A COLLABORATIVE PILOT SURVEY OF FIBROPAPILLOMATOSIS AND OTHER POTENTIAL DISEASE AGENTS OF GREEN AND LOGGERHEAD SEA TURTLES AT MORETON BAY, AUSTRALIA

April 1998

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Project Description and Rationale

A cooperative and collaborative pilot study at Moreton Bay, Australia is proposed for June 1998 to collect biomedical specimens to determine distribution and prevalence of fibropapillomatosis (FP) and other potential diseases in foraging aggregations of green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) sea turtles. Some individuals of both species at this location are known to be afflicted with FP and possibly other pathological conditions. However, no histopathological, viral or epidemiological research has been carried out to quantify and characterize the problem. The proposed study will yield fundamental baseline information to fulfill this need. The results of this research will significantly contribute to conservation and management plans for Australian and other South Pacific sea turtles populations.

Field Sampling

Green and loggerhead turtles captured under the direction of Dr. Colin Limpus (Queensland Department of Environment) will be carefully and comprehensively subjected to clinical examinations in the field to determine presence of external or oropharyngeal FP tumors, or other pathological conditions.

Blood specimens will be taken by standard venipuncture from dorsal post-occipital sinuses. Blood will be placed in three labeled heparinized vacutainer tubes and refrigerated at 4 °C or placed in chemical ice. If a clinical laboratory is available within 12 hrs, one tube will be sent to the laboratory for CBC. Plasma will be separated from a second tube after blood specimens are centrifuged then immediately frozen on dry ice or liquid nitrogen for further biochemical, endocrinologic and serologic testing. Plasma will be submitted to the laboratory for biochemistry analysis either in Australia or the United States. The third tube with lithium heparin will be processed in the field to measure absolute white blood cell counts using the Unopette System, total solids with a clinical refractometer and microhematocrit with a centrifuge. The buffy coat will be

placed in a cryogenic vial and subjected to ultrafreezing. Two sets of blood smears will be made for absolute white blood cell counts and the identification of hemoparasites. Blood slides will be air-dried and stored for later staining and examination.

Six-mm skin biopsies (using a standard Dermapunch) will be collected from all turtles. If FP is present, biopsies from selected tumors of different sizes will be collected and either fixed in 10% neutral buffered formalin for histopathologic evaluation, fixed in Karnovsky's solution for electron microscopic evaluation, and/or ultrafrozen with special transport media on dry ice/liquid nitrogen for molecular studies and virus screening and isolation. The collection of all specimens will follow strict accepted biomedical protocols.

Cloacal and nasopharyngeal (choanal, tracheal) swabs will be obtained for bacterial isolation and characterization of normal flora if a qualified laboratory is identified on site. Two sets of samples will be taken: one swab will be placed in Stuart's Transport Media and the second swab in Cary-Blair media. Swabs for chlamydial antigen will be also collected. Swabs will be kept at 4°C or on blue ice until reaching the laboratory for isolation and identification.

Deliberate/intentional necropsies resulting for euthanasia are not justified for this project., unless turtles are encountered that have severe FP with no hope of survival in the wild. If this occurs, tissues will be fixed in neutral buffered 10% formalin for histopathology. Selected tissues will be ultrafrozen on dry ice or liquid nitrogen for microbiological, molecular and toxicological analysis.

Laboratory Techniques

Complete blood cell counts will be performed if a laboratory can be accessed within 12 hours. Blood biochemistry values will be determined using an automated random access analyzer Olympus 5000 series AU5061 or updated model. Analysis will be performed on site or with SmithKline-Beecham Clinical Laboratories, (Van Nuys, California). Ultrafrozen plasma can also be submitted for hormonal and serologic testing.

Fixed normal skin and fibropapilloma biopsies will be embedded in paraffin, sectioned 6-µm thick and stained with hematoxylin and eosin. The skin lesions for electron microscopy will be washed with 0.2 M Sorenson's phosphate buffer pH 7.3 and postfixed in 1.0% osmium tetroxide for 1 h. The tissues will be washed through two changes of ddH_2O, dehydrated through a graded acetone series, infiltrated with and embedded in Medcast-Araldite 502 Resin® (Ted Pella Inc., Redding, CA). Semithin, 1-2µm survey sections will be cut from the blocks, stained with Methylene Blue-Azure II-Basic Fuchsin, and examined with a light microscope. Ultrathin sections from the tumor biopsies of two turtles will be placed on copper grids, stained with uranyl acetate and lead citrate, and examined with a transmission electron microscope.

Histopathologic analyses will be conducted at the Veterinary Diagnostic Laboratory of Colorado State University. Ultrafrozen biopsies of normal skin and tumors and buffy coats will be submitted to the Retrovirus Research Laboratory of the University of Hawaii, and the Department

of Microbiology and Immunology, College of Veterinary Medicine, Cornell University, Ithaca, New York for virus isolation attempts, cell culture and molecular studies. Specimens for bacteriologic isolation will be collected if a qualified laboratory can be reached within 12 hours of collection of specimens. Blood will be stored frozen at -20°C until submitted for toxicological testing.

Results and Publications

Data from this pilot survey will be statistically analyzed and compared with similar studies in the Hawaiian Islands and elsewhere. Future research needs will be identified and recommendations will be provided. The results of this research will be compiled into one or more manuscripts for submission to a scientific journal. Dr. Colin Limpus, the Australian host and co-investigator of this project, will be the second author of all resulting multiple authored publications.

Financial Responsibilities

All travel and lodging costs to and from the Australian study site will be paid by expedition members of the Hawaiian Research Team. All sample shipments and analytical costs will be paid by the Hawaiian Research Team for samples taken to the U.S.A. Six persons will travel to Australia to accomplish this study - A. Aguirre (lead veterinary researcher), G. Balazs, T. Work (DVM), A. Beale (veterinary assistant), B. Zimmerman (veterinary assistant) and M. Rice (field assistant and videographer).

Fibropapillomatosis Research Team coordinated by the Honolulu Laboratory's Marine Turtle Research Program

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George Balazs, Zoologist and Leader (B.S., M.S.)
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Relevant Publications by Team Members

Aguirre, A. A., T. R. Spraker, G. H. Balazs, and B. Zimmerman.
1998. Spirorchidiasis and fibropapillomatosis in green turtles of the Hawaiian Islands. J. Wildl. Dis. 34(1):91-98.

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Work, T. and G. H. Balazs.
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Dr C.J. Limpus
(07) 3227 7718

200250/7

7 April 1998

Trevor LONG
Seaworld Research and Rescue Foundation

Fax: 07 55882187

Dear Trevor

SEAWORLD SUPPORT TO MORETON BAY TURTLE RESEARCH

As discussed on the phone:
Your support is sought for a collaborative study of diseases in the marine turtles of Moreton Bay - with particular emphasis on fibropapilloma and blood fluke disease in loggerhead and green turtles.

The study will be jointly staffed by the DoE turtle research team and by the US National Marine Fisheries Service marine turtle research team out of Hawaii. George Balazs will be the co leader from Hawaiia. See attached project outline of the disease research that has been developed by George Balazs and myself. The study is planned to dove-tail with our standard annual mark-recapture census of loggerhead and green turtles in Moreton Bay so that the turtles from the mark-recapture studies will be used in this add on project.

Given your past support for the Department's Moreton Bay turtle research, I am keen for your continued participation in the new facet of the work. In particular I hope you can donate:

- use of *SEAWORLD II* as a research platform and sleeping area for the team for five days of field work in Moreton Bay during 15-19 June 1998.
- your staff time to crew the vessel for this time.
- fuel for the field trip
- meals for the team while on board *SEAWORLD II*

George Balazs and myself as the co-investigators give our assurance that your organisation will be acknowledged according to your specifications in all publications and in any oral presentations arising from this study. It is expected that 1 or more presentations will be made at the 19th International Symposium on Sea Turtle Biology and Conservation in Texas, USA in early 1989.

As you will see from the project outline, we will be attempting to cover some "laboratory work" to process sample samples while on board the vessel and possibly send some samples daily to a local laboratory for processing. Folding tables may be used on the deck to deal with this. We can talk further to sort out fine details.

My team will be bringing our usual two turtle catch boats and the necessary skippers for the turtle rodeo work. All turtles will be tagged, measured, weighted and processed for sex, maturity and breeding status using laparoscopy as per past procedures.

I envisage that your veterinary and aquaria staff would benefit from the opportunity to work along side and discuss issues with the team that will be coming from the USA. I have commenced discussions with our media folks to ensure that the collaborative study gets some good media coverage. I have no problems with you shooting footage for your own use.

Yours sincerely

Dr C.J. Limpus
Manager
Research & Monitoring (Maritime)

Dr C.J. Limpus
(07) 3227 7718

200250/7

8 April 1998

MEMORANDUM

TO: Director, Conservation Strategy

FROM: Dr C.J. Limpus, Manager, Research & Monitoring (Maritime)

SUBJECT: **Collaborative research on turtle diseases in Moreton Bay**

For your information:

I have set in train planning for a 1 week pilot study of diseases of loggerhead turtles and green turtles in Moreton Bay for the week 15-19 June 1998.

- it will be a collaborative study between our departmental team and a team from the US National Marine Fisheries Service Hawaiian turtle research team. See attached project proposal from the NMFS.
- co leaders of the study will be myself and George Balazs, NMFS
- the study will focus primarily on fibropapilloma disease.
- the resources required from DoE for this study include:
    - turtle catch-boats and skippers to capture the turtles (2 boats currently available & D. Limpus and myself are qualified to skipper the boats.)
    - tags (currently in hand)
    - measuring equipment (currently on hand)
    - fuel for the boats - ~$500 (funds are available to cover this)

This study will be an add-on to the annual mark-recapture census study of the Moreton Bay loggerhead and green turtle populations that normally occurs in May. I have shifted the study into mid June to fit with the availability of the NMFS team. This annual sampling has been supported by SEAWORLD in recent years. I have again requested them to assist in the study. See attached fax to SEAWORLD.

Dr C.J. Limpus
Manager
Research & Monitoring (Maritime)

ri, 24 Apr 1998 18:08:38 -0700
. Colin Limpus <Colin.Limpus@env.qld.gov.au>
: "George H. Balazs" <gbalazs@honlab.nmfs.hawaii.edu>
Subject: Re: Urgent message- 6 total

George H. Balazs wrote:
>
> Col- Please advise if I can bring up to 6 people (myself + 5). Trust me,
> everyone I bring will work like hell, no doubt about it.
>
> Can you please email me an answer very soon. I leave for UAE for 9 days
> early next week, so need to know now in order to inform the people so
> they can make plans. Best, George
>
>
> **
> * George H. Balazs, Leader *
> * Marine Turtle Research Program *
> * National Marine Fisheries Service *
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> **

sorry about delays but I have been off at Business planning meeting for my branch.

All systems are go for the turtle disease study field work in Moreton Bay stepping on to the boats at daylight 15 June and stepping ashore at dusk on 19th June.

we can accomodate your team of 6 - no WUCKING FURRIES (which translates in Australian to "No WUCKERS, MATE")

SeaWorld Research and Rescue Foundation notified me to day that they will be supplying their SEAWORLD II as a mother ship for us to operate from (-65ft vessel) and my Department will be providing a 35ft "patrol boat" to anchor up with us each night to provide the extra berths and cooking capacity.

I need to talk with you about options for the on the spot blood tests etc so that we can advance this further. We can ferry the samples ashore each night and have a courier service from a Medical Pathology Lab meet the boat to take them to immediate analysis - cost will be my limiting capacity - we need to talk. I may be able to include a PhD student on some aspects of the work for additional collaboration.

The 2 turtle catch-boats are in survey and their refit with all necessary gear is well under way. Tags, fuel have been organised

Your guys will need wet-suits & booties for anyone who wants to be involved in the catch-boats. That includes those who will be just be taking samples at the instance of capture away from the mother ship, ie. anyione on board the catch-boats. The enthusiastic catchers who want to try catching in the deeper areas will also need fins, mask&Snorkle. NO WEIGHT BELTS - I will supply.

Give me your travel arrangements as soon as you can. Our Departmental

ant some photo opportuntity with you over here. Our media
ion will certainly be involved. Seaworld will probably be shooting
otage so bring your makeup kit.

We are going to have a ball working together...

Take care
--

+--+
Colin Limpus
Conservation Strategy Branch
Tel: 07 32277718 Fax: 07 32276386
E-mail: Col.Limpus@env.qld.gov.au

BREEDING SEASON (YR. COMMENCING)

	Limpus data	Bustard data
1964	200	
1965	600	
1967		538
1968		292
1969		362
1974	1121	
1975	21	
1976	355	
1977	46	
1978	285	
1979	513	
1980	327	
1981	878	
1982	139	
1983	125	
1984	1471	
1985	42	
1986	505	
1987	947	
1988	111	
1989	1009	
1990	120	
1991	602	
1992	498	
1993	488	
1994	364	
1995	632	
1996	1509	
1997	289	

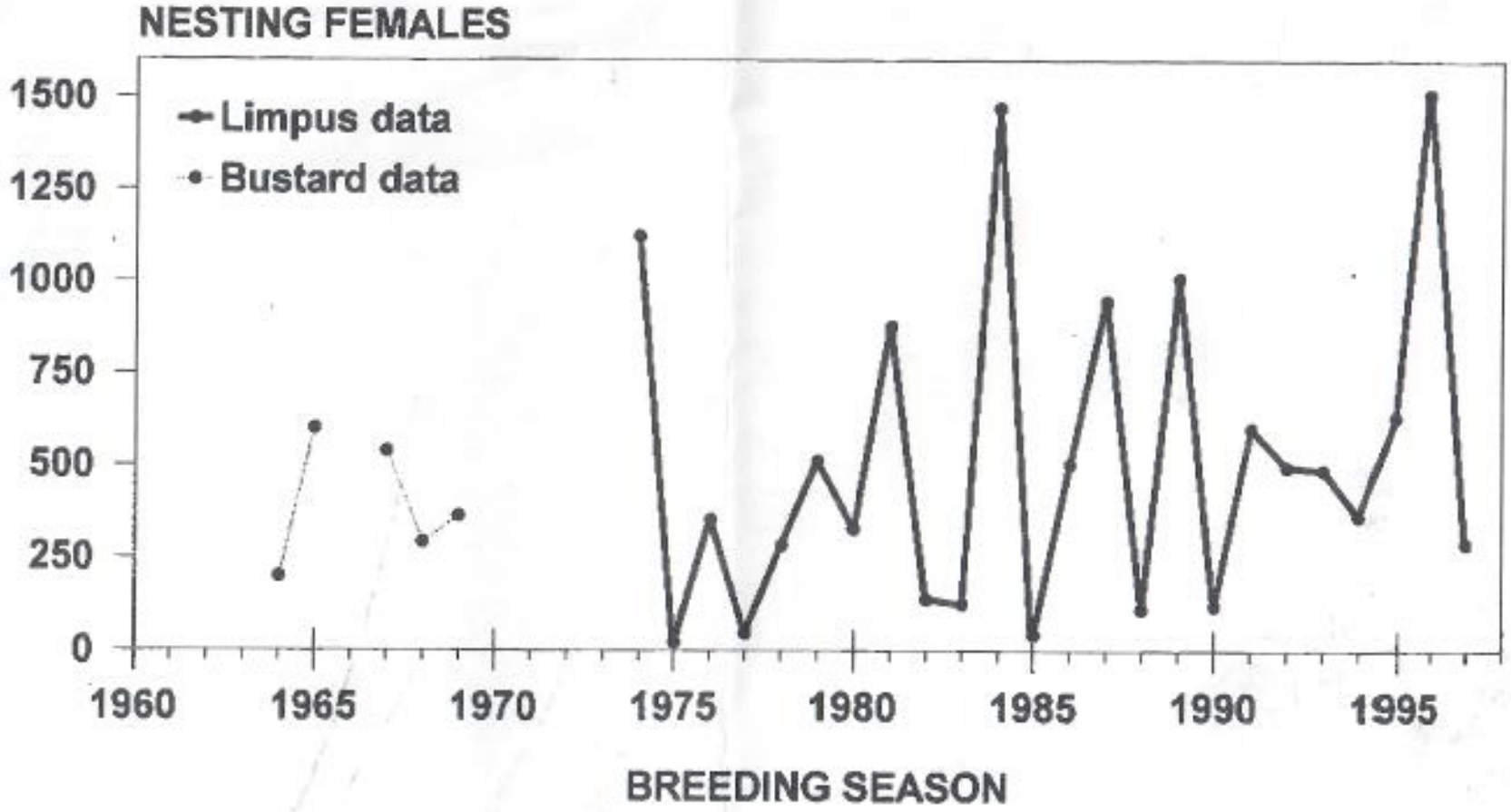
total tagging counts

approx values

Heron Island annual green turtle nesting population

see attached graph

Chelonia mydas HERON ISLAND
TOTAL ANNUAL NESTING POPULATION



Colorado Veterinary Diagnostic Laboratory
College of Veterinary Medicine and Biomedical Sciences
Colorado State University, Fort Collins, CO 80523
Phone: 970-491-1281 Fax: 970-491-0320

DL#: 989-23367
Date: 12/23/99

Vet/Clinic: George Balazs/National Marine Fisheries Service
Owner: NA
Animal ID: NA **Date Specimen Taken:** NA
Species: Australian Sea Turtles **Breed:** NA **Age:** NA **Sex:** NA

History: Submitted are 24 skin biopsies from sea turtles from Australia. All of these samples have been fixed in 10 percent neutral buffered formalin.

HISTOPATHOLOGY: Sample 7 - Normal skin.

Sample 27.1 - Fibropapilloma.

Sample 27.2 - Fibropapilloma.

Sample 30.A - Normal skin.

Sample 30.B - This section is of an extremely early tumor. It is characterized by acanthosis with extremely early pseudoepitheliomatous hyperplasia. There is extensive serocellular crusting on the surface of the epidermis. The degree of fibroplasia within the dermis is considered moderate and of the flattened type of pattern of tumors.

Sample 30.C - Early fibropapilloma with a flattened tumor pattern.

Sample 32 - Normal skin.

Sample 36.1 - Normal skin.

Sample 35 - Fibropapilloma, papillary pattern.

Sample 36.2 - Tissue too small, no diagnosis.

Sample 39.T - Fibropapilloma, papillary pattern.

Sample 40.1 - Normal skin.

Sample 40.2 - Tissue too small, no diagnosis.

Sample 41/44 - Normal skin.

Sample 42 - Normal skin/severe hyperkeratosis with numerous fungal agents, no evidence of tumor in this tissue.

Sample 44.T2 - Fibropapilloma, large.

Sample 46 - Fibropapilloma, flattened pattern but has no pseudoepitheliomatous hyperplasia. It could have been a piece of relatively large nodular smooth type of tumor.

Sample 48.T - Fibropapilloma, large mass.

Sample 50.T - Fibropapilloma, large mass. Pseudoepitheliomatous hyperplasia not present within biopsy.

Sample 52 - Four pieces of tissue are on this slide. Two of them are normal skin and two of them are of a large fibropapilloma. The sections of fibropapilloma do not have pseudoepitheliomatous hyperplasia.

Sample 53 - Severe dermatitis associated with some type of organism. I can't tell what kind of organism it is but it is relatively large and somewhat suggestive of algal growth or some kind of plant life growing on the surface of this turtle, but there is no evidence of tumor in the skin.

Sample 53.1 - Fibropapilloma with both papillary and flattened patterns.

Sample 53.2 - Normal skin.

Sample 53.3 - Fibropapilloma, papillary pattern.

Terry R. Spraker, DVM/PhD

Typed: 2/5/99 ea

Tumor -45

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS

24	Tumor pattern	nodule 3/2 2/5 3/3 4/4	0/4 2/2	0/2 1/4	3/6 3/3	4/4 1/6			
4	Flat	0/0 1/5 0/3 0/4	1/4 0/2	0/2 3/4	0/6 0/3	0/4 0/6			
20	Papillary	0/0 2/5 0/3 0/4	4/4 0/2	2/2 3/4	3/6 1/3	0/4 5/6			
37	Acanthosis +,++,+++	8-10 (2/2) 3/3 4/4	3/4 2/2	2/2 4/4	4/6 1/3	4/4 4/6			
noopi 33	Orthokeratotic hyperkeratosis	1-5 (3/3)	3/4 3/2	4/4 3/4	0/2 1/2	3/4 3/6	1/3 4/4	4/6	
23	Fungus on surface	0/2 2/5 1/3 3/4 4/4 3/2	2/2 3/4	3/6 0/2	1/4 5/6				
8	Mites on surface	0/2 0/5 0/3 0/4 4/4 0/2	0/2 3/4	0/6 0/2	1/4 5/6				
40	Bacteria on surface	3/2 5/5 2/3 4/4 4/4 2/2	2/2 3/4	4/6 1/2	3/4 4/6				
34 noopi	Pseudoepitheliomatous hyperplasia		0/2 4/5	3/3 3/4 4/4	0/2 2/2	4/4 4/6	1/2 2/4	4/6	
11	Necrosis, focal, epidermal	1/2 0/5 1/3	0/3 0/4	0/2	1/2 1/4	3/6 0/2	1/4 3/6		
10	Inflammation under necrosis	1/2 0/5	1/3 0/3	0/4 0/2	1/2 1/4	3/6 0/2	1/4 •	3/6	
19	Swelling of nuclei	1/2 1/5 3/3 0/4 3/4	0/2	1/2 3/4	3/6	0/2	1/4 3/6		
45:1-2	Nucleoli 1:1-2, 2:3-4, prom	1-5 1-2 1-3 4-2	4:4	2:1 2:1	1:4 1:4 1:2	4:1	6:4		
0	Margination of chrom + IN include.		0/2 0/5 4/3	0/4 0/4	2/2 0/2	0/4 0/4	0/2 0/4	0/6	
21	Intercellular edema	1/2 3/5 2/3 0/4 3/4 0/2	1/2 3/4	3/6 0/2	3/4	3/6			
19	Intracellular edema	1/2 2/5 2/3 0/4 3/4 0/2	1/2 3/4	3/6 0/2	3/4	3/6			
12	Individual cell necrosis (S-B/S)	1/2	2/5 1/3	1/4 0/4	0/2 3/4	0/6 1/2	1/4 3/6		
8	Blister between SB/SS/SC	1/2 1/5 1/3 0/4	0/4	0/2 0/2	1/4 0/6	1/2 3/4	1/6		
0	Mitotic figures	0/2 0/5 0/3 0/4 3/4	0/2	0/2 0/2	0/4 0/6	0/2 0/4	0/6		
11	cytoplasmic vacuolation	0/2	2/5	0/3 0/4	3/4 0/2	3/4 0/4	1/2 0/4	3/6	
30	lymphocytic infilt. stra basale	1/2	4/5	3/5 4/4	4/4	0/2 1/2	4/4 5/6	1/2 1/4	3/6
1	papillary projection, epidermis	0/2	0/5 0/3	1/4	0/4 0/2	0/2	0/4 0/6	0/2 0/4	0/6
14	serocellular crusts	1/2 0/5 1/3	1/4	1/4	0/2	2/2	2/4 4/6	0/2 1/4	2/6

Tumor 45

	DERMIS									
L-9 M-36	~~Reactive fibroblast~~ cellularity	L-2/2	M-5/5	L-2/4 M 2/4 M-4/4	3-M L-4 M	6-M 1-L 2M	2M 2L	6-M		
45	Fibroblastic area: Dense/Loose	D-2/2	5/5							
0	Deep fibroblastic reaction	0/2 0/5	0/3 0/4	0 NP/2						
27/45	Vessels sur. by lym - tumor	2/2 3/5	3/3 4/4	1/4 2/2	1/2	1/4 3/6	3/3 4/4	3/6		
17 /21	Vessels sur. by lym - under tumor	1-NP 1-NP	3/3 4/4	1/1 3/3	NP/2 0/2	1/1 1/2	0/1 2/2	5/5		
21/45	Granuloma - tumor	0/2 3/5	0/3 3/4 2/4	0/2 1/2	4/4	5/6 0/3	2/4	1/6		
4/32	Granuloma - under tumor	0/1 2/3	0/1 0/1 2/3	NP 0/2	0/1	0/2 0/1	1/2	1/5		
7/39	Cleft between epidermis/dermis	0/2	1/4 1/3	0/4 0/2	0/2 1/4	0/6 1/2	3/4 1/6			
17	Pigment in tumor	0/2 2/5	3/3 4/4 2/2	0/2 0/4	1/6 1/3	1/4 3/6				
0	Small foci nec. within tumor	0/2 0/5	0/3 0/4	0/4 0/2	0/2 0/4	0/6 0/3	0/4	0/6		
00	Inflammation in tumor	0/2 1/5	2/3 1/4	0/2	0/2	1/4 0/6	1/3 3/4	0/6		
0	Mitotic figures	0/2 0/5	0/3 0/4	0/4 0/4	0/2 0/2	0/4 0/6	0/3 0/4	0/6		0/5
4	Keratin pearls	0/2 0/5	0/3 0/4	0/2	1/4 0/6	0/3 0/4	2/6			4-HH 6-HH
45	Lymphatics/clefts/interweaving bundles	HH-2/2	HH-5/5	3/3-4/4	4-HH	2-HH	2 HH	4-HH 6-HH	3-HH 6-HH	
6	Neovascularization	0/2 1/5	0/3	2-3	0/2 1/2	1/4 0/6	1/3 0/4	0/6		
0	foci of sarcoma	0/2 0/5	0/3 0/4	0/4 0/4	0/2 0/2	0/4 0/6	0/3 0/4	0/6		
0	regressing	0/2 2/5	0/3 0/4	0/4 0/2	0/2 0/4	0/6 0/3	0/4	0/6		

Dust ST.

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	#1	#2	#3	#4	#5	#6	#7 Small dorsal sacr
Tumor pattern	—	—	—	—	—	—	—
Flat	—	—	—	—	—	—	—
Papillary	—	—	—	—	—	—	—
Acanthosis +, ++, +++	5&7	7-8	7-8	7-8	6-7	5-7	7-8
Orthokeratotic hyperkeratosis	1/1	1/2	1/2	1/2	1/1	1/2	1/1 Thic
Fungus on surface	+	+	—	+	+	—	#
Mites on surface	—	—	—	—	—	—	—
Bacteria on surface	+	—	—	+	+	+	+
Pseudoepitheliomatous hyperplasia	—	—	—	—	—	—	—
Necrosis, focal, epidermal	—	—	—	—	—	—	—
Inflammation under necrosis	—	—	—	—	—	—	—
Swelling of nuclei	? —	—	—	—	—	—	—
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	—	—	—	—	—	—	—
Intercellular edema	+VM	—	—	—	—	—	—
Intracellular edema	* —	—	—	—	—	—	—
Individual cell necrosis (S-B/S)	—	—	—	—	—	—	—
Blister between SB/SS/SC	—	—	—	—	—	—	—
Mitotic figures	—	—	—	—	—	—	—
cytoplasmic vacuolation	—	—	+-N	—	—	—	—
loss of lymph cells under St. Basal	—	—	+	—	—	—	—
papillary projection, epidermis	+	* +	—	—	—	+	+
sebaceous crust	—	—	—	—	—	—	—
	N	N	N	N	N	C	O

Axilla S.T.

DERMIS	#1	#2	#3	#4	#5	#6 (small dermal scar)	#7
Dermal ~~Reactive fibroblast~~ cellularity	~~Non~~ Nor	W Nor	N/W Nor	N/W Nor	N/W Nor	Dec Nor	Nor N/W
Fibroblastic area: Dense/Loose	—	—	—	—	—	Dec	—
Deep fibroblastic reaction	—	—	—	—	—	—	—
Vessels sur. by lym - tumor	—	—	—	—	—	+ scan	—
Vessels sur. by lym - under tumor	+ Rare	+ F	+ M	+ M	+ M	+	+
Granuloma - tumor	—	—	—	—	—	—	—
Granuloma - under tumor	1 +	2 Dec +	—	+	—	—	—
Cleft between epidermis/dermis	—	—	—	—	—	—	—
Pigment in tumor V - around vessels	+ (V) Derm	+ (V) D	+ V D	+ V Derm	+ V De-	+ V	+ V VLi HC
Small foci nec. within tumor	—	—	—	—	—	—	—
Inflammation in tumor	—	—	—	—	—	—	—
Mitotic figures	—	—	—	—	—	—	—
keratin pearls	—	—	—	—	—	—	—
hyphae/ steels / intervening hyaline	—	—	—	—	—	—	—
neovascularization	—	—	—	—	—	—	—
foci of sarcoma	—	—	—	—	—	—	—
regressing	—	—	—	—	—	—	—
	N	N	O	O	N	S	S

#3 - dermatitis -

#4 - mole possible involved -
vasculitis
- mild dermatitis

#6 - epidermis - Nor -
focal scarring of dermis c very early tumor - but of SQ only in dermis

#7 - this may be a small fibrous polyp assoc with fungating head
no neoplasm

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	# 9A	# 9B	# 9C	# 10 (missing)	# 11	# 12	# 13A	# 13B
Tumor pattern	–		–		–	–	–	–
Flat	–		–		–	–	–	–
Papillary	–		–		–	–	–	–
Acanthosis +, ++, +++	+ 5-10		+ 15-		– 5-7	– 10-12	– 6-9	– 8-10
Orthokeratotic hyperkeratosis	1/+		–		1/2 +	1/5 –	1-2 –	1-5 –
Fungus on surface	+		+F		+F	–	–	–
Mites on surface	–		–		–	–	–	–
Bacteria on surface	+		+		+F	+F	–	–
Pseudoepitheliomatous hyperplasia	–		–		–	–	–	–
Necrosis, focal, epidermal	–		–		–	–	–	–
Inflammation under necrosis	–		–		–	–	–	–
Swelling of nuclei	–		+		–	+ vac	–	–
Nucleoli 1:1-2, 2:3-4, prom.	1-2		1-2		1-2	1-2	1-2	1-2
Margination of chrom + IN include.	–		–		–	–	–	–
Intercellular edema	–		#		–	–	–	–
Intracellular edema	–		#		–	–	–	–
Individual cell necrosis (S-B/S)	–		#		–	–	ICE # –	–
Blister between SB/~~S~~C normn	–		+		–	–	–	–
Mitotic figures	–		–		–	–	–	–
cytoplasmic vacuolation	+ vac –		+		–	–	–	–
Lymphocyte inf. + / SB	–		–		–	–	–	–
papillary projects, epidermi	–		–		+	–	–	–
serocellular crust	–		–		–	–	–	–
	N		N		N	N	S	N

DERMIS	#9A	9B	9C	#10 missing	#11	#12	#13A	#13B
~~Reactive fibroblast~~ cellularity	T/N		T/N		T/N N.	T/N	Dec under	T/N N
Fibroblastic area: Dense/Loose	N		N		N	N	Dec dens. D	N
Deep fibroblastic reaction	–		–		–	–	–	–
Vessels sur. by lym - tumor	–		–		–	–	–	–
Vessels sur. by lym - under tumor	Derm +		+ PA		+	+ UA	–	+
Granuloma - tumor	–		–		–	–	–	–
Granuloma - under tumor	–		–		+	–	–	–
Cleft between epidermis/dermis	–		+		–	–	–	–
Pigment in tumor	derm +		+ Der		+ Der	+ UL MK	+	+
Small foci nec. within tumor	–		–		–	–	–	–
Inflammation in tumor	–		–		–	–	–	–
Mitotic figures	–		–		–	–	–	–
keratin pearls	–		–		–	–	–	–
hyphae/sheets/interweaving bundles	–		–		–	–	–	–
neovascularization	–		–		–	–	–	–
foci of sarcoma	–		–		–	–	–	–
regressing	–		–		–	–	–	–
	N		N		N	N	S	N

9B - keratin plaque with fungus/bacteria

9C - severe epidermitis/eczema - suggestive of viral epidermitis

#12 - nice normal skin

13A - focal superficial dermal scarring - epidermis - normal

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	#14	#15A	#15B	16	17	18A	18B	20
Tumor pattern nodule	-	-	+	-	-	+	-	-
Flat	-	-	+	-	-	+	-	-
Papillary	-	-	-	-	-	-	-	-
Acanthosis +,++,+++	+ 15-20	- 5-8	- 5-10	- 8-10	- 8-10	- 6-8	- 5-8	- 5-10
Orthokeratotic hyperkeratosis	1-6 -	1-5 -	1-5 -	111 +	1-3 -	1-4 -	1-1 +	3/1 +
Fungus on surface	-	-	-	+	-	-	-	#
Mites on surface	-	-	-	-	-	-	-	-
Bacteria on surface	-	-	+	+	+	+	+	+
Pseudoepitheliomatous hyperplasia	-	-		-	-	-	-	-
Necrosis, focal, epidermal	+	-	+	-	-	-	-	-
Inflammation under necrosis	+	-	+	-	-	-	-	-
Swelling of nuclei	-	-	+	-	-	-	-	-
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	-	-	-	-	-	-	-	-
Intercellular edema	+	-	+	-	-	-	+	-
Intracellular edema	-	-	+	-	-	-	-	-
Individual cell necrosis (S-B/S)	-	-	+	-	-	-	-	-
Blister between SB/SS/SC	-	-	+	-	-	-	-	-
Mitotic figures	-	-	-	-	-	-	-	-
cytoplasmic vacuolation	-	-	-	-	-	-	+	-
Lymphocytic inf. BS	-	-	+	-	-	-	+	-
papillary projection, epider	-	-	-	-	-	-	-	+
serocellular crust.	#	-	+	-	-	-	-	-
	N	N	+	N	N	+	N	N

DERMIS	#14	#15A	#15B	16	17	18A	18B	20
~~Reactive fibroblast~~ cellularity	T/W mod	T/W mod	Loco	T/W mod	T/W mod	low	T/W mod	T/W mod
Fibroblastic area: Dense/Loose	mod	mod	dens	mod	mod	dense	mod	mod
Deep fibroblastic reaction	–	–	–	–	–	NP	–	–
Vessels sur. by lym - tumor	–	–	+ lym	–	–	+	–	–
Vessels sur. by lym - ~~under tumor~~ dermis	+	–	–	+	–	NP	+	+
Granuloma - tumor	–	–	–	–	–	–	–	–
Granuloma - under tumor	–	–	–	+	–	NP	–	–
Cleft between epidermis/dermis	–	–	–	–	–	–	–	–
Pigment in tumor granular cast	+ dec	+	–	+	–	–	+	+
Small foci nec. within tumor	–	–	–	–	–	–	–	–
Inflammation in tumor	–	–	–	–	–	–	–	–
Mitotic figures	–	–	+	–	–	+	–	–
keratin pearls	–	–	+	–	–	+	–	–
hyaline/clefts/interweaving bundles	–	–	HH	–	–	HH	–	–
Neovascularization	–	–	–	–	–	+	–	–
foci of sarcoma	–	–	–	–	–	+	–	–
regressing	–	–	–	–	–	–	–	–
Hemorrhage in dermis	+ m.H	–	–	–	–	–	–	–
	N	N	T	N	N	T	N	N

14 - focal epidermitis c serocellular crust - no tumor

* 15A - mod normal

15B - tumor in dermis - no epiderm,

18A Biop tumor lower ~~me~~ -

20 Orth + heavy lymphs

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	#21	#22	#23	#24				
Tumor pattern	–	–	–	–				
Flat	–	–	–	–				
Papillary	–	–	–	–				
Acanthosis +, ++, +++	– 5-7	– 6-8	+ 8-10	– 6-8				
Orthokeratotic hyperkeratosis	1+4 –	1-3 –	1-3 +foc	1+4 –				
Fungus on surface	–	–	+	+				
Mites on surface	–	–	–	–				
Bacteria on surface	+	+	+	+				
Pseudoepitheliomatous hyperplasia	–	–	–	–				
Necrosis, focal, epidermal	–	–	–	–				
Inflammation under necrosis	–	–	–	–				
Swelling of nuclei	–	–	–	–				
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2				
Margination of chrom + IN include.	–	–	–	–				
Intercellular edema	–	–	–	–				
Intracellular edema	–	–	–	–				
Individual cell necrosis (S-B/S)	–	–	–	–				
Blister between SB/SS/SC	–	–	–	–				
Mitotic figures	–	–	–	–				
cytoplasmic vacuolation	–	–	–	–				
Lymphocytic inf - BS	–	–	–	–				
papillary projections, epider	–	–	–	–				
Serocellular crusts	–	–	–	–				
	N	N	N	N				

DERMIS	# 21	# 22	# 23	# 24				
~~Reactive fibroblast~~ cellularity	TIW	TIW	TIW	TIW				
Fibroblastic area: Dense/Loose	LOV	LOV	LOV	LOV				
Deep fibroblastic reaction	–	–	–	–				
Vessels sur. by lym - tumor	–	–	–	–				
Vessels sur. by lym - under tumor	+	–	NF	–				
Granuloma - tumor	–	–	–	–				
Granuloma - under tumor	–	–	–	–				
Cleft between epidermis/dermis	–	–	–	–				
Pigment in tumor	derm +	deep + R	+	+				
Small foci nec. within tumor	–	–	–	–				
Inflammation in tumor	–	–	–	–				
Mitotic figures	–	–	–	–				
keratin pearls	–	–	–	–				
hyphae/sheets/intervening inflam	–	–	–	–				
NEOVASCULATION	–	–	–	–				
foci of SARCOMA	–	–	–	–				
regressing	–	–	–	–				
	N	N	N	N				

TURTLE CHART HISTOPATHOLOGY

T T T T epidermis ulcerated

EPIDERMIS	#35 A	#35 B	#35 C	#35 D	25 E	26 T	26 S
Tumor ~~pattern~~ nodule	+	−	−		−	+	−
Flat	−	+	−		−	−	−
Papillary / verrucous	−	+	+		−	−	−
Acanthosis +, ++, +++	+ 12-15	+ 8-12	− 5-10		− 7-8	+ 15-20	− 5-8
Orthokeratotic hyperkeratosis	1/1 +	1-3 −	1/4 −		1/3 −	1-3 +	1/3 −
Fungus on surface	−	−	−	+	+	+	+
Mites on surface	−	−	−		−	−	−
Bacteria on surface	+	+	+	+	+	+	+
Pseudoepitheliomatous hyperplasia	+	+	+		−	+	−
Necrosis, focal, epidermal	−	−	−		−	−	−
Inflammation under necrosis	−	−	−		−	−	−
Swelling of nuclei	+	−	−		−	−	−
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2		1-2	1-2	1-2
Margination of chrom + IN include.	−	−	−		−	−	−
Intercellular edema	+	+	+		−	−	−
Intracellular edema	+	+	−		−	−	−
Individual cell necrosis (S-B/S)	+	−	+		−	−	−
Blister between SB/SS/SC	+	−	−		−	−	−
Mitotic figures	−	−	−		−	−	−
cytoplasmic vacuolation	+	+	−		−	−	−
Lymphocytic inf- BS	+	+	+		−	+	−
papillary projections	−	−	−		−	−	−
subcellular crust	−	−	−		−	−	−
	T	T	T	T	N	T	N

DERMIS	#25 A	#25 B	#25 C	#25 D	25 E	26 T	26 S
~~Reactive fibroblast~~ cellularity	mod	mod	mod	mod	thin	mod	thin
Fibroblastic area: Dense/Loose	Den	Den	Den	Den	Loose	Den	Loose
Deep fibroblastic reaction	NP	–	–	NP	–	–	–
Vessels sur. by lym - tumor	–	–	–	+	–	+	–
Vessels sur. by lym - under tumor	NP	+	+	NP	focal +	+	+
Granuloma - tumor	+	+	+	–	–	–	–
Granuloma - under tumor	NP	+	+	NP	+	–	+
Cleft between epidermis/dermis	+	–	–	NP	–	–	–
Pigment in tumor	+	–	–	–	focal +	+	dermal +
Small foci nec. within tumor	–	–	–	–	–	–	–
Inflammation in tumor	–	–	–	+	–	–	–
Mitotic figures	–	–	–	–	–	–	–
keratin pearls	+	–	–	–	–	–	–
hyphae/sheets/intervening bundles	H/I	H/I/S	H/I	H/I/S	–	H/I/S	–
neovascularization	–	–	–	+ surface	–	–	–
foci of sarcoma	–	–	–	–	–	–	–
regressing	–	–	–	–	–	–	–
	T	T	T	T	N	T	N

25A - Top of tumor - one focus - mid cell

& 25B - Several slides of this tumor

25D - epidermis - ulcerated w/ crust/tumor on surface

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	#21 NS	#21 T-1	#21 T-2	#21 T-3				
Tumor pattern, nodular, smooth	−	+	+	+				
Flat	−	−	−	−				
Papillary	−	−	−	−				
Acanthosis +, ++, +++	− 8-10	+ 15-20	+ 10-15	+ 12-18				
Orthokeratotic hyperkeratosis	1/4 −	1/3 +	NP	1/4 +				
Fungus on surface	−	−	−	+				
Mites on surface	−	−	−	−				
Bacteria on surface	+	+	−	+				
Pseudoepitheliomatous hyperplasia	−	+	+	−				
Necrosis, focal, epidermal	−	ulcer +	−	−				
Inflammation under necrosis	−	+	−	−				
Swelling of nuclei	−	+	+	+				
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2				
Margination of chrom + IN include.	−	−	−	−				
Intercellular edema	−	+	+	−				
Intracellular edema	−	+	+	−				
Individual cell necrosis (S-B/S)	−	+	−	−				
Blister between SB/~~SS~~/SC /derm	−	+	−	−				
Mitotic figures	−	−	−	−				
cytoplasmic vacuolation	−	−	−	−				
Cyanobacteria on f. BS	−	+	+	+				
Dyskeratosis prof.	−	−	−	−				
Subcellular crust	−	+	−	−				
	N	T	T	T				

DERMIS	#27 S1	#27 T-1	#27 T-2	#27 T-3				
~~Reactive fibroblast~~ cellularity	Tr	mod	mod	mod				
Fibroblastic area: Dense/Loose	Dr	D	D	D				
Deep fibroblastic reaction	–	–	–	–				
Vessels sur. by lym - tumor	–	+	+	+				
Vessels sur. by lym - under tumor	+	NP	NP	+				
Granuloma - tumor	–	–	–	–				
Granuloma - under tumor	–	NP	NP	–				
Cleft between epidermis/dermis	–	+	–	–				
Pigment in tumor	+	++	++	+				
Small foci nec. within tumor	–	–	–	–				
Inflammation in tumor	–	+	–	+				
Mitotic figures	–	–	–	–				
keratin pearls	–	–	–	–				
hyphae/sheets/intervening tumor	–	HH/S	HH/S	S/TS				
neovascularization	–	–	–	–				
foci of sarcoma	–	–	–	–				
regressing	–	–	–	–				
	N	T	T	T				

first S.T.

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	# 28 S	# 28 T-1	# 28 T-2	# 28 T-3	# 28 T-4			
Tumor pattern, nodule, smooth	—	+	+	+	+			
Flat	—	—	—	—	—			
Papillary	—	—	—	—	—			
Acanthosis +, ++, +++	— 6-9	+ 8-15	+ 8-10	++ 15-25	6-10			
Orthokeratotic hyperkeratosis	1/2 —	1/2 +	1/2 +	1/3 +	1/2 +			
Fungus on surface	+	—	+	—	+			
Mites on surface	—	—	—	—	—			
Bacteria on surface	+	+	+	+	+			
Pseudoepitheliomatous hyperplasia	—	UM +	UM +	+	—			
Necrosis, focal, epidermal	—	—	—	—	—			
Inflammation under necrosis	—	—	—	—	—			
Swelling of nuclei	—	—	—	—	—			
Nucleoli 1:1-2, 2:3-4, prom.	1—2	1-2	1-2	1-2	1-2			
Margination of chrom + IN include.	—	—	—	—	—			
Intercellular edema	—	—	—	—	—			
Intracellular edema	—	—	—	—	—			
Individual cell necrosis (S-B/S)	—	—	+UM	—	—			
Blister between SB/SS/SC	—	—	—	—	—			
Mitotic figures	—	—	—	—	—			
cytoplasmic vacuolation	—	—	—	—	—			
lymphocytic inf SB	—	+	+	+	+			
pap. Hairy projections -	—	—	—	—	+			
serocellular crust -	—	—	—	—	—			
	N	T	T	T	T			

DERMIS	#28 S	#28 T-1	#28 T-2	#28 T-3	#28 T-4			
~~Reactive fibroblast~~ cellularity	T/W	Low	Low	M-D	L			
Fibroblastic area: Dense/Loose	W	Dens	Dens	Dens	Dens			
Deep fibroblastic reaction	–	–	–	–	–			
Vessels sur. by lym - tumor	–	+	+	+	+			
Vessels sur. by lym - under tumor	+	NP	NP	NP	+			
Granuloma - tumor	–	+	+	+	–			
Granuloma - under tumor	–	NP	NP	NP	–			
Cleft between epidermis/dermis	–	–	–	–	–			
Pigment in tumor	Derm +	+	+	+	+			
Small foci nec. within tumor	–	–	–	–	–			
Inflammation in tumor	–	+	–	–	–			
Mitotic figures	–	–	–	–	–			
Keratin pearls	–	–	–	–	–			
Lymph's / sheets / interweaving bundles	–	HH	H	HH	HH			
Neovascularization	–	–	–	+	–			
foci of Sarcoma	–	–	–	–	–			
regressing	–	–	–	–	–			
	N	T	T	T	T	T		

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	30 A-1	30 A-2	30 B	30 C-1	30 C-2	30 T↑ 4x HPI same
Tumor pattern	-	-	-	-	-	-
Flat	-	-	+	-	-	-
Papillary	-	-	+	+	+	+
Acanthosis +,++,+++	- 6-10	- 8-10	- 6-8	++ 15-20	+ 6-10	+ 8-15
Orthokeratotic hyperkeratosis	1/2 -	1/2 -	1/2 -	1/4 +	1/4 -	1-4 +
Fungus on surface	+	+	+	+	+	+
Mites on surface	-	-	-	-	-	-
Bacteria on surface	+	+	+	+	+	++
Pseudoepitheliomatous hyperplasia	-	-	+	++	++	++
Necrosis, focal, epidermal	-	-	-	-	-	-
Inflammation under necrosis	-	-	-	-	-	-
Swelling of nuclei	-	-	-	+	+	+
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	-	-	-	-	-	-
Intercellular edema	-	-	-	+	+	+
Intracellular edema	-	-	-	+	+	+
Individual cell necrosis (S-B/S)	-	-	-	-	-	-
Blister between SB/SS/SC	-	-	-	-	-	-
Mitotic figures	-	-	-	-	-	-
cytoplasmic vacuolation	-	-	-	+	+	+
lymphocytic inf. SB	-	-	+	+	+	+
papillary projection (small epi. dc)	-	-	-	-	-	-
subcellular crust	-	-	-	+	-	-
	N	N	T	T	T	T

DERMIS	#30 A-1	30 A-2	30 B	30 C-1	30 C-2	4 x #30 Tum Loop
~~Reactive fibroblast~~ cellularity	mod	mod	Mod	mod	mod	mod
Fibroblastic area: Dense/Loose	mod	mod	Dense	Dense	Dense	Dense
Deep fibroblastic reaction	–	–	–	–	~	–
Vessels sur. by lym - tumor	NP	NP	–	–	–	+
Vessels sur. by lym - under tumor	+	+	++	++	++	NP
Granuloma - tumor	NP	NP	+	–	+	–
Granuloma - under tumor	–	–	–	–	–	NP
Cleft between epidermis/dermis	–	–	–	–	–	–
Pigment in tumor	P+	P+	–	–	–	–
Small foci nec. within tumor	–	–	–	–	–	–
Inflammation in tumor	–	–	–	–	–	–
Mitotic figures	–	–	–	–	–	–
keratin pearls	–	–	–	–	–	–
hyphae/sheets/intervening bundles	–	–	+++	++	+++	+++
neovascularization	–	–	–	+	+	–
foci of sarcoma	–	–	–	–	–	–
regressing	–	–	–	–	–	–
	N	N	T	T	T	T

AST

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	± 31 S-1	± 31 S-2	±31 T-1	31 T-2	32	33	34
Tumor pattern, nodule, smooth	−	−	+	+	−	−	−
Flat	−	−	−	−	−	−	−
Papillary	−	−	−	−	−	−	−
Acanthosis +,++,+++	− 6-8	+ 8-10	− 8-12	− 8-10	− 6-8	− 8-10	− 4-6
Orthokeratotic hyperkeratosis	1/3 −	1/2 +	1/2 +	1/1 +	1/3 −	1/4 −	1-2 −
Fungus on surface	+	+	+	+	−	−	+
Mites on surface	−	−	−	−	−	−	−
Bacteria on surface	+	+	+	+	−	+	+
Pseudoepitheliomatous hyperplasia	−	−	−	−	−	−	−
Necrosis, focal, epidermal	−	−	−	−	−	−	−
Inflammation under necrosis	−	−	−	−	−	−	−
Swelling of nuclei	−	−	−	−	−	−	−
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-4	1-2	1-2	1-2
Margination of chrom + IN include.	−	−	−	−	−	−	−
Intercellular edema	−	−	−	−	−	−	−
Intracellular edema	−	−	−	−	−	−	−
Individual cell necrosis (S-B/S)	−	−	−	−	−	−	−
Blister between SB/SS/SC	−	−	−	−	−	−	−
Mitotic figures	−	−	−	−	−	−	−
cytoplasmic vacuolation	−	−	−	−	−	−	−
lymphocytic inf SB	−	−	−	−	−	−	−
Papillary projection, epidermis	−	−	−	−	−	−	−
sarcellular crusts	−	−	−	−	−	−	−
	N	N	T	T	N	N	N

DERMIS	#31 S-1	#31 S-2	#31 T-1	#31 T-2	32	33	34
~~Reactive fibroblast~~ cellularity	T/N	T/N	Low	Low	T/N	T/N	T/N
Fibroblastic area: Dense/Loose	NOR	NOR	De-	De-	NOR	NOR	NOR
Deep fibroblastic reaction	—	—	NP	NP	NP	NP	NP
Vessels sur. by lym - tumor	NP	NP	++	+	NP	NP	NP
Vessels sur. by lym - under tumor	+	++	NP	NP	—	—	—
Granuloma - tumor	NP	NP	—	—	NP	NP	NP
Granuloma - under tumor	—	—	NP	NP	—	—	—
Cleft between epidermis/dermis	—	—	—	—	—	—	—
Pigment in tumor	+Dec	+Dec	+	+	—	+Dec	—
Small foci nec. within tumor	NP	NP	—	—	NP	NP	NP
Inflammation in tumor	NP	NP	+	—	NP	NP	NP
Mitotic figures	NP	NP	—	—	NP	NP	NP
Keratin pearls	NP	NP	—	—	NP	NP	NP
Hyphae/sheets/interweaving bundles	NP	NP	HH	HH	NP	NP	NP
Neovascularization	NP	N	—	—	NP	NP	NP
foci of Sarcoma	NP	NP	—	—	NP	NP	NP
regressing	NP	NP	—	—	NP	NP	NP
	N	D	T	T	N	N	N

#31 S-2 - moderate dermatitis - no tumor

31 T1D2 - may be bid - same tumor

#34 - Nice normal, thin epidermis

2 pieces skin both same

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	35 S-1	35 S-2	35 T	36 S-1	36 S-2	36 T	37	38
Tumor pattern	−	−	−	−	−	−	−	−
Flat	−	−	−	−	−	−	−	−
Papillary	−	−	+	−	−	+	−	−
Acanthosis +, ++, +++	− 8-12	− 10-12	+ 8-15	+ 15-20	− 6-12	+ 8-20	− 8-10	− 8-10
Orthokeratotic hyperkeratosis	1-6 −	1-6 −	1/3 +	1/6 +	1/3 +	1/10 −	1/1 + 3/4	1/2 +
Fungus on surface	−	−	+	−	+	+	+	+
Mites on surface	−	−	−	−	−	−	−	−
Bacteria on surface	−	−	+	+	+	+	+	+
Pseudoepitheliomatous hyperplasia	−	−	+	+	−	+	−	−
Necrosis, focal, epidermal	−	−	−	+	−	+	−	−
Inflammation under necrosis	−	−	−	+	−	+	−	−
Swelling of nuclei	−	−	−	+	−	+	−	−
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	−	−	−	−	−	−	−	−
Intercellular edema	−	−	−	+	−	+	−	−
Intracellular edema	−	−	−	+	−	+	−	−
Individual cell necrosis (S-B/S)	−	−	−	−	−	−	−	−
Blister between SB/~~surface~~ dermis	−	−	−	+	−	−	−	−
Mitotic figures	−	−	−	−	−	+	−	−
cytoplasmic vesiculation	−	−	−	+	−	+	−	−
Lymphocytic infiltration SB	−	−	−	+	−	+	−	−
papillary projection, epidermis	−	−	−	−	+	−	+	−
subcellular crust.	−	−	+	+	−	+	−	−
	N	N	T	N	N	T	N	N

DERMIS	35 S1	35 S-2	35 T	36 S-1	36 S-2	36 T	37	38
~~Reactive fibroblast~~ cellularity	T/N	T/N	M	T/N	T/N	Mod	T/N	T/N
Fibroblastic area: Dense/Loose	Nor	Nor	Dense	Nor	Nor	Dense	Nor	Nor
Deep fibroblastic reaction	NP	NP	—	P—	—	—	—	—
Vessels sur. by lym - tumor	NP	NP	+	NP	NP	—	NP	NP
Vessels sur. by lym - under tumor	—	—	—	dermal ++	+	[illegible]	++	+
Granuloma - tumor	NP	NP	—	NP	NP	+	NP	NP
Granuloma - under tumor	—	—	—	—	—	—	—	—
Cleft between epidermis/dermis	—	—	—	+	—	—	—	—
Pigment in tumor	—	—	—	NP +	—	—	Dem —	+
Small foci nec. within tumor	NP	NP	—	~~NP~~	NP	—	NP	NP
Inflammation in tumor	NP	NP	—	NP	NP	—	NP	NP
Mitotic figures	NP	NP	—	NP	NP	—	NP	NP
Keratin pearls	NP	NP	—	NP	NP	—	NP	NP
Hyphae/sheets/intervening bundles	NP	NP	HH	NP	NP	HH	A/P	NP
Neovascularization	NP	NP	—	NP	NP	+	NP	NP
foci of Sarcoma	NP	NP	—	NP	NP	—	NP	NP
regressing	NP	NP	—	NP	NP	—	NP	NP
	N	N	T	N	N	T	N	N

35-S - 2 section - probably 1 piece
35-T - 3 section tumor - all identical
36 S-1 - several clefts per tumor
37 - Cx section of schisome in dermal vessels

TURTLE CHART HISTOPATHOLOGY

? 3 sections same tumor

EPIDERMIS	39 T-1	39 T-2	39 S	41 T-1	40 S-1	41 S-1	42 S	42 T
Tumor pattern, nodular	−	−	−	+	−	−	−	−
Flat	+	−	−	−	−	−	+	−
Papillary	+	+	−	−	−	−	−	+
Acanthosis +, ++, +++	+ 6-10	+ 8-15	− 6-8	++ 15-20	+ 6-10	− 8-10	+ 10-12	+ 12-15
Orthokeratotic hyperkeratosis	+ 1/4	+ 1/1-1/4	− 1/2	− 1/10	+ 1/2	+ 1/1	+ 1/2	+ 1/2
Fungus on surface	+	−	++	−	++	+	+	+
Mites on surface	+	−	−	−	−	−	−	+
Bacteria on surface	+	+	+	−	+	+	+	+
Pseudoepitheliomatous hyperplasia	++	++	+ focal	++	+	−	+	++
Necrosis, focal, epidermal	+	−	−	−	−	−	−	−
Inflammation under necrosis	+	−	−	−	−	−	−	−
Swelling of nuclei	+	+	+	+	−	−	−	−
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	−	−	−	−	−	−	−	−
Intercellular edema	+	+	+	+	−	−	−	−
Intracellular edema	+	+	+	+	−	−	−	−
Individual cell necrosis (S-B/S)	+	−	−	+	−	−	①	−
Blister between SB ~~SB/SG~~ Dermis	−	−	−	+	−	−	−	−
Mitotic figures	−	−	−	−	−	−	−	−
cytoplasmic vacuolation	+	+	−	+	−	−	−	−
lymphocytic inf. str. basale	+	+	−	+	−	−	−	+
pap. hairy projection, epidermis	−	−	+	−	−	−	+	−
serocellular crusts	+	−	−	−	−	−	−	+
	T	T	N	T	N	N	N	T

DERMIS	39 T-1 3 sect. skin ?	39 T-2	39 S	41 T-1	40 S-1	41 S-1	42 S	42 T
~~Reactive fibroblast~~ cellularity	M	M/H	T/w	M	T/w	T/w	M	M
Fibroblastic area: Dense/Loose	D	D	ww	D	ww	ww	Den	Den
Deep fibroblastic reaction	–	–	–	NP	NP	–	–	–
Vessels sur. by lym - tumor	–	–	NP	+	NP	NP	–	–
Vessels sur. by lym - under tumor	++	NP	++	NP	++	–	++	NP
Granuloma - tumor	+	+	NP	++	NP	NP	+	+
Granuloma - under tumor	–	NP	+	NP	–	–	–	NP
Cleft between epidermis/dermis	–	–	–	+	–	–	–	–
Pigment in tumor	–	–	NP	–	–	+	+	–
Small foci nec. within tumor	–	–	NP	–	–	–	–	–
Inflammation in tumor	–	–	NP	+	NP	NP	–	–
Mitotic figures	–	–	NP	–	NP	NP	–	–
keratin pearls	+	–	NP	–	NP	NP	[illegible]	–
haphaz/sheets/interweaving bundles	HH	HH/IB	NP	HH	NP	NP	HH	HH
neovasculation	+	–	NP	–	NP	NP	–	–
foci of sarcoma	–	–?	NP	–	NP	NP	–	–
regressing	–	–	NP	–	NP	NP	–	–
	T	T	N	T	N	N	N	T

39 T-1 ? one tumor/3 sections or X/each

40 S-1 – [illegible] [illegible]
[illegible] 1 skin & 1 tumor – only one skin in cassette –

42-S- is either a very early tumor or a focus of severe dermatitis associated with changes to the epidermis & superficial dermis

A.S.T.

2 sections identical

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	43 S	43 T-1	43 OFP	44 S	44 T-1	44 T-2	44 T-3	44 T-4
Tumor pattern	–	[redacted]	–	–	–	+	+	+
Flat	–	[redacted]	–	–	–	–	–	–
Papillary	–	[redacted]	+	–	+	+	–	–
Acanthosis +, ++, +++	– 6-8	+ 5-10	+ 5-10	– 8-10	+ 12-15	+ 10-15	+ 12-16	+ 15-20
Orthokeratotic hyperkeratosis	1/2 –	1/4 +	1-5 –	1-2 +	1-6 –	1-2 +	1-5 +	1-4 –
Fungus on surface	+	–	–	+	–	+	+	–
Mites on surface	–	–	–	–	–	–	–	–
Bacteria on surface	+	++	+	+	+	+	+	+
Pseudoepitheliomatous hyperplasia	–	+	+	–	+	+	+	+
Necrosis, focal, epidermal	–	++	–	–	+	+	–	–
Inflammation under necrosis	–	++	–	–	+	–	–	–
Swelling of nuclei	–	+	–	–	+	–	+	–
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	–	–	–	–	–	–	–	–
Intercellular edema	–	+	–	–	+	–	–	+
Intracellular edema	–	+	–	–	+	–	–	–
Individual cell necrosis (S-B/S)	–	–	–	–	–	–	–	–
Blister between SB/SS/SC	–	–	–	–	–	–	–	–
Mitotic figures	–	–	–	–	–	–	–	–
cytoplasmic vacuolation	–	–	–	–	–	–	–	–
lymphocytic infl. str. basale	–	+	–	–	+	+	+	+
perivascular, periadnexal	–	–	–	–	–	–	–	–
perivascular crusts	–	++	–	–	+	–	+	+
	N	T	T	N	T	T	T	T

DERMIS	43 S	43 T-1	43 OFP	44 S	44 T-1	44 T-2	44 T-3	44 T-4
~~Reactive fibroblast~~ cellularity	T/M	M	M	T/M	Mod	Mod	Mod	Mod
Fibroblastic area: Dense/Loose	Mix	Den	Den	Mix	Den	Den	Den	Den
Deep fibroblastic reaction	—	NP	—	—	—	—	NP	NP
Vessels sur. by lym - tumor	NP	—	+	NP	+	—	—	—
Vessels sur. by lym - under tumor	+	NP	—	+	NP	+	NP	NP
Granuloma - tumor	NP	+	+	NP	+	+	+	—
Granuloma - under tumor	—	NP	—	—	NP	—	NP	NP
Cleft between epidermis/dermis	—	—	—	—	—	—	—	—
Pigment in tumor	~~NP~~ +	—	—	NP +	+	—	—	—
Small foci nec. within tumor	NP	—	—	NP	—	—	—	—
Inflammation in tumor	NP	—	+	NP	+	—	—	—
Mitotic figures	NP	—	—	NP	—	—	—	—
keratin pearls	NP	—	—	NP	—	—	—	—
hyphaz/stects/interweaving bundles	NP	M	M	NP	M	M	M	M
Neovascularization	NP	—	—	NP	—	—	—	—
foci of Sarcoma	NP	—	—	NP	—	—	—	—
regressing	NP	—	—	NP	—	—	—	—
	N	T	T	N	T	T	T	T

43 T-1 - very small piece of tissue that is primarily composed of subcellular crust.

AST(

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	49 S	49 T-1	49 T-2	50 S	50 T Spine All small	51 S	52 S	52 Tm [illegible]
Tumor pattern	−	+	+	−	+	−	−	?+
Flat	−	−	−	−	−	−	−	−
Papillary	−	−	−	−	−	−	−	−
Acanthosis +,++,+++	+ 10-15	+ 10-20	+ 15-20	− 5-8	+ 10-15	− 6-8	− 6-8	+ 8-10
Orthokeratotic hyperkeratosis	+ 1/3	+ 1/3	+ 1/4	1/2 +	1/1 +	1/3 −	1/1 +	1/1 +
Fungus on surface	++	+	−	+	−	−	+	−
Mites on surface	−	~~[illegible]~~ +	−	−	−	−	−	−
Bacteria on surface	+++	+	+	+	−	−	+	+
Pseudoepitheliomatous hyperplasia	M+	+	+	−	−	−	−	−
Necrosis, focal, epidermal	−	++	−	−	−	−	−	−
Inflammation under necrosis	−	++	−	−	−	−	−	−
Swelling of nuclei	−	+	−	−	−	−	−	−
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	−	−	−	−	−	−	−	−
Intercellular edema	−	+	+	−	−	−	−	−
Intracellular edema	−	+	+	−	−	−	−	−
Individual cell necrosis (S-B/S)	−	−	+	−	−	−	−	−
Blister between SB/SS/SC	−	[illegible] + [illegible]	+	−	−	−	−	−
Mitotic figures	−	−	−	−	−	−	−	−
cytoplasmic vacuolation	−	−	−	−	−	−	−	−
lymphocytic inf. stratum basale	−	−	++	−	−	−	−	−
papillary projection, epidermis	−	−	−	−	−	−	−	−
serocellular crusts	−	−	+	−	−	−	−	−
	N	T	T	N	T	N	N	T

DERMIS	49 S	49 T-1	49 T-2	50 S	50 T (Spin Ag shave)	51 S	52 S	52 T
~~Reactive fibroblast~~ cellularity	T/N	Mod	Mod	T/N	Low	T/N	T/N	Low
Fibroblastic area: Dense/Loose	Loose	Dense	Dense	Loose	Dense	Loose	Loose	Dense
Deep fibroblastic reaction	–	–	–	–	–	–	–	–
Vessels sur. by lym - tumor	NP	+	+	NP	+	NP	NP	+
Vessels sur. by lym - under tumor	+	NP	+	+	NP	–	+	+
Granuloma - tumor	~~NP~~	~~+++~~	+	NP	–	NO	~~NP~~	–
Granuloma - under tumor	–	NP	+	–	NP	–	–	–
Cleft between epidermis/dermis	–	+	+	–	–	–	–	–
Pigment in tumor	~~Dense~~	–	+	+	–	+	+	–
Small foci nec. within tumor	~~NP~~	–	–	–	–	~~NP~~	NP	–
Inflammation in tumor	NP	–	+	–	+	NP	NP	–
Mitotic figures	NP	–	–	–	–	NP	NP	–
keratin pearls	NP	–	–	–	–	NP	NP	–
hyaline/sheets/interweaving bundles	NP	HH	HH	–	HH	NP	NP	S
Neovascularization	NP	–	–	–	–	NP	NP	–
foci of sarcoma	NP	–	–	–	–	NP	NP	–
regressing	NP	–	–	–	–	NP	NP	–
	N	T	T	N	T	N	N	T

52- probably - old scar - may be early tumor but if so only present within dermis

AST.

TURTLE CHART HISTOPATHOLOGY

3 Section all same tumor?

EPIDERMIS	45	46	47 S	47 T	48 S	48 T-1	48 T-2
Tumor pattern	-	-	-	+	-	+	
Flat	-	-	-	-	-	-	Sp: Keloid
Papillary	-	-	-	+	-	-	
Acanthosis +,++,+++	- 4-8	- 10-12	- 6-8	- 6-10	- 6-10	+ 10-20	
Orthokeratotic hyperkeratosis	1/2 +	1/5 -	1/4 -	1/6 -	1/2 -	1/3 +	
Fungus on surface	#	-	+	-	-	-	Layer
Mites on surface	-	-	-	-	-	-	
Bacteria on surface	+	-	+	-	+	+	
Pseudoepitheliomatous hyperplasia	-	-	-	-	-	+	
Necrosis, focal, epidermal	-	-	-	-	-	-	5##
Inflammation under necrosis	-	-	-	-	-	-	9##
Swelling of nuclei	-	-	-	-	-	-	Partly ulcerated
Nucleoli 1:1-2, 2:3-4, prom.	1-2	1-2	1-2	1-2	1-2	1-2	
Margination of chrom + IN include.	-	-	-	-	-	-	
Intercellular edema	-	-	-	-	-	-	
Intracellular edema	-	-	-	-	-	-	
Individual cell necrosis (E-B)	-	-	-	-	-	+	
Blister between SB ~~and~~ dermis	-	-	-	-	-	mild +	
Mitotic figures	-	-	-	-	-	-	
cytoplasmic vacuolation	-	-	-	-	-	-	
lymphocytic inf. str. basale	-	-	-	-	-	+	
pap. hairy projection, epidermis	-	-	-	-	+	-	
syncellular crusts	-	-	-	-	-	-	
	N	N	N	T	N	T	T

DERMIS	45	46	47 S	47 T (Same)	48 S	48 T-1	48 T-2
~~Reactive fibroblast~~ cellularity	T/N	T/N	T/N	Mod	T/N	Low	Mod
Fibroblastic area: Dense/Loose	NR	NR	NR	Den	NR	Den	Den
Deep fibroblastic reaction	–	–	–	–	–	–	–
Vessels sur. by lym - tumor	NP	ND	NP	–	ND	+	+
Vessels sur. by lym - under tumor	+	–	–	–	+	~~NP~~	~~NP~~
Granuloma - tumor	NP	ND	NP	–	–	–	–
Granuloma - under tumor	–	+	–	–	–	NP	NP
Cleft between epidermis/dermis	–	–	–	–	–	+	~~NP~~
Pigment in tumor	~~NP~~ –	+	+	+	+	–	–
Small foci nec. within tumor	ND	NP	NP	–	NP	~~NP~~	–
Inflammation in tumor	NP	NP	NP	–	NP	–	+
Mitotic figures	ND	NP	ND	–	NP	–	–
keratin pearls	NP	ND	NP	–	ND	–	–
hyphaz/sheets/intervening muscle	NP	NP	NP	HH	ND	HH	HH
Neovascularization	NP	ND	NP	–	ND	–	HH
foci of sarcoma	NP	NP	NP	–	ND	–	–
regressing	NP	NP	ND	–	NP	–	–
	N	N	N	T	N	T	T

4 slides 53-

#3 3X tumor maybe

#4

TURTLE CHART HISTOPATHOLOGY

EPIDERMIS	#1 53 [redacted]	#2 53 [redacted]	53 T-1	53 T-2	53 T-3	53 1	53 2	53 3
Tumor pattern	-	-	+ focal	-	-	-	-	-
Flat	-	-	-	-	-	-	-	-
Papillary	-	-	-	+	+	+	+	+
Acanthosis +, ++, +++	- 8-10	- 8-10	+ 12-15	+ 10-15	+ 8-10	+ 12-15	+ 10-20	+ 10-2
Orthokeratotic hyperkeratosis	[redacted]	1/3 +	1/4 +	+ 1-4	+ 1-4	+ 1/4	+ 1/4	+ 1/4
Fungus on surface	-	+	+	-	+	++	+	++
Mites on surface	-	-	-	+	+	++	+	++
Bacteria on surface	-	+	+	+	+	++	+	++
Pseudoepitheliomatous hyperplasia	-	-	+	++	++	++	++	+
Necrosis, focal, epidermal	-	-	-	-	-	+	+	+
Inflammation under necrosis	-	-	-	-	-	+	+	+
Swelling of nuclei	-	-	-	-	-	+	+	+
Nucleoli 1:1-2, 2:3-4, prom.	1A	1-2	1-2	1-2	1-2	1-2	1-2	1-2
Margination of chrom + IN include.	-	-	-	-	-	-	-	-
Intercellular edema	-	-	-	-	-	+	+	+
Intracellular edema	-	-	-	-	-	+	+	+
Individual cell necrosis (S-B/S)	-	-	-	-	-	+	+	+
Blister between SB/SS/SC	-	-	-	-	-	-	-	+
Mitotic figures	-	-	-	-	-	-	-	-
cytoplasmic vacuolation	-	-	-	-	-	-	+	+
lymphocytic inf. str. basale	-	-	-	-	-	+	-	+
pap. dermis projection, epidermis	-	+	-	-	-	-	-	-
perivascular cuffs	-	-	-	-	-	+	+	-
	N	N	T	T	T	T	T	T

4 slide
#53

DERMIS	(1) 53 S-1	(2) 53 S-2	(3) 53 T-1	4 sect tumor 53 T-2	53 T-3	(4) 53 1	53 2	53 3
~~Reactive fibroblast~~ cellularity	T/W	T/W	Mod	Mod	Mod	Mod	Mod	Mod
Fibroblastic area: Dense/Loose	W	W	Den	Den	Den	Den	Den	Den
Deep fibroblastic reaction	–	–	–	–	–	–	–	–
Vessels sur. by lym - tumor	NP	NP	–	–	–	+	+	+
Vessels sur. by lym - under tumor	–	+	+	+	+	+	+	NP
Granuloma - tumor	NP	NP	–	–	–	–	+	–
Granuloma - under tumor	–	–	–	+	–	–	–	NP
Cleft between epidermis/dermis	–	–	–	–	–	–	–	+
Pigment in tumor	~~NP~~	+	–	–	–	+	+	+
Small foci nec. within tumor	NP	NP	–	–	–	–	–	–
Inflammation in tumor	NP	NP	–	–	–	–	–	+
Mitotic figures	NP	NP	–	–	–	–	–	–
keratin pearls	NP	NP	–	–	–	+	+	–
hyphae/sheets/interweaving bundles	NP	NP	HH	HH	HH	HH	HH	HH
neovascularization	NP	NP	–	–	–	–	–	–
foci of sarcoma	NP	NP	–	–	–	–	–	–
regressing	NP	NP	–	–	–	–	–	–
	N	N	T	T	T	T	T	

University of Alaska Southeast
Juneau • Ketchikan • Sitka

School of Education, Liberal Arts and Science
Juneau Campus

George Balazs
U.S. Department of Commerce, NOAA
National Marine Fisheries Service
SWFC, Honolulu Lab, F/SWC2
2570 Dole Street
Honolulu, Hawaii 96822 – 2396

28 December 1998

Dear George:

Here are the results from your Moreton Bay, Australia, samples and the two from Hawaii (27 samples). Australia has a lot of algae and sea grass species that are not found anywhere else, but I have done the best I can with the samples and am confident the identifications are correct. The specimens you sent were interesting and I have pressed a few for our reference later.

I will have to review the past records to see where we stand exactly as far as sample credits are concerned, but you are certainly in the black.

Aloha,

Dennis

Dennis J. Russell

11120 Glacier Highway • Juneau, Alaska 99801-8671 • (907) 465-6405 • FAX: (907) 465-6406

Moreton Bay, Australia, Samples 16-17-18 June 1998, Collected by George Balazs

Identifications of sea grass and algae species by Dennis J. Russell, 22 Dec 1998
I am not familiar with the Australian species of sea grasses or algae and do not have a library for these species. The following is based on what literature I have available.

Moreton Bay, Australia, 16 June 1998

FG1
Halophila ovalis (sea grass)

FG3
Acanthophora spicifera
Covered with many fine hairs

FG4
Halodule beaudettei (sea grass)

FG5
Halodule beaudettei

FG7
Spyridia filamentosa

FG8
Full of very fine Ceramium sp.
On the leaves of Halodule beaudettei

Moreton Bay, Australia, 17 June 1998

BA9
Halophila ovalis
Hypnea valentiae

BA11
Hypnea valentiae

BA12
Dictyota sp.
Hypnea valentiae
Acanthophora spicifera
Spyridia filamentosa
Halodule beaudettei

BA13
Dasya sp.
Hypnea valentiae
Halodule beaudettei

BA14
Halodule beaudettei

BA15
Halodule beaudettei

BA16
Filamentous mat of Cladophora sp.

BA17
Halophila stipulacea (sea grass)

BA19
Caulerpa taxifolia

Moreton Bay, Australia, 18 June 1998

MB21
Acanthophora spicifera
Covered with fine hairs, may be male

MB23
Spyridia filamentosa

MB24
Hypnea nidifica (covered with snail eggs)
Halodule beaudettei
Hydrozoan colonies
Amphipods
Snail shells

MB25
Cystoseira sp. (perhaps it is C. articulata)
5.0cm tall and only 1 mm thick, bladders 2-3 in a row, 2mm diameter, conceptacles present on cylindrical receptacles

MB26
Hypnea valentiae

MB27
Halodule beaudettei
Piece of Halophila ovalis mixed in

MB28
Halodule beaudettei

MB29
Halophila ovalis
Halodule beaudettei

MB30
Halophila ovalis

MB31
Spyridia filamentosa
Syringodium isoetifolium (sea grass)

08-14-98 Honokowai, Maui (Fuzzy?), 30 ft. scuba reef collection

Halimeda scabra
Covered with a "fuzz" of branched sporangia

12010-98 Kaneohe Bay, A.O.L. mouth contents

Halophila hawaiiana

FIRST CONFIRMATION OF MULTIPLE FIBROPAPILLOMAS IN A WESTERN AUSTRALIAN GREEN TURTLE (CHELONIA MYDAS)

Multiple small (1-3 cm diameter) and several relatively large (5-10 cm diameter) round, pedunculated tumours were attached to the skin of the axillary and inguinal regions of a juvenile green turtle (Chelonia mydas) of approximately 10 kg weight and 46 cm curved carapace length found stranded at Baba Head, Shark Bay, Western Australia, on 2 June 1995. The tumours were relatively soft, and were covered with small papillary projections. One large tumour protruding from the inguinal region on the left side had an ulcerated surface and a necrotic central core. There was a 1-2 cm diameter lobulated tumour attached to the conjunctiva on the ventral eyelid of the right eye.

Other juvenile Western Australian sea turtles with very few small external tumours had previously been reported to the junior author (RITP), but the regional occurrence of fibropapilloma disease had not been confirmed. The Baba Head stranding, however, suggested a well developed case of fibropapilloma disease. Transport of the turtle to Perth for further investigation was arranged.

The animal was euthanased by intravenous injection of sodium pentobarbitone into the vertebral venous sinus by a midline approach along the ventral surface of the cranial edge of the carapace. Necropsy examination revealed several, well demarcated, spherical, smooth, white tumours measuring 0.5-1 cm in diameter in each kidney. Some tumours were raised from the surface of the kidney. Their cut surface was white. Other visceral organs appeared grossly normal. Several skin and kidney tumours, and randomly selected 1 cm^3 segments of the visceral organs were removed, fixed in buffered formalin, and processed routinely for histological examination.

The skin tumours were non-encapsulated and composed predominantly of well differentiated, fibroblastic tissue covered by a diffusely, slightly thickened epidermis. The superficial tissue was basophilic, highly cellular and occasional mitotic figures were present in this layer. Deeper fibroblastic tissue was less cellular, disorganised and vascularised. Throughout some

neoplasms were moderate accumulations of free melanin granules and perivascular aggregations of lymphocytes and occasional plasma cells. The tumours in the kidneys were composed of non-encapsulated, dense, well differentiated but disorganised fibroblasts within a dense collagenous ground substance. There was infiltration around renal tubules and collecting ducts at the margins of the neoplasms. Other organs appeared histologically normal.

Fibropapillomas such as those described have been recorded in wild green turtles throughout the Pacific and western Atlantic oceans (Herbst, 1994). In Florida and in the Hawaiian Islands there is a high prevalence and high public awareness of the condition (Balazs, 1991a,b; Herbst, 1994). In Australia there have been several recordings of similar disease in green turtles in the waters off the Queensland coast (Glazebrook and Campbell, 1990; Limpus and Miller, 1994). There have been two recordings of the disease from the Indian Ocean, in the Seychelles and at Aldabra Island, respectively (Herbst, 1994). We believe this is the first confirmation of the disease occurring in Western Australian waters.

Similar fibropapillomas have been reported less frequently in other sea turtles, including wild loggerhead turtles (Caretta caretta) in Florida (Herbst, 1994) and Australia (Limpus and Miller 1994); olive ridley turtles (Lepidochelys olivacea) in Costa Rica (Herbst, 1994); and flatback turtles (Natator depressus) in Australia (Limpus and Miller, 1994). We have no reports so far of the disease occurring in species other than green turtles in Western Australia.

In the present case, the neoplasms described were morphologically benign. The turtle appeared relatively strong, and was in good condition when captured. However, if left to progress naturally, the neoplasms can grow to much larger sizes (>30 cm) and, depending on their location, can interfere with swimming, vision, respiration, and feeding (Herbst, 1994). Affected turtles often have internal fibromas, such as we have described, in the lungs, kidneys, heart, gastrointestinal tract and liver (Herbst, 1994). Growth of visceral neoplasms may compress adjacent normal tissue and organs. Consequently, affected turtles have a reduced ability to survive in the wild.

We have not seen any such tumours on the more than 15,000 mainly adult female turtles tagged in the wild over the past nine years. Dedicated survey of occurrence in Western Australian juvenile turtles has not been attempted, but low frequency occurrence of probable fibropapil-lomas has been reported from observations of approximately 700 turtles in Exmouth Gulf over the past 4-5 years (R. Wann and J. Wann, pers. comm.).

The gross and histological lesions described are similar to neoplasms in other species caused by papillomaviruses. Numerous research groups using various immunological and molecular techniques have generally been unable to demonstrate or extract papillomavirus, group-specific antigens or DNA from the sea turtle neoplasms (Herbst, 1994; Jacobson et al., 1989). A recent transmission study provides evidence that the sea turtle disease may be caused by a herpesvirus (Herbst et al., 1995). The disease was experimentally reproduced in young green sea turtles raised from eggs 15-43 weeks following inoculation with cell-free, filtered homogenates of fibropapillomas obtained from naturally affected turtles. Tumour development was associated with a rise in ambient water temperature. Scattered foci of epidermal degeneration were found in tissue sections of experimentally-induced fibropapillomas and within some sections taken from donor turtles. Electron microscopic examination of these lesions demonstrated intranuclear herpesvirus-like particles.

Acknowledgments: We thank Dot Terry, Nanga Wildlife Park and Refuge, Shark Bay, for drawing this case to our attention, caring for the turtle post-stranding, and arranging its transport to Perth. Necropsy and histology facilities were provided by Murdoch University.

The work comprises part of the Western Australian Marine Turtle Project, supported by Department of Conservation and Land Management, and the Australian Nature Conservation Agency.

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S. R. RAIDAL, Veterinary Biology, School of Veterinary Studies, Murdoch University, Murdoch, Western AUSTRALIA 6150 and R. I. T. PRINCE, Wildlife Research Centre, Department of Conservation and Land Management, P. O. Box 51, Wanneroo, Western AUSTRALIA 6065.

CAUTION URGED IN THE INTERPRETATION OF TRENDS AT NESTING BEACHES

In a recent issue of the Marine Turtle Newsletter, two papers report apparent increases in populations of ridley sea turtles in México (Márquez et al., 1996a,b). Both articles begin with statements to the effect that increasing trends in the annual number of nesting females or the number of nests laid can be interpreted as a reflection of an increasing population. Regrettably, this is not so, and while I join the authors' optimistic hopes for these endangered populations, I would caution against premature declarations of success. There are at least three reasons why the apparent increase in nesting may or may not indicate increasing populations.

First, nesting population counts can only reflect the numbers of reproductively active females. Non-reproducing females and males may or may not be following the same trends. The best that can be deduced from the two data sets presented is that at some time in the fairly recent past, there has been a steady increase in the number of females who reproduced. This may reflect increased recruitment, decreased mortality within these cohorts, or merely a change

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Science Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2395
(808)983-5300 • Fax: (808)983-2902

12/22/98
Fedex TO
Terry Sprakter

24 Australian (Moreton Bay) Sea turtle
Biopsies IN 10% FORMALIN

35	6/16/98	27^*_1	
7		27^*_2	
46	18 JUN 98	30A	
32	6/16/98	30B	
52	18 JUN 98	30C	
50T	18 JUN 98	36^*_1	
48T	18 JUN98	36^*_2	17 JUN 98
$44T_2$	18 JUN98		
41 (44?)	18 JUN 98		
42	18 JUN98		
39T	18 JUN 98		
53	Leech eggs 6/19/98		
53^*_3	19 JUN 98		
53^*_2	19 JUN 98		
53^*_1	19 JUN 98		
40^*_2	18 JUN98		
40^*_1	18 JUN98		

from
George Balazs

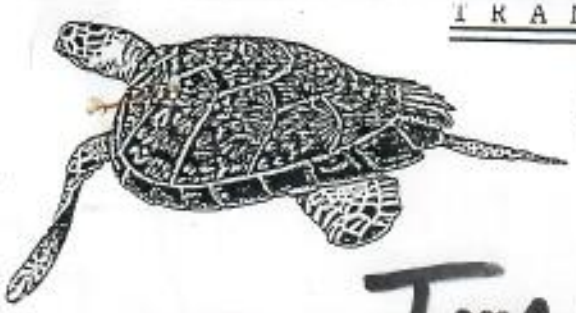
22/7/98

George,

This dry shipper contains 53 samples for biochemistry analysis. In this box is also a cardboard cylinder containing a few laminated prints of western pacific green turtles which we undoubtedly feel are the best looking turtles in the pacific. Cheers OTR

P.S When emptying this container be very sure you get every sample out as there is often a tendency for 1 or 2 samples to get stuck So count them as they come out.

Thanks
Tim + Mark



TRANSMITTAL SHEET

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center Honolulu Laboratory
2570 Dole St. • Honolulu, Hawaii 96822-2396

Commercial: (808) 983-5733
Telefax: (808) 983-2902

TELEFAX FOR: JIM CASEY DATE: 25 AUG 95

FAXED 8-26-95 1:30 SPG/SKKM

FROM: GEORGE BALAZS TELEPHONE EXT: (808) 983-5733

NUMBER OF SHEETS TRANSMITTED (including this page) 5

MESSAGE:

Jim - Here are the data sheets enclosed with the Fedex label on the package. Ample dry ice was used. But please let me know how much remains upon receipt tomorrow A.M. I'd like to have the cooler, and internal styrofoam box returned to me - please charge to our fedex account #1510-7478-2.

There are 56 vials of Australian C. mydas tissue representing 30 individual turtles. There are 17 vials of Australian Caretta caretta tissue representing 13 individual turtles. In addition, there's are Maui C. mydas with 2 vials. Note that 4 of the C. mydas Australian had inadequately labeled vials. That is, we don't know which is normal skin and which is tumor. But, we can tell later if you have some for histopathology. Call me if you have questions - Aloha,

FEDEX # 804783086877 8/24/98

Sample list of biopsies collected at Moreton Bay, Australia

Vials **(CM = 56, CC = 17)** + 1 vial CM Tumor
1 vial CM normal
From 8-11-98
Honokowai, Maui
ID 4077510D6D

June 1998

Marine Turtle Research Program
National Marine Fisheries Service
Southwest Fisheries Science Center
Honolulu Laboratory
2570 Dole Street
Honolulu, HI 96822-2396
(808) 983-5733

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor
2	T75752	F	22.0	CM	57.2	X	
3	T54780	M	32.5	CM	64.5	X	
4	K10030	F	117.5	CM	102.1	X	
5	T64367	F	29.5	CM	61.3	X	
6	K10029	F	157.5	CM	107.4	X	
9	K10048	F	66.0	CM	84.5	X	
9C	K10048	F	66.0	CM	84.5	X	
10	K10050	F	98.5	CM	94.2	X	
11	T80269	F	32.5	CM	64.2	X	
18A	T57231	F	77.5	CM	88.7	X	
18B	T57231	F	77.5	CM	88.7	X	
19	K5245	F	49.0	CM	75.1	X	
20	T67494	F	69.0	CM	83.0	X	
25B	K7324	M	10.4	CM	45.2		X
25D	K7324	M	10.4	CM	45.2		X
25E	K7324	M	10.4	CM	45.2	X	

UF = Ultrafreezer
CM = *Chelonia mydas* = 30 individuals Australia
CC = *Caretta caretta* = 13 individuals Australia

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

Chelonia myda Maui = 1 individual

Sample list of biopsies collected at Moreton Bay, Australia (CM = 56, CC = 17) June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor
26S	T92023	M	28.0	CM	63.1	X	
26T	T92023	M	28.0	CM	63.1		X
27*	T93002	F	61.0	CM	80.9	?	?
27*	T93002	F	61.0	CM	80.9	?	?
28S	T53662	M	68.0	CM	85.6	X	
28T	T53662	M	68.0	CM	85.6		X
30A*	T81731	M	68.5	CM	81.5	?	?
30B*	T81731	M	68.5	CM	81.5	?	?
30C*	T81731	M	68.5	CM	81.5	?	?
30L	T81731	M	68.5	CM	81.5	Leech eggs	
31S	T85191	M	100.5	CM	93.1	X	
31T	T85191	M	100.5	CM	93.1		X
36*	T28710	F	26.0	CM	61.0	?	?
36*	T28710	F	26.0	CM	61.0	?	?
37	T67484	M	28.0	CM	62.1	X	
38	T51149	F	32.5	CM	64.3	X	
39S	T79114	F	30.0	CM	63.4	X	
39T	T79114	F	30.0	CM	63.4		X
40*	K7104	M	25.5	CM	57.4	?	?
40*	K7104	M	25.5	CM	57.4	?	?

UF = Ultrafreezer
CM = *Chelonia mydas*
CC = *Caretta caretta*

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

Sample list of biopsies collected at Moreton Bay, Australia (CM = 56, CC = 17) June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor
42S	K15142	F	22.0	CM	58.7	X	
42	K15142	F	22.0	CM	58.7		X (?)
43S	K7403	M	45.0	CM	75.7	X	
43T	K7403	M	45.0	CM	75.7		X
43OFP	K7403	M	45.0	CM	75.7		X
44S	K7281	M	44.5	CM	71.1	X	
44	K7281	M	44.5	CM	71.1		X (?)
44T	K7281	M	44.5	CM	71.1		X
44T	K7281	M	44.5	CM	71.1		X
45	K5963	M	40.5	CM	68.8	X	
48S	K5964	F	90.0	CM	86.7	X	
48T	K5964	F	90.0	CM	86.7		X
49S	T93083	F	60.5	CM	82.4	X	
49T	T93083	F	60.5	CM	82.4		X
50S	K5967	F	126.0	CM	108.5	X	
50T	K5967	F	126.0	CM	108.5		X
53*	T71537	F	75.0	CM	84.9	?	?
53*	T71537	F	75.0	CM	84.9	?	?
53*	T71537	F	75.0	CM	84.9	?	?
53 Leech eggs	T71537	F	75.0	CM	84.9	Leech eggs	

UF = Ultrafreezer
CM = *Chelonia mydas*
CC = *Caretta caretta*

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

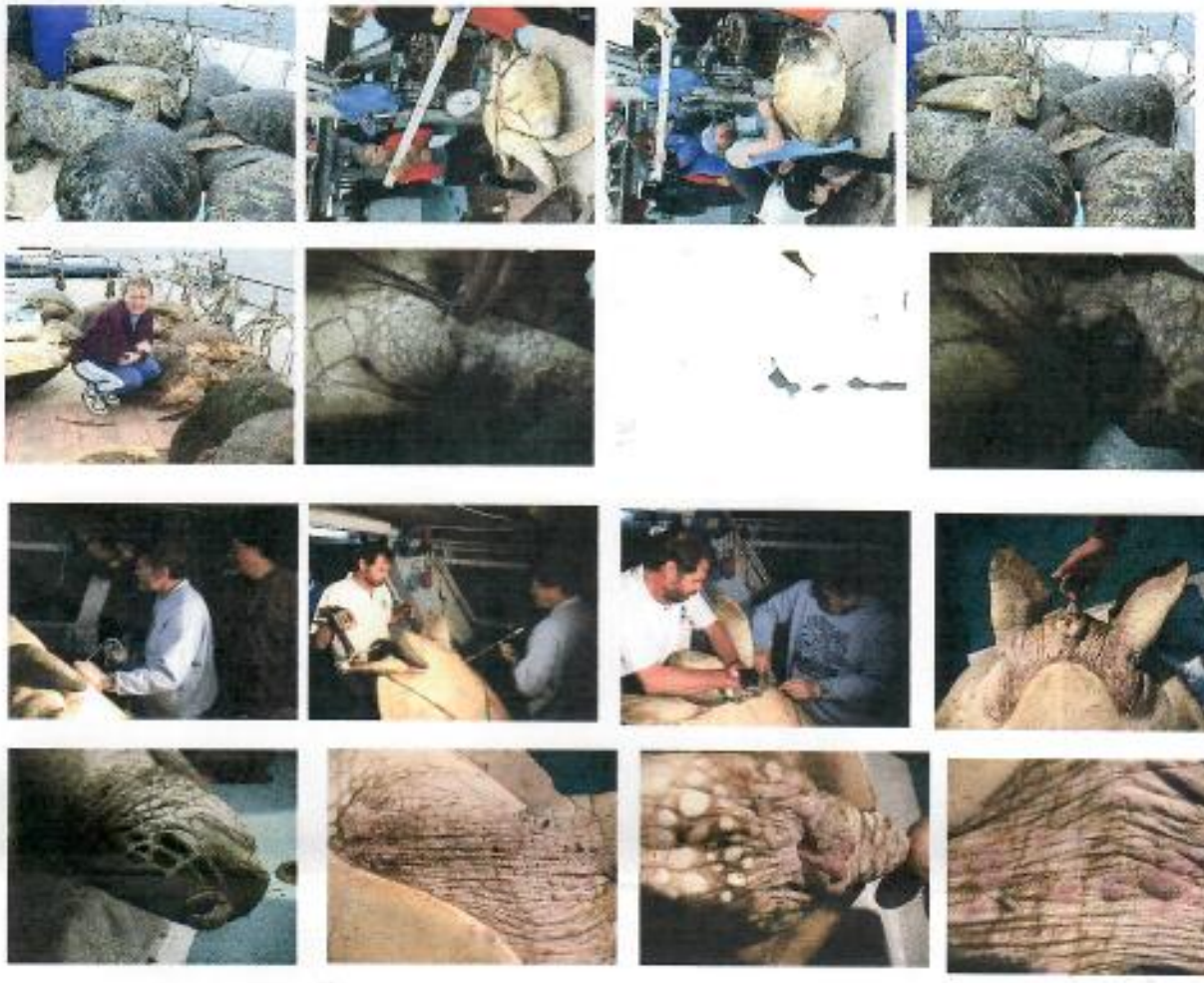
Sample list of biopsies collected at Moreton Bay, Australia (CM = 56, CC = 17) June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor
1	T79953	F	29.0	CC	61.6	X	
12	K17069	M	49.5	CC	78.4	X	
13A	K10028	M	97.5	CC	99.3		X
13B	K10028	M	97.5	CC	99.3	X	
14	K10047	F	60.0	CC	82.0	X	
15	K17067	F	67.0	CC	85.3	X	
15B	K17067	F	67.0	CC	85.3		X
16	K17066	M	18.0	CC	52.7	X	
21	K17070	F	73.0	CC	86.3	X	
22	T57182	F	67.5	CC	87.3	X	
23	K8698	M	54.5	CC	78.0	X	
24	T71533	M	57.5	CC	81.1	X	
33	K10031	F	67.0	CC	86.5	X	
34	T91896	F	62.0	CC	82.3	X	
47	K15114	F	63.0	CC	82.0	X	
47	K15114	F	63.0	CC	82.0	X	
51	K15147	F	59.0	CC	83.8	X	

UF = Ultrafreezer
CM = *Chelonia mydas*
CC = *Caretta caretta*

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

Australia floppy 1



Australia floppy 2

Australia floppy 3

QUEENSLAND TURTLE CONSERVATION PROJECT
MORETON BAY RODEO : 15-19 MAY 1997

DEPARTMENT OF ENVIRONMENT, US NATIONAL MARINE FISHERIES SERVICE and SEAWORLD

LOGISTICS:

CREW:

DoE team:

Dr. Col. Limpus (Project leader)
Duncan Limpus (Technical Officer)
Mark Hamann (UQ, PhD student)
Tim Jessop (UQ, PhD student)

US National Marine Fisheries Service team:

George Balazs (Project leader)
Dr. Alonso Aguirre (University of Hawaii, veterinarian)
Mark Rice
+ three others

Seaworld crew:

Trevor Long
Wendy Blanchard (veterinarian)
Marnie Horton (senior aquariast)

VESSELS:

Mother ship:

Seaworld I
Seaworld II

Turtle catch boats:

Turtle Research 1: 9987QE
Turtle Research 3: 11723QE

STUDY AREA:

Moreton Banks, Maroom Banks, Pool Island and Pelican Banks (weather permitting)

COMMUNICATIONS:

Telephone:

- *Seaworld* I , phone no. 0418 756767
- or place call through ships radio, Coast Guard/Air Sea Rescue radio : Seaworld call sign - **Seaworld I VL4606**

local radio communications between vessels: Channel 77

Alternate contact to US visitors:

via Col Limpus' home phone: 61 7 3245 4056 and organise for return call.

DATES, TIMES, PLACES:

The team will be living on board *Seaworld I*.

Monday, 26 May, 0800hr: Departing Raby Bay Air Sea Rescue boat ramp

- Monday, Tuesday, Wednesday nights at anchor in or adjacent to the Moreton Banks (?Blue hole)
- Thursday night at anchor in southern Bay (?Peel Island or Pelican Banks area)

Friday, 30 May ~1530hr, Return to Raby Bay

PERSONAL GEAR:

Please keep gear to a minimum!

- wetsuit & booties
- sunglasses & sun protection
- toilet gear
- warm work clothes. It will be cold at night and wet under foot on the work deck.
- Duncan, Mark and Tim to bring their own swags for sleeping on the deck.
- Everyone except the US visitors to bring their own towel.

Bring your own munchies/soft drink. All other food is provided - Trevor's usual diverse quisine!

RESEARCH ACTIVITIES:

1. Turtle diseases in Moreton Bay (pilot study):
   (Collaborative study with US NMFS)
   - documentation of external evidence of diseases and injuries to marine turtles;
   - quantification of incidence and severity of green turtle fibropapilloma disease in loggerhead and green turtles:
     - collection and subsequent analysis of skin and blood samples from apparently healthy and infected turtles and tumor samples from infected turtles;
   - assessment of blood fluke, microbial and viral infections using swabs and blood samples with assistance from local institutions (QUT, DPI ARI).

2. Demographic study of Moreton Bay turtles:
   (DoE Research and Monitoring project)
   - mark /recapture of unbiased catch of a large series of *Chelonia* & *Caretta* for measurement, sex, maturity, breeding status, growth;
   - feeding area fidelity study;
   - assessment of breeding frequency for the 1997-1998 bredding season.

3. Hawksbill population dynamics:
   (Japan Bekko Association grant)
   - Peel Island & Henderson Gutter: mark recapture of hawksbill turtles with recorded sex, maturity, breeding status, genetic sampling, growth ring assessment.

Follow ups to previous studies:

4. Satellite telemetry:
   (Seaworld Research and Rescue Foundation grant)
   - Recovery of the 5 adult female *Caretta* that were tracked via satellite telemetry in 1996-1997.

5. Biology of adult male *Chelonia*:
   (ARC Grant, UQ)
   - Maximum capture of adult male *Chelonia* to assess migration and demographic characteristics

Minor studies

6. Dugong studies:
   (DoE Research and Monitoring project)
   - Assess tagging techniques for dugong.

TRAVEL ARRANGEMENTS FOR US VISITORS:

13 June: arrive Brisbane on Qantas 508 at 0930hr

- will be met with transport by Col Limpus

transfer to Alexandra Hills Hotel (accommodation 3 double rooms for nights of 13th & 14th) $80/night/[redacted] — includes breakfast

14 June: midday bar-B-Q at Limpus residence (13 Valantine Rd, Birkdale) for locals to meet the visitors.

19th & 20th June: Alexandra Hills Hotel (accommodation as above)

21 June: depart Brisbane on Qantas 505 at 0700hr
Col Limpus will provide transport to the airport.

ALEXANDRA HILLS HOTEL/MOTEL
FINUCANE ROAD
ALEXANDRA HILLS QLD 4161
PH (07) 3824 4444

RECEIPT

Date 30.5.98

Received from .....

The sum of Sixty Dollars .....

being for Deposit for 3 rooms
Booked for 13 & 14th June
14 & 15th June

$ 60—

Signature
Duty Manager

WELCOME TO THE McGUIRES ALEXANDRA HILLS HOTEL/MOTEL

Here at the Alexandra Hills Hotel/Motel we have twelve motel rooms each with one double bed and two single beds.

Each room also contains:

* Ensuite
* Tea and Coffee making facilities
* Air - conditioning
* Colour Television
* STD phone.

We have a same day Dry Cleaning service available to our guests (Monday to Friday).

You will find our accommodation tariffs to be very reasonable and all include a complimentary, full cooked breakfast delivered to your room, for each morning you stay with us.

Tariffs are as follows:			
	Double:	$ 80.00	
	Single:	$ 70.00	
	Extra Adult:	$ 25.00	
	Extra Child:	$ 15.00	(4 - 12yrs)

* Children three and under are free of charge *

If you stay with us for a period of 7 nights or longer, or make a group booking of 10 rooms or more you will receive a 10% discount.

Our Hotel/Motel has a lot to offer for people of all ages;
* Downstairs in ***Jack's Bar*** we have $ 1.95 Roast lunches, 25 New Pokie machines, Jupiter's Keno, PubTab, Pool Tables and Live entertainment from Thursday through to Saturday.
* ***Splendido's*** is our friendly family Restaurant, open seven days a week for Lunch and Dinner. Room service is also available.
* McGuire's Famous ***Seafood Smorgasbord*** is Friday & Saturday night, only $27.95 for all you can eat.
* On Friday nights our night club ***"Alexandra's"*** comes alive for all to enjoy.

We are also just minutes from local shopping complexes, movie theatres and the beach side, with the busline running straight past us.

McGUIRES ALEXANDRA HILLS HOTEL/MOTEL
CNR FINUCAINE AND McDONALD ROAD
ALEXANDRA HILLS QLD 4161
PH: 3824 4444 FAX: 3824 4979

Sample list of biopsies collected at Moreton Bay, Australia
June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor
7	K10050	F	99.5	CM	94.2		
52	T51134	F	83.5	CM	87.9		
32	X28457	F	98.0	CC	97.3		
35	T91895	M	116.0	CC	98.8		
46	T53800	M	85.5	CC	84.8		

UF = Ultrafreezer
CM = *Chelonia mydas*
CC = *Caretta caretta*

FEDEX # 804783086877 8/24/98

Sample list of biopsies collected at Moreton Bay, Australia

Vials (CM = 56, CC = 17)

June 1998

Marine Turtle Research Program
National Marine Fisheries Service
Southwest Fisheries Science Center
Honolulu Laboratory
2570 Dole Street
Honolulu, HI 96822-2396
(808)983-5733

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor	
				CM				
2	T75752	F	22.0	CM	57.2	X		—
3	T54780	M	32.5	CM	64.5	X		—
4	K10030	F	117.5	CM	102.1	X		—
5	T64367	F	29.5	CM	61.3	X		—
6	K10029	F	157.5	CM	107.4	X		—
9	K10048	F	66.0	CM	84.5	X		—
9C	K10048	F	66.0	CM	84.5	X		—
10	K10050	F	98.5	CM	94.2	X		++
11	T80269	F	32.5	CM	64.2	X		—
18A	T57231	F	77.5	CM	88.7	X		+
18B	T57231	F	77.5	CM	88.7	X		—
19	K5245	F	49.0	CM	75.1	X		+
20	T67494	F	69.0	CM	83.0	X		+-(weak)
25B	K7324	M	10.4	CM	45.2		X	+++
25D	K7324	M	10.4	CM	45.2		X	+++
25E	K7324	M	10.4	CM	45.2	X		+

UF = Ultrafreezer
CM = *Chelonia mydas* = 30 individuals Australia
CC = *Caretta caretta* = 13 individuals Australia

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

Sample list of biopsies collected at Moreton Bay, Australia 2
(CM = 56, CC = 17)
June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor	
26S	T92023	M	28.0	CM	63.1	X		+
26T	T92023	M	28.0	CM	63.1		X	+
27* 1	T93002	F	61.0	CM	80.9	?	?	+
27* 2	T93002	F	61.0	CM	80.9	?	?	+
28S	T53662	M	68.0	CM	85.6	X		−
28T	T53662	M	68.0	CM	85.6		X	+
30A*	T81731	M	68.5	CM	81.5	?	?	+
30B*	T81731	M	68.5	CM	81.5	?	?	+++
30C*	T81731	M	68.5	CM	81.5	?	?	++
30L	T81731	M	68.5	CM	81.5	Leech eggs		++
31S	T85191	M	100.5	CM	93.1	X		+
31T	T85191	M	100.5	CM	93.1		X	+−
36* 1	T28710	F	26.0	CM	61.0	?	?	+−
36* 2	T28710	F	26.0	CM	61.0	?	?	+++−
37	T67484	M	28.0	CM	62.1	X		+−
38	T51149	F	32.5	CM	64.3	X		+−
39S	T79114	F	30.0	CM	63.4	X		+−
39T	T79114	F	30.0	CM	63.4		X	+++
40* 1	K7104	M	25.5	CM	57.4	?	?	+++
40* 2	K7104	M	25.5	CM	57.4	?	?	+++−

UF = Ultrafreezer
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CC = *Caretta caretta*

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

I Tube #41 is not listed

Sample list of biopsies collected at Moreton Bay, Australia (CM = 56, CC = 17) June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor	
42S	K15142	F	22.0	CM	58.7	X		+
42	K15142	F	22.0	CM	58.7		X (?)	+
43S	K7403	M	45.0	CM	75.7	X		−
43T	K7403	M	45.0	CM	75.7		X	++++
43OFP	K7403	M	45.0	CM	75.7		X	++++
44S	K7281	M	44.5	CM	71.1	X		−
44	K7281	M	44.5	CM	71.1		X (?)	−
44T	K7281	M	44.5	CM	71.1		X	+++
44T	K7281	M	44.5	CM	71.1		X	+++
45	K5963	M	40.5	CM	68.8	X		−
48S	K5964	F	90.0	CM	86.7	X		+++
48T	K5964	F	90.0	CM	86.7		X	+++
49S	T93083	F	60.5	CM	82.4	X		−
49T	T93083	F	60.5	CM	82.4		X	++
50S	K5967	F	126.0	CM	108.5	X		−
50T	K5967	F	126.0	CM	108.5		X	−
53*	T71537	F	75.0	CM	84.9	?	?	+++
53*	T71537	F	75.0	CM	84.9	?	?	+
53*	T71537	F	75.0	CM	84.9	?	?	+++
53 Leech eggs	T71537	F	75.0	CM	84.9	Leech eggs		−

UF = Ultrafreezer
CM = *Chelonia mydas*
CC = *Caretta caretta*

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

Sample list of biopsies collected at Moreton Bay, Australia
(CM = 56, CC = 17)
June 1998

CC

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor	
1	T79953	F	29.0	CC	61.6	X		—
12	K17069	M	49.5	CC	78.4	X		—
13A	K10028	M	97.5	CC	99.3		X	+++
13B	K10028	M	97.5	CC	99.3	X		—
14	K10047	F	60.0	CC	82.0	X		—
15	K17067	F	67.0	CC	85.3	X		—
15B	K17067	F	67.0	CC	85.3		X	++++
16	K17066	M	18.0	CC	52.7	X		—
21	K17070	F	73.0	CC	86.3	X		—
22	T57182	F	67.5	CC	87.3	X		—
23	K8698	M	54.5	CC	78.0	X		—
24	T71533	M	57.5	CC	81.1	X		—
33	K10031	F	67.0	CC	86.5	X		— (+) low
34	T91896	F	62.0	CC	82.3	X		— (+) low
47	K15114	F	63.0	CC	82.0	X		+ low
47(2)	K15114	F	63.0	CC	82.0	X		—
51	K15147	F	59.0	CC	83.8	X		—

14
4
2

UF = Ultrafreezer
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CC = *Caretta caretta*

* Unknown (not labeled) as to which vial contains UF skin and UF tumor

+++ highest level

Sample list of biopsies collected at Moreton Bay, Australia
June 1998

Vial ID	Tag ID	Sex	Weight (Kg)	Species	CCL (cm)	UF Skin	UF Tumor
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46	T53800	M	85.5	CC	84.8		

UF = Ultrafreezer
CM = *Chelonia mydas*
CC = *Caretta caretta*

??

↑ Nothing on vial

11-24

Alonso - + TERRY

These samples were not sent to Jim, I guess because I didn't know what they were. Can you determine? I should probably send now, but will wait to see Terry's results. GLD.