

Tasmanian devil research offers new insights for tackling cancer in humans

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Since the mid-1990s, devil facial tumor disease has decimated the natural population of Tasmanian devils, which are now found only on the island state of Tasmania, off the southeastern coast of Australia. Credit: Washington State University

A rare, transmissible tumor has brought the iconic Tasmanian devil to the brink of extinction, but new research by scientists at Washington State University and the Fred Hutchinson Cancer Research Center in Seattle indicates hope for the animals' survival and possibly new treatment for human cancers.

The study, published in *Genetics* on Aug. 1, found a single genetic mutation that leads to reduced growth of a transmissible cancer in Tasmanian devils in the wild.

"This gene is implicated in human prostate and colon cancers," said Andrew Storfer, professor of biological sciences at WSU. "While the findings hold the most immediate promise to help save the world's few remaining Tasmanian devils, these results could also someday translate to [human health](#)."

The research team, led by Storfer and Mark Margres, now a postdoctoral fellow at Harvard University, studied the genomes of cases of devil facial [tumor](#) disease, or DFTD, that regressed spontaneously—that is, the cancer began disappearing on its own.

They were surprised to find the mutation contributing to tumor regression doesn't change the gene function but instead, turns on a gene that slows cell growth in the tumor. At least, it behaves that way in the lab.

Current human cancer therapies focus on removing every trace of a tumor, often through toxic or debilitating treatments, said David Hockenbery, a cancer biologist at Fred Hutch who contributed to the study.

"If there were ways that tumors could be tricked into regressing without having to administer cytotoxic drugs or deforming surgeries, it would be a major advance," he said.

While infections cause up to 20 percent of all [human cancers](#)—such as gastric cancer from *Helicobacter pylori* and cervical cancer from human papillomavirus—for Tasmanian devils, the [cancer](#) is the infection.

DFTD spreads between the animals when they bite each other during common social behaviors. Since the mid-1990s, the disease has decimated the natural population of the carnivorous marsupials, which are now found only on the island state of Tasmania, off the southeastern coast of Australia.

Storfer's lab leads a National Institutes of Health-funded team of researchers from the U.S. and Australia to improve conservation efforts for Tasmanian devils and increase understanding of the co-evolution of the tumor and its host.

Though ferocious with each other, Tasmanian

devils take mild handling by people without much fuss, making it easy for investigators to humanely capture the animals, collect tissue samples and tag them for monitoring before release back into the wild.

As the researchers work to save the devils, they also have an unprecedented opportunity to watch tumors naturally evolve and sometime regress without drugs or surgery.

"Although this disease is largely fatal, we're seeing tumors just disappear from an increasing number of individual animals," Storfer said.

The team is looking at the effects of other promising mutations in regressed tumors as well.

"We hope to learn something that could be applied to understanding and possibly treating a number of human cancers in the future," Storfer said.

More information: Mark J. Margres et al, Spontaneous Tumor Regression in Tasmanian Devils Associated with RASL11A Activation, *Genetics* (2020). [DOI: 10.1534/genetics.120.303428](https://doi.org/10.1534/genetics.120.303428)

Provided by Washington State University

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