

FIBROPAPILLOMATOSIS (FP) OF SEA TURTLES

ANIMAL GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE	TREATMENT	PREVENTION & CONTROL
Sea turtles	unknown, marine leeches (<i>Ozobranchus</i> spp.) have been implicated as mechanical vectors	Papillary masses on the body surface Tumors can also occur in internal organs	Tumors can fatally debilitate the animals	Surgical removal of tumors	<p><i>In houses</i> Isolate affected turtles. Tanks should have separate water sources.</p> <p><i>in zoos</i> Isolate affected turtles. Tanks should have separate water sources.</p>

Fact sheet compiled by Rachel Marschang, Institut für Umwelt und Tierhygiene, Universität Hohenheim, Stuttgart, Germany	Last update February 2009
Fact sheet reviewed by Silvia Blahak, Chemisches und Veterinäruntersuchungsamt OWL, Detmold, Germany James F. X. Wellehan, Zoological Medicine Service, College of Veterinary Medicine, University of Florida	
Susceptible animal groups Many species of marine turtles including green (<i>Chelonia mydas</i>), loggerhead (<i>Caretta caretta</i>), Hawksbill (<i>Eretmochelys imbricata</i>), and olive ridley (<i>Lepidochelys olivacea</i>) sea turtles	
Causative organism Alphaherpesvirus.	
Zoonotic potential No.	
Distribution World-wide.	
Transmission Unclear. In the marine environment, FP could potentially be transmitted to uninfected individuals by direct contact between infected turtles or by contact with substrates harbouring virus, such as sediments, contaminated surfaces or seawater. Marine leeches (<i>Ozobranchus</i> spp.) have been found to carry high viral DNA loads, implicating them as mechanical vectors.	
Incubation period 15 to 43 weeks following experimental infection by intradermal injection or scarification.	
Clinical symptoms Fibropapillomas. Individual or multiple tumors can occur externally all over the body. Internal tumors are also possible.	
Post mortem findings Internal tumors are most commonly found in the lungs but can also occur in other tissues including the liver, gallbladder, intestinal tract and kidneys.	
Diagnosis Gross pathological and histological examination of the tumors, Polymerase chain reaction (PCR). Internal tumors can be detected by radiography, MRI and endoscopy. An ELISA for the detection of antibodies against chelonid fibropapillomatosis-associated herpesvirus (CFPHV) was recently described.	
Material required for laboratory analysis Tumor material	
Relevant diagnostic laboratories Contact pathologists with experience with reptiles. For virus detection: contact laboratories with experience with reptile viruses and/or detection of various herpesviruses: <ul style="list-style-type: none"> • Dr. Rachel E. Marschang, Institut für Umwelt- und Tierhygiene (460), Hohenheim University, Stuttgart, Germany 	



- Dr. Silvia Blahak, Chemisches und Veterinäruntersuchungsamt OWL, Detmold, Germany
- Dr. Szilvia Farkas, Veterinary Medical Research Institute of the Hungarian Academy of Sciences, Budapest, Hungary

It is best to contact the laboratory before collecting and sending the samples to optimize chances of success.

Treatment

Surgical removal of tumors.

Prevention and control in zoos

- Strict hygiene and quarantine procedures. Newly acquired animals should be kept isolated for a minimum of 3 months and should undergo thorough physical examinations both before and after quarantine.
- Preventive measures to reduce stress may help reduce mortality. Reduction in the number of animals per tank, strict hygiene procedures, high water quality, and optimal water temperature will reduce the number of animals affected.

Herpesviruses can cause latent infections, so that any infected animals should be considered life-long carriers.

Suggested disinfectant for housing facilities**Notification****Guarantees required under EU Legislation****Guarantees required by EAZA Zoos****Measures required under the Animal Disease Surveillance Plan****Measures required for introducing animals from non-approved sources****Measures to be taken in case of disease outbreak or positive laboratory findings****Conditions for restoring disease-free status after an outbreak****Contacts for further information****References**

1. Croft LA, Graham JP, Schaf SA, Jacobson ER. 2004. Evaluation of magnetic resonance imaging for detection of internal tumors in green turtles with cutaneous fibropapillomatosis. *J Am Vet Med Assoc* 225: 1428-1435.
2. Greenblatt R, Work TM, Balazs GH, Sutton CA, Casey RN, Casey JW. 2004. The *Ozobranchus* leech is a candidate mechanical vector for the fibropapilloma-associated turtle herpesvirus found latently infecting skin tumors on Hawaiian green turtles (*Chelonia mydas*). *Virology* 321: 101-110.
3. Herbst LH, Jacobson ER, Moretti R, Brown T, Sundberg JP, Klein PA. 1995. Experimental transmission of green turtles fibropapillomatosis using cell-free tumor extracts. *Diseases of Aquatic Organisms* 22: 1-12.
4. Herbst LH, Ene A, Mei S, Desalle R, Lenz J. 2004. Tumor outbreaks in marine turtles are not due to recent herpesvirus mutations. *Current Biol* 14: R697-R699.
5. Herbst LH, Lemaire S, Ene AR, Heslin DJ, Ehrhart LM, Bagley DA, Klein PA, Lenz J. 2008. Use of baculovirus-expressed glycoprotein H in an enzyme-linked immunosorbent assay developed to assess exposure to chelonid fibropapillomatosis-associated herpesvirus and its relationship to the prevalence of fibropapillomatosis in sea turtles. *Clinical and Vaccine Immunology* 15: 843-851.
6. Jacobson, E. R. 2007. Viruses and viral diseases of reptiles. *In: Infectious Diseases and Pathology of Reptiles*, E. R. Jacobson (ed.). CRC Press, Taylor and Francis Group, Boca Raton, USA. Pp. 395-460.
7. Wyneken J, Mader DR, Weber II SE, Merigo C. 2006. Medical care of sea turtles. *In: Reptile Medicine and Surgery*. DR Mader (ed). Saunders Elsevier, St. Louis, MI, USA. Pp. 972-1007.