



LIONS ~ DEVILS

NEWS #1 August 2008



"It would be a great shame for the Devil to follow the Tasmanian Tiger".

Tasmanian Devil Facial Tumour Disease

In the mid 1990's a new disease was observed affecting Tasmanian devils (*Sarcophilus harrisii*) and increasing numbers of animals were submitted for examination and diagnosis by veterinary pathologists at the Animal Health Laboratories, Department of Primary Industries and Water, Launceston, Tasmania. As the prevalence of this disfiguring facial tumour disease increased in many populations throughout the state it became quickly apparent that it was presenting as a new and emerging disease of the iconic Tasmanian devil.

Using standard pathological techniques Loh *et al* (2006a) found that the cells in the facial masses of DFTD were consistent with an undifferentiated neoplasm. Neoplasms had been described from devils previously (Griner, 1979) however none had the characteristics of this new disease. Affected devils consistently had disfiguring and debilitating facial tumours and initially there was very little agreement on the cell type and classification of this tumour as DFTD cells exhibited many forms. One consistent finding was that the tumours appeared morphologically similar in affected animals from a wide geographic range in the state.

Further tumour classification was undertaken and from this information combined with the morphological and microscopic features of DFTD it was concluded that the neoplasm was consistent with a malignant neuroendocrine tumour.

In parallel with this work studies of the tissue cells were being undertaken to describe the normal cell structure of the Tasmanian devil. Like so many aspects of the Tasmanian devil very little was known of the basic chromosomal characteristics of the species. Standard cell study techniques were adapted to the study of devil tissues and cell structure of this unique neoplasm was established.

The particular characteristic displayed in DFTD cells was remarkable in the extent and consistency shown (Pearse and Swift, 2006) Like the morphological descriptions derived from pathological studies this characteristic was consistent in tumours from animals in many geographical locations within the state. Rearrangements were identical in male and female animals from a range of ages indicating that cytogenetically, DFTD is relatively stable. The degree of chromosomal rearrangement that had been observed in all tumours, the consistency of the rearrangements combined with this finding, lead researchers to hypothesise that the cancer was acting as a transmissible graft.

The tumour is in cell culture and work to date has identified a number of different strains, which are yet to be characterised pathogenically.

For a cancer to be transmissible there are a number of mechanisms which could be operating either separately or in combination to allow this phenomena. The host cellular immune system is key to protection against rogue cell lines which have been developed endogenously or introduced from the environment. For a cell line to be transmissible it must avoid a normal cell response, rely upon host immuno-compromise or

The Strategy of Control

To consider methods for controlling DFTD one must understand the disease and its method of transmission as well as the history of the species. At some time in the past there was a "genetic bottleneck" resulting in the death of most of the animals and survival of only a few individuals that when reproducing created a population of very closely related animals.

This unique cancer is limited to the Tasmanian Devil. The causative agent are the tumour cells. Unlike other types of cancers, a virus, chemical, compound, mineral or environmental contaminant is not the cause of the disease. How the original cell became malignant is still not understood but it is known that when cells from the cancer are introduced into an animal by deep bite wounds, the animal does not recognize the cells as foreign tissue and the cells grow and form these tumours. Cells from tumours in and around the mouth are constantly breaking off and when attached to the teeth and gums are introduced when Devils bite each other while fighting over food and mates. It is because the population of Devils is so closely related that individuals cannot recognize cells as foreign and reject them. Understanding this is a help in developing control measures.

We cannot stop Devils from their normal behavior in the wild, or for that matter if kept in groups in captivity. If infected Devils can be eliminated from a population there would be no malignant cells available to transfer from one to another. If non-infected animals are captured and used as an insurance breeding population they should be free of the disease. (Unless it spontaneously occurs again which is very unlikely.)

A basic principle of disease control is to separate infected individuals from those that are not infected. Since insect bites and air movement does not appear to be involved in the spread of DFTD, mechanical separation of infected and non-infected animals would stop the spread of the disease. This could be accomplished by trapping and separating or destroying infected animals. Given their habitat and range this might be a very difficult task. Another strategy being considered is the development of a vaccine which when administered to unaffected animals would stimulate their immune system to recognize the cancer cells as foreign and destroy them. Cancer vaccines have had a history of great difficulty to produce and administering them to wild Devils would be a challenging task.

One hope would be the discovery of a population of genetically different Devils. Hopefully they would naturally recognize the cancer cells and reject them. This may be the case with the population of animals in the far North-West of Tasmania. If this were the case, over many decades, this population of animals could spread and repopulate the State if the affected population dies out.

What ever strategy or strategies work needs to be implemented as soon as possible. The disease has been spreading quickly and threatens to drive the Tasmanian Devil to extinction. It would be a great shame for the Devil to follow the Tasmanian Tiger.

Dr James M. HARRIS, DVM

Continued over page ...

itself induce suppression. Research is aggressively working to explain how DFTD is transmissible. Hope rests in the populations that remain free of the disease in that they will help to explain the mechanism. As they are free of disease they also act as a good source of breeding animals for captive management of the species.

Work continues to achieve the ultimate aim of having Tasmanian devils in the wild in ecologically sustainable populations.

Dr Stephen Pyecroft, BVSc (Hons) PhD MACVSc

CONTACT :

For technical queries and advice on Club proposals please contact

VDG Dr John Gillham, BVSc

In addition to the experts who have contributed to this "News" I have contact with many others working in this important programme and can provide further information if required.

How Tasmanian Lions Can Help

There are a number of land owners in the various parts of Tasmania either establishing isolation colonies or planning to do so in the near future, including some associated with wildlife parks. If Clubs wish to become involved, in the first instance check in your own communities for interested land owners and park operators.

The type of help which can be given may vary from assistance in the supply of materials to the supply of volunteer labour. This will be a matter of arrangement between the Club and the operator of the isolation facility.

As information comes to hand regarding approved operators of isolation colonies, and Club's expressions of interest, details will be collated and made available to all Clubs.

To save the Tasmanian Devil it behoves the Lions of Tasmania to become involved.



Clubs wishing to help those establishing and operating isolation colonies of the Tasmanian Devil, **must** ensure that the operator has all of the essential permits.

It must be remembered that the Tasmanian Devil is not only a native species requiring Government authority to keep, it is also an endangered species.

An isolation fence constructed on the property shown below : high enough to prevent Devils climbing up and buried deep enough to prevent tunnelling. It is necessary to prevent Devils escaping and any that may be outside getting into the isolation area.



An approved isolation area currently being developed on Tasmania's East Coast.

I believe that Tasmanian Lions can become significantly involved as partners in the Tasmanian community in efforts to prevent the extinction of the Tasmanian Devil VDG John Gillham