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Unexpected discovery behind second devil facial tumour

Researchers have identified the cell of origin of Devil Facial Tumour 2 (DFT2), the second transmissible cancer that was first observed in Tasmanian devils from the Channel area in south-east Tasmania in 2014.

The research was performed by scientists from the University of Tasmania's Menzies Institute for Medical Research, School of Medicine and Central Science Laboratory, with support from the University of Cambridge, Australian Proteome Analysis Facility and Walter and Eliza Hall Institute of Medical Research.

In an unexpected discovery, the recently published research found that DFT2 originated from the cells that cover the nerves, called Schwann cells – similarly to DFT1, which was seen first in north-eastern Tasmania in 1996.

“Scientists used a range of techniques to compare DFT2 with the original DFTD(DFT1) and found both cancers were similar; therefore, they originated from identical tissues,” senior team member Professor Greg Woods from the Menzies Institute said.

“The development of transmissible cancers in mammals is thought to be a rare event, occurring only when certain factors combine to overcome robust protective defences, and here in the Tasmanian devil it has occurred not once, but twice, in founder cells from the Schwann cell lineage.

"The emergence of two independent transmissible cancers from the same tissue in the Tasmanian devil presents an unprecedented opportunity to gain insight into cancer development, evolution and immune evasion in mammalian species."

The lead author, Menzies’ Dr Amanda Patchett, said wounds caused by devils biting one another might explain the link to how both cancers arose from Schwann cells.

“In humans, cancers can be caused by damage to cells because the repair process produces proteins that also promote cancer and these proteins also encourage Schwann cell growth,” she said.

“Because devils often have wounds, this leads to Schwann cells occasionally becoming cancerous in devils. Biting accounts for how the cancers are spread between devils.”

Professor Woods said while future studies would continue to focus on the management of DFT1 and DFT2 in wild Tasmanian devil populations, the research also highlighted the possibility of the emergence of further DFTDs which could increase the complexity of the conservation management of the species.

“However, it is hoped that further investigations into the development of DFTDs from Schwann cells in the devil will allow for identification of strategies to mitigate this risk,” Professor Woods said.

Associate Professor Bruce Lyons (Medicine), on behalf of the research team, said the support of the Save the Tasmanian Devil Appeal (www.utas.edu.au/devil) was critical for the long-term nature of this work.

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