representatives to provide recommendations to the WDA council.

Our membership is based on the calendar year, so what better time than now to send in your membership renewal and continue receiving all the benefits of your association.

Still the best bargain among professional associations, annual dues for 2010 will remain at \$40 for active veterinarians and subscribing members and \$20 for veterinary students. One way to beat future dues increases is to renew for several years in advance. All dues should be sent with a renewal form (downloadable from our website at www.aawv.net/membership.html) to AAWV Treasurer Mark Drew at Idaho Department of Fish and Game, 16569 S. 10th Ave., Caldwell, ID 83607 USA.

Of course the best part of membership in the AAWV is attending the world class joint conferences our members enjoy and take part in. This year has an international and southern feel. We already have quite a few AAWV members planning the trip to Puerto Iguazu, Argentina May 30–June 4. Then we head to South Padre Island, Texas with the AAZV to spend the last week of October in the sand and surf. As mentioned in previous newsletters, we'll co-sponsor the first tri-lateral meeting of AAWV's bordering countries, bringing together the Canadian Association of Zoo and Wildlife Veterinarians, the Mexican Association of Conservation Medicine (Kalaankab), and the AAZV. Speaking not only for myself, but all your AAWV officers and Advisory Council, we look forward to seeing you at all these great venues!

Are You Eligible to be an EMERITUS MEMBER in the AAWV or Know Someone Who Is?

AN EMERITUS MEMBER is a veterinarian who has been an active member for at least 10 years, is in good standing with the Association and is no longer earning a full income as a full-time veterinarian, or is 65 or older. EMERITUS MEMBERS are also voting members.

If you believe you are eligible to become an EMERITUS MEMBER or want to nominate someone you believe is, please contact Secretary Peri Wolff at pwolff@ndow.org.

SAVE THE DATE!

“Wildlife and Ecosystem Health Without Borders” North American Trilateral Meeting



South Padre Island, Texas
24-25 October, 2010

In conjunction with the AAZV/AAWV/ARAV Annual Conference

2010 International Conference on Emerging Infectious Diseases

Sunday, July 11 – Wednesday, July 14, 2010
Hyatt Regency Atlanta
Atlanta, Georgia, USA 30303



ICEID 2010 will focus on the impact of various intervention and preventive strategies that have been implemented to address emerging infectious disease threats. **ICEID 2010** encompasses three days of plenary and panel sessions, oral and poster presentations, and a broad spectrum of infectious diseases of public health relevance.

Registration will open February 11, 2010.

Pre-registration fee is \$425. On-site registration will be \$475.

Student registration fees are \$200 for pre-registration and \$250 on-site. Student registration is limited to 300 spaces.

For on-line registration please visit the website www.iceid.org.

For additional information, please contact Sharon Martin at SMartin@cdc.gov or Denise Swann at CSwann@cdc.gov.

▶ Considering
Presentation of a
Paper at the Trilateral
Conference?
Fill out form attached
as a separate pdf
with this newsletter

Bat White-Nose Syndrome: A North American Wildlife Conservation Crisis

Prepared by David Blehert,
USGS – National Wildlife Health Center

White-Nose Syndrome (WNS) is a disease that has caused mass mortalities of several species of insectivorous hibernating bats across an expanding region the eastern United States. When WNS was first identified during the winter of 2006/2007, bat die-offs were restricted to an area near Albany, New York. Since then, WNS has been detected more than 900 kilometers (560 miles) from the original site and has caused unprecedented mortality of hibernating bats in eight surrounding states, including Connecticut, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Virginia, Vermont, and West Virginia. Six species of bats that hibernate in the region, including the little brown bat (*Myotis lucifugus*) and the endangered Indiana bat (*M. sodalis*), are known to be affected. Although WNS infection has not yet been documented among the endangered Virginia big-eared bat (*Corynorhinus townsendii virginianus*) or the endangered gray bat (*M. grisescens*), these species are believed to be at risk. The sudden and widespread mortality associated with WNS has never been seen in any of the more than 1,100 species of bats worldwide, and this mortality event may represent the most precipitous decline of North American wildlife caused by infectious disease in recorded history.



WNS-affected hibernating bats often have white fungal growth on their muzzles, ears, and/or wing membranes as the result of infection by a newly described species of cold-loving (psychrophilic) fungus, *Geomyces destructans*. The fungus grows optimally between approximately 4 and 14°C (39-57°F). This is within the annual temperature range of bat hibernation caves as far south as northern Florida, indicating that *G. destructans* could persist year-round in bat

Bats differ from most other small mammals in that they have high rates of survival with low rates of reproduction, a combination that yields a low potential for rapid population growth.

hibernation sites across large expanses of the US.

During the course of the WNS investigation, consistent disease-causing parasites, bacteria, or viruses have not been found, and rRNA gene sequence analyses of isolates of *G. destructans* cultured from sick bats across a broad geographic area indicate that the fungal isolates are identical within genetic markers analyzed. Histopathological examination demonstrated that characteristic *G. destructans* infection of bat skin causes severe epidermal erosions and ulcers, and fungal hyphae can also invade underlying connective tissue. Although the mechanism by which *G. destructans* skin infection may cause bat mortality is not yet known, chytridiomycosis of amphibians is an example of a life-threatening vertebrate fungal skin infection that directly causes mortality of individual animals, resulting in population declines and extinctions around the world.

Only by developing a better understanding of WNS will we be able to devise strategies to contain and manage this disease. Towards this goal, several research studies are underway. Complete sequencing of the *G. destructans* genome is in progress at the Broad Institute Microbial Sequencing Center. Preliminary data from WNS infection studies conducted at USGS-National Wildlife Health Center suggest that *G. destructans* can infect healthy bats and be transmitted among bats in a controlled environment. Additionally, preliminary analyses of sediment samples collected from bat hibernacula (caves and mines) of the eastern half of the United States indicated that a genetic signature of *G. destructans* was present in sediments collected in WNS-positive states. The genetic signature of *G. destructans* has thus far not been detected in environmental samples or on bats collected from outside the known WNS-infested region. Identification of genetic material from *G. destructans* in environmental samples suggests that the fungus is present, and the potential exists for *G. destructans*

to remain viable in caves or mines in the absence of bats and be transmitted between hibernacula as an unwanted hitchhiker upon humans, their clothing, or caving gear.

It was recently reported that *G. destructans* was isolated from a bat in France, and there are references in European scientific literature to bats with white material on their muzzles dating back to the early 1980s. However, large-scale bat mortalities have not been reported among European bats. Further investigation of the European WNS connection may prove to be critical to understanding the epidemiology of WNS in North America.

Bats differ from most other small mammals in that they have high rates of survival with low rates of reproduction, a combination that yields a low potential for rapid population growth. Bat species affected by WNS can live up to 20 years and have only one offspring per year. Bat numbers do not

fluctuate widely over time, and populations of bats affected by WNS will not recover quickly. In regions of the US where WNS has been documented, bats are primary predators of night-flying insects. The ecological consequences of losing large numbers of insectivorous bats are not known, but could impact agriculture, forest ecology, and the prevalence of insect-borne diseases. Epidemiological studies to determine the origin of *G. destructans*, ecological studies to ascertain the link between fungal skin infection and bat mortality, modeling studies to determine the potential for further WNS spread, and a more comprehensive understanding of WNS pathogenesis will be critical towards containing and managing this unprecedented wildlife disease.

EDITOR'S NOTE: According to Pro-MED, White Nose Syndrome was identified on February 8th in three dead bats from Sullivan County, Tennessee. This is the first report of the presence of the disease in that state.

An Interesting Emerging Disease Case Study: Bovine Besnoitiosis in Europe

From ProMED (edited)

Recent epidemiological data confirm a geographic expansion and increasing number of cases of besnoitiosis in cattle herds in some European Union member states. Many aspects of the epidemiology of bovine besnoitiosis remain uncertain, including prevalence and incidence of infection and disease in endemic areas, routes of transmission and risk factors associated with infection and disease.

Besnoitia besnoiti is a sporozoan sarcocystid organism which multiplies in endothelial, histiocytic, and other cells. Bovine besnoitiosis has two distinct sequential clinical stages: the acute anasarca stage, characterized by proliferation of endozoites in blood vessels and manifesting as lymphadenopathy, subcutaneous swellings, diarrhea, abortion and infertility; and the chronic scleroderma stage which is associated primarily with cyst formation. The severity of the disease may vary from mild to fatal in seriously affected animals. Many infected animals remain asymptomatic or mildly symptomatic with minor perivulvar or conjunctival cysts. The disease is endemic in tropical and sub-tropical regions, with high infection rate but low mortality. It has been reported from southern Europe, Africa, Asia, and South America.

Besnoitia besnoiti is suspected to have a heteroxenous life cycle, having more than one obligatory host, but as yet the definitive host has not been identified. Horizontal direct and indirect transmission seems to be responsible for the spread of the disease. Arthropods such as horseflies and deer

flies may play a role by transmitting *B. besnoiti* mechanically from chronically or asymptomatic infected cattle. Wild ruminants and probably rodents may act as reservoirs of the parasite. A number of diagnostic tests such as cytology, histopathology, serology and PCR testing are available. There are no effective drugs or vaccines available in Europe at present. Live-attenuated vaccines have been developed and are applied on a limited scale in select animal groups such as imported bulls and breeding cattle in South Africa and Israel.

The Animal Health and Welfare Panel recommends that epidemiological investigations in endemic areas in Europe are necessary to elucidate the importance of infected animals and the routes of transmission. Relevance of direct transmission through direct contact during natural mating should be evaluated. Entomological studies can be used to address the potential role of biting flies in transmission. Further studies are also necessary to elucidate the role of wild ruminants and rodents as putative reservoirs of the parasite, and the existence of a definitive host and its role in the epidemiology of bovine besnoitiosis should be studied. Diagnostic tools need to be further developed and standardized to address unanswered questions related to the epidemiology and clinical progression of the disease. Appropriate measures and strategies to control besnoitiosis need to be investigated using the available epidemiological information.

Harmful Algal Blooms – Now and Again?

From ProMED (edited)

With a new theory emerging that toxic algae rather may have contributed to prehistoric mass extinctions, researchers are trying to unravel the mystery of what caused a massive algae bloom off the north west coast of the United States that left thousands of seabirds dead and may have sickened some surfers and kayakers. The bloom, which stretched roughly 300 miles from Newport, Oregon north to the Canadian border, persisted through several months of late 2009, peaking in September and October of that year. Up to 10,000 birds died of hypothermia in September 2009, and researchers are still trying to come up with a count for October. They are also checking reports that surfers and kayakers who came in contact with the foam may have suffered cold-like symptoms, including temporary loss of smell and taste. The toxins also may have become aerosolized and affected beachcombers. In another strange twist, pathologists performing necropsies found that some of the birds lacked normal bacteria in their stomachs and other internal organs.

Blooms of the single-cell, saltwater algae species known as *Akashiwo sanguinea* have been found in Puget Sound, the Chesapeake Bay, and elsewhere around the world. The bloom off the northwest coast, however, was huge compared with others. At its height, there were 1.5 million algal cells per quart of water, and the bloom was up to 65 feet deep and many miles wide. Whipped by waves and storms, the microscopic phytoplankton, which had turned the ocean a rust color, broke apart, releasing toxins and creating a meringue-like foam that coated the feathers of birds like spilled oil. In only one other instance, a smaller bloom in 2007 in California's Monterey Bay, have the cells broken apart to create a toxic froth. [Those of you who stayed through till the end of the 2009 WDA Conference may remember Dave Jessup's very interesting presentation of his work on this Monterey Bay bloom - Ed.]

No one is sure what ignited the bloom, especially since this particular species of algae usually likes warmer water than that found off the Pacific Northwest coast. Some scientists think it could be caused by climate change, which has both raised ocean temperatures and made the water more acidic - both conditions which could favor this algal species. Others say it could be the result of such weather conditions as El Niño or the Pacific decadal oscillation, a long-lived El Niño-like pattern of Pacific climate variability. The bloom may also have been fed by nutrients washed down the Columbia River from farms in eastern Washington and Oregon, or from ocean condition upwelling where cold nutrient-rich

water is pushed toward the surface by wind. Alternatively it could just be the natural rhythms of the ocean, which scientists are just beginning to understand. "The ocean does have a natural pulse," said Vera Trainer, a Seattle-based research oceanographer for the National Oceanic and Atmospheric Administration. "Is this part of the pulse or is this something different? We want to find out. But some of this is very unusual. We are looking at this very intensely."

John Rodgers, an ecotoxicologist at Clemson University in South Carolina, who along with James Castle, a geologist at Clemson, developed the killer algae theory, said he and Castle have found ancient deposits of toxin-producing and oxygen-depleting blue-green algae that coincide with 5 mass extinctions millions of years ago. The blue-green algae were found in ponds, lakes, and rivers, and could have been ingested by prehistoric animals. The toxins may also have been absorbed by plants that were later eaten by animals, or may have become airborne and inhaled by animals. Though he said algae may not have been the only cause for the extinctions, he proposes that it was a major factor. "They certainly didn't die on the same day or week," Rodgers said. "This happened over hundreds of years."

Though the bloom off the north west coast is in salt water rather than fresh water, Rodgers said such blooms were well worth keeping an eye on. "They are changing, expanding their ranges into places never seen before and in densities never seen before," Rodgers said. "It's hard to ignore, and as the data grows, we are becoming more and more convinced." Rodgers said his theory has been peer reviewed and is gaining acceptance among scientists. Current climate conditions are becoming strikingly similar to those that existed during the time of the mass extinctions, he said. In a paper published in March 2009 in *Environment Geosciences*, Rodgers and Castle wrote that their finding "gives us cause for concern and underscores the importance of careful and strategic monitoring as we move into an era of global climate change." Scientists studying the bloom off the northwest coast are wary when asked about Rodgers' and Castle's theory. "I would be cautious about it," Trainer said. Raphael Kudela, a toxic algae expert and ocean sciences professor at the University of California at Santa Cruz, thinks algae blooms such as those off the northwest coast are becoming more frequent. "It is consistent with climate change," Kudela said, adding that a bloom like this in the chilly waters of the northwest was "very unusual"; however, in regards to the killer algae theory, he said "People who study harmful algae don't dismiss it. But it can't be proved."

EDUCATION AND EMPLOYMENT OPPORTUNITIES

Visit <http://www.aawv.net/jobs.html> for the latest in employment and training opportunities

Directory of Veterinary Services Lindsay Wildlife Museum

The Lindsay Wildlife Museum, a natural history, environmental education and wildlife rehabilitation center located in Walnut Creek, California, is seeking a full-time director of veterinary services. The DVS will provide veterinary services for rehabilitating wildlife and resident animals, provide medical care for more than 5,000 wildlife rehabilitation cases annually and 110 captive native California wild animals that are used for educational programming, provide training for staff and volunteers to provide appropriate nursing care, and manage the in-house diagnostic laboratory and pharmacy. The director will also have administrative duties including ensuring center compliance with federal and state laws regarding veterinary medical and wildlife rehabilitation and exhibition practices and developing an annual veterinary department budget. The DVS will also provide leadership as a senior manager within the museum, participating in organization-wide strategic planning and budgeting and in solicitation of donors and grant money. For more information click here or email jobs@wildlife-museum.org.

Wildlife Medicine and Rehab Internship

Frink Center for Wildlife – Newark, DE

Tri-State Bird Rescue & Research, Inc. is offering a one-year, paid internship in wildlife medicine and rehabilitation. The intern will work closely with the staff of two full-time clinical veterinarians, two CVTs, three full-time clinic supervisors and over 100 volunteers active in bird care.

Areas of instruction and subsequent responsibilities include clinical duties and human health & safety concerns; the intern will ultimately assume responsibility for the majority of the medical decisions and treatment regarding the in-house caseload. The Frink Center for Wildlife treats approximately 3000 native wild birds annually and responds to oil spills involving wildlife. The intern will also assist with the Introduction to Wildlife Medicine course taught to the first-year class at the Univ. of Penn. School of Veterinary Medicine, with the preparation and presentation of continuing education programs for staff, volunteers, and other wildlife rehabilitators, and will also assist in on-going research projects.

Qualified candidates must possess a VMD/DVM, or equivalent degree from an accredited college. Application review will begin 15 April 2010. Submit applications to Erica A. Miller, DVM, 110 Possum Hollow Road, Newark, DE 19711; 302-737-9543 x116; 302-737-9562 (fax); emiller@tristatebird.org.

Marine Biologist Forensic Science Course

Shoals Marine Laboratory is offering a course in Forensic Science for Wildlife Biologists, June 28 - July 5 2010. Learn about the anatomy of marine vertebrates, including seals, dolphins, seabirds, fishes, and develop your incident reporting skills. Forensic Science for Wildlife Biologists provides a field-oriented introduction to the forensic science domain and the special rules and practices governing the utilization of science within the justice system. FSWB students receive comprehensive instruction in the recognition, documentation, collection, and preservation of physical evidence. FSWB participants are also afforded the unique opportunity to develop practical incident response, scene management, and forensic teamwork skills via participation in realistic, marine-oriented crime scene exercises. Additionally, FSWB students receive hands-on instruction in forensic pathology procedures, forensic necropsy techniques and may participate in the necropsy of a variety of marine vertebrates.

Forensic Science for Wildlife Biologists is primarily designed for practicing marine biologists, veterinarians, veterinary pathologists, wildlife conservation officers, and stranding network personnel desiring a practical introduction to forensic science. For more information contact William E. Bemis at web24@cornell.edu or visit the course web page www.sml.cornell.edu.

CE in Invertebrate Medicine

North Carolina State University, Aug. 28, 2010, 7:30 am - 5:00 pm

Designed for veterinarians, veterinary students, and professional aquarists/curators, this course presents the anatomy, physiology, natural history, and disease problems of the more important invertebrate groups: sponges, corals, mollusks, annelids, crustaceans, echinoderms, and arachnids.

Upon completion of this program participants will be able to obtain a useful history and plan examination procedures in a variety of invertebrate species; perform gross necropsy examination of invertebrates and be able to identify major anatomical features and organ systems; anesthetize and recover invertebrate patients using water-soluble and gas anesthetic agents; compound and deliver medication for some invertebrates; and identify probable causes of environmentally related problems in aquatic and terrestrial systems and recommend mitigation.

Registration for this course is \$125. For more information go to www.cvm.ncsu.edu/conted/invert.html.

PUBLICATIONS OF INTEREST

MORTALITY TRENDS OF STRANDED MARINE MAMMALS

Bogomolni AB et al. *Diseases of Aquatic Organisms*. 2010. 88:143-155. (Full article available at www.int-res.com/articles/dao_0a/d088p143.pdf)

To understand the cause of death of 405 marine mammals stranded on Cape Cod and southeastern Massachusetts between 2000 and 2006, a system for coding final diagnosis was developed and categorized as (1) disease, (2) human interaction, (3) mass stranded with no significant findings, (4) single-stranded with no significant findings, (5) rock and/or sand ingestion, (6) predatory attack, (7) failure to thrive or dependent calf or pup, or (8) other. The cause of death for 91 animals could not be determined. For the 314 animals that could be assigned a cause of death, gross and histological pathology results and ancillary testing indicated



that disease was the leading cause of mortality in the region, affecting 116/314 (37%) of cases. Human interaction, including harassment, entanglement, and vessel collision, fatally affected 31/314 (10%) of all animals. Human interaction accounted for 13/29 (45%) of all determined gray seal *Halichoerus grypus* mortalities. Mass strandings were most likely to occur in northeastern Cape Cod Bay; 97/106 (92%) of mass stranded animals necropsied presented with no significant pathological findings. Mass strandings were the leading cause of death in 3 of the 4 small cetacean species: 46/67 (69%) of Atlantic white-sided dolphin *Lagenorhynchus acutus*, 15/21 (71%) of long-finned pilot whale *Globicephala melas*, and 33/54 (61%) of short-beaked common dolphin *Delphinus delphis*. These baseline data are critical for understanding marine mammal population health and mortality trends, which in turn have significant conservation and management implications. They not only afford a better retrospective analysis of strandings, but ultimately have application for improving current and future response to live animal stranding.

NOTE: It would be interesting to know more about the spectrum of diseases to which these animals are succumbing. Individual case data are available open access at www.int-res.com/articles/suppl/d088p143_app.pdf

IMMUNOLOGY OF WHALES AND DOLPHINS

Andreas Beineke et al. *Veterinary Immunology and Immunopathology*. 2010. 133(2-4):81-94

The increasing disease susceptibility in different whale and dolphin populations has led to speculation about a possible negative influence of environmental contaminants on the immune system and therefore on the health status of marine mammals. Despite current efforts in the immunology of marine mammals several aspects of immune functions in aquatic mammals remain unknown. However, assays for evaluating cellular immune responses, such as lymphocyte proliferation, respiratory burst as well as phagocytic and cytotoxic activity of leukocytes and humoral immune responses have been established for different cetacean species. Additionally, immunological and molecular techniques enable the detection and quantification of pro- and anti-inflammatory cytokines in lymphoid cells during inflammation or immune responses, respectively. Different T and B cell subsets as well as antigen-presenting cells can be detected by flow cytometry and immunohistochemistry. Despite great homologies between marine and terrestrial mammal lymphoid organs, some unique anatomical structures, particularly the complex lymphoepithelial laryngeal glands in cetaceans represent an adaptation to the marine environment. Additionally, physiological changes, such as age-related thymic atrophy and cystic degeneration of the “anal tonsil” of whales have to be taken into account when investigating these lymphoid structures. Systemic morbillivirus infections lead to fatalities in cetaceans associated with generalized lymphoid depletion. Similarly, chronic diseases and starvation are associated with a loss of functional lymphoid cells and decreased resistance against opportunistic infections. There is growing evidence for an immunotoxic effect of different environmental contaminants in whales and dolphins, as demonstrated in field studies. Furthermore, immunomodulatory properties of different persistent xenobiotics have been confirmed in cetacean lymphoid cells in vitro as well as in animal models in vivo. However, species-specific differences of the immune system and detoxification of xenobiotics between cetaceans and laboratory rodents have to be considered when interpreting these toxicological data for risk assessment in whales and dolphins. its remote locale.



UPCOMING MEETINGS

- Mar 25-26** International Conference on Biocontainment Facilities. St. Petersburg, Florida. Click here for more information.
- May 2-6** XXXII International Meeting for Marine Mammals. Xalapa, Veracruz, Mexico. This year's theme is Marine Mammals: Bio-indicators of the marine ecosystem health. For information about workshops and other conference details, contact Eduardo Morteo at emorteo@gmail.com.
- May 8-12** 41st Annual Conference of the International Association for Aquatic Animal Medicine. Vancouver, British Columbia, Canada. Visit this link for more info.
- May 30-Jun 4** 59th Wildlife Disease Association Annual Meeting. Iguazu, Argentina. More info here.
- Jul 3-7** 24th International Congress for Conservation Biology: Conservation for a Changing Planet. Edmonton, Alberta, Canada. Presented by the Society for Conservation Biology; click here for more information.
- July 11-14** 2010 International Conference on Emerging Infectious Diseases. Atlanta, Georgia. Go to www.iceid.org for more information.
- Jul 12-19** World Aquatic Veterinary Medical Association 2010 Aquatic Veterinary Conference. Athens, Greece. Optional post-conference 3-day cruise through the Greek Islands! Visit www.wavma.org for updated information.
- Sep 1-4** Congreso Veterinario de Leon. Leon Guanajuato, Mexico. Registration is free of charge. For more information go to www.cvdl.com.mx.
- Sep 5-9** Sixth International Symposium on Aquatic Animal Health. Tampa Marriott Waterside Hotel, Tampa, Florida. For more information go to <http://aquaticpath.epi.ufl.edu/isaah6>
- Oct 24-29** Annual Conference of the AAWV. South Padre Island, Texas. Held in conjunction with the AAZV and the Association of Reptile and Amphibian Veterinarians. Register at www.aazv.org.