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Significant Cancer Rates in California Sea Lions Has Major Human Health Implications

20-plus years of data in newly released study by The Marine Mammal Center shows ocean pollutants is one of the leading causes of cancer in sea lions, and highlights how the exposure to environmental contaminants can fast-track the likelihood of humans developing virally caused cancers.

Sausalito, Calif. (February 1, 2021) – Scientists at The Marine Mammal Center – the world’s largest marine mammal hospital – have found that viral-caused cancer in adult California sea lions is significantly increased by their exposure to toxins in the environment. The study is the result of over 20 years of research and examination of nearly 400 California sea lion patients by The Marine Mammal Center.

The Marine Mammal Center has been on the forefront of researching and understanding cancer in California sea lions and its connection to both ocean and human health. Since the cancer in sea lions was first discovered in 1979, between 18-23 percent of adult sea lions admitted to the Center’s hospital have died of the fatal disease – the highest prevalence for a single type of cancer in any mammal, including humans.

The study, which was published in *Frontiers in Marine Science*, a peer-reviewed research journal, concluded that efforts to prevent ecosystem contamination with pollutants must improve in order to prevent virally caused cancer development in both wildlife and humans.

“This paper’s conclusions mark a significant milestone in piecing together the complicated puzzle of cancer development in California sea lions,” said Dr. Pádraig Duignan, Chief Pathologist at The Marine Mammal Center and co-author of the study. “The decades of research looking into this deadly disease clearly shows the ocean environment we all share is in trouble and that we need to find solutions to protect our collective health.”

The findings also show that California sea lions have among the highest levels of certain persistent organic pollutants in the blubber of any marine mammals – a disturbing report that is cause for concern for scientists across the globe.

“Even though some of the pollutants we’re finding in the blubber have been out of use for years, these cancer-causing elements remain in the environment for a very long time and wreak havoc on opportunistic coastal feeders like sea lions,” said Dr. Duignan. “It concerns me knowing that we consume very similar seafood as these cancer victims and that the ocean is raising a loud and clear

alarm in the sick bodies of a sentinel species. We need to continue this critical research and collaborate with the human cancer doctors to find patterns to help discover the link between sea lions and ourselves.”

Previously, researchers at The Marine Mammal Center determined that these sea lions are infected with a herpesvirus similar to one that causes Kaposi’s sarcoma (a viral cancer) in humans. In this newly released study, scientists used complex statistical analysis and modeling to investigate the relative roles of the various factors in the development of fatal metastatic cancer. The results showed that the damage of the DNA in sea lions occurs due to a number of factors, including:

- the interaction of many environmental factors, including chemical contaminants and pollutants; and
- infections by tumor-promoting viruses like Otarine herpesvirus-1.

Additionally, their findings found that the animals’ own genetic predisposition was not a significant factor to developing the cancer.

“While there is more to be learned about the complex factors that play into the development of this disease, what we learn from these animals contributes to research that underpins the threat to human health from pollutants in the ocean,” said Dr. Frances M. D. Gulland, the lead author of the study who worked at The Marine Mammal Center for 25 years.

The Marine Mammal Center is a leading contributor to the global body of research and knowledge about marine mammal medicine and ocean health. The Center generates research findings and scientific outputs at volumes comparable to top academic institutions and prides itself on gathering and providing open research data that is free to access, reuse, repurpose and redistribute.

In 2010, the Center brought together an array of international researchers to form the Sea Lion Cancer Consortium to further investigate this disease, multiple of whom helped co-author the paper. The research work was funded by the Geoffrey Hughes Fellowship, the National Institutes of Health and National Science Foundation joint program for the Ecology of Infectious Disease, the National Marine Fisheries Service Marine Mammal Health and Stranding Program, and the Natural Environment Research Council.

ABOUT THE MARINE MAMMAL CENTER:

Headquartered on the site of a former Cold War missile base, The Marine Mammal Center is a global leader in marine mammal health, science and conservation, and is the largest marine mammal hospital in the world. The Center’s teaching hospital and training programs operate globally, with its headquarters in the Golden Gate National Recreation Area, part of the National Park Service. Expert teams from the Center travel around the world to work with emerging first responders and has itself rescued more than 24,000 marine mammals from 600 miles of its authorized rescue area of California coastline and the Big Island of Hawai’i. The Center’s mission is to advance global ocean conservation through marine mammal rescue and rehabilitation, scientific research, and education.

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