

Spotlight

By M.O.

Lessons Learned from a Devil

O'Neill *et al.*

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The Tasmanian devil, the largest living carnivorous marsupial, is an iconic animal in Australia. The black, sturdy, dog-like animal serves as the symbol of the Tasmanian National Parks and Wildlife Service and has appeared on commemorative Australian two-dollar coins. The devil is known for its ferocious appetite and fierce fighting habits. Previously considered relatively common, it is now listed as an endangered species; its original population declined by 70 – 90 % over the last 15 years due to a mysterious face tumor called the Tasmanian devil facial tumor disease (DFTD).

In this article, Iain O'Neill reviews the origins of DFTD as the prototype of a transmittable noninfectious tumor. He lays out the evidence that the relative genetic isolation on the Tasmanian island plays a critical role in the inability of the devil's immune system to fight off transmitted tumor cells. DFTD was first reported in 1996 and is a disfiguring facial and oral malignancy with 100% mortality. Histologically, an undifferentiated neuroendocrine tumor, it kills affected animals by impairing feeding but also through regional and systemic metastasis. O'Neill summarizes the evidence leading to the conclusion that transmission of clonal tumor cells occurs through fighting and facial bites and that the devil's reduced MHC diversity is to blame for the rapid spread of the deadly disease. He points out that molecular studies of DFTD may serve to elucidate rare settings of tumor transmission in humans, such as transplantation tumor transmission or cell trafficking at the fetal-maternal interface.