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Media Release

Chiefs of Staff, News Directors

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Potential genetic responses to devil disease examined

New research investigating potential genetic responses associated with the spread of the Devil Facial Tumour Disease (DFTD) amongst the Tasmanian devil population has been published.

Former University of Tasmania School of Biological Sciences PhD student Dr Anna Brüniche-Olsen was part of a team of researchers, including Associate Professor Barbara Holland, Associate Professor Menna Jones and Dr Chris Burridge from the University of Tasmania, and Professor Jeremy Austin from University of Adelaide, which studied the devil population across Tasmania over 15 years.

Since its emergence in the mid-1990s, DFTD has caused a decline of more than 80 per cent in the state's devil population.

"We were interested in investigating if there was any evidence for a genetic response to the spread of DFTD in the Tasmanian devil genome," Dr Brüniche-Olsen said.

"A disease that strongly influences the reproductive output of individuals is expected to enforce a strong selection pressure on a population and this should be 'captured' in the genome."

Using tissue samples from devil populations sampled between 1999-2013 (spanning both pre- and post-DFTD arrival at individual sites), the researchers used markers to trace changes in genetic variants as the disease entered the populations.

"This study design enabled us to determine if there was a consistent pattern of change in the frequency of each of the genetic variants in populations across Tasmania with respect to the arrival of the disease," Dr Brüniche-Olsen said.

"Our results showed that there was no consistent selection pattern associated with the spread of DFTD.

“If DFTD enforced a strong selection pressure on the devil genome, we would have expected that this selection ‘footprint’ would be the same across all populations affected by DFTD and not random as we observed.”

Dr Brüniche-Olsen said the research is part of a bigger picture.

“We previously documented how Tasmanian devils lost genetic diversity 5,000-3,000 years ago, coinciding with a time of unstable climate, and that the species has had low genetic diversity for thousands of years,” she said.

“This low genetic diversity leaves little room for selection to operate, even more so in a species with small population size.

“Genetic diversity is what makes a population able to evolve and adapt to changes in its environment or respond to novel diseases. Therefore, a species that has low genetic diversity is more prone to extinction.

“It is therefore essential that conservation measures aiming at supporting genetic diversity be implemented to limit further loss of genetic diversity in the Tasmanian devil and conserve the species for generations to come.”

Dr Brüniche-Olsen’s research paper, ‘Detecting Selection on Temporal and Spatial Scales: A Genomic Time-Series Assessment of Selective Responses to Devil Facial Tumor Disease’, was published in the online peer reviewed journal, *Plos One, at* *http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0147875*

The research paper is part of Dr Brüniche-Olsen’s PhD project, which investigated the demographic history of the Tasmanian devil over the last 30,000 years.