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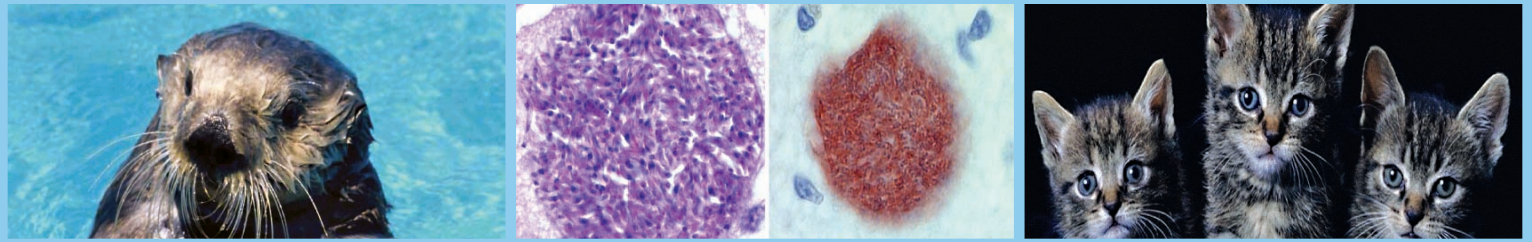
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Parasite Shed in Cat Feces Kills Sea Otters

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Summary

Endangered sea otters in California have been found to suffer lethal infections from a parasite, *Toxoplasma gondii*, shed in cat feces. These infections may be a factor contributing to the marine mammal's slow recovery from near extinction.

Toxoplasma gondii is a protozoan parasite that attacks an otter's brain tissue, causing lesions, depression, convulsions and death. Because cats are the only animals known to shed *Toxoplasma gondii*, runoff must be carrying cat feces and the parasite to the coast. From there, it is not clear how otters are getting sick. One possibility is that they are ingesting infected mussels or other filter-feeding bivalves, which accumulate pathogens in their tissues.

The parasite is usually harmless to healthy people. The exception is pregnant women, whose fetuses can develop toxoplasmosis, hence the advice for pregnant women to avoid cleaning cat litter boxes.

Once numbering more than 300,000, southern sea otters were hunted to near extinction in the 19th century for their lush pelts. They were granted protection under the Endangered Species Act in 1977, when their numbers were about 1,789. In the mid-1990s, their recovery staggered and concerns were raised about the animal's long-term prospects. More recently their numbers seem to be rising. Observers tallied a total of 2,692 California sea otters for the 2006 spring survey, compared with 2,100 in 2002 and 2,377 in 1995.

Findings

The scientists discovered that:

- 42 percent of live otters surveyed had antibodies to *Toxoplasma gondii*, an almost certain sign of infection; and
- 76 percent of otters near heavy freshwater outflows—storm drains and river mouths—had antibodies to *Toxoplasma gondii*.

Subsequent necropsies showed that otters, previously assumed killed by boat strikes or sharks, probably died of protozoal encephalitis caused by *Toxoplasma gondii* infections.

Their illness illustrates the potential for terrestrial diseases to spread to the marine environment via polluted runoff.

Not just otters are at risk. Encephalitis has also been documented in harbor seals and spinner dolphins.

People are potentially at risk, too, since they also eat shellfish. There already has been one documented outbreak of human toxoplasmosis in British Columbia, linked to contaminated drinking water, presumably from cat droppings.

Collaborators

California Department of Fish and Game, U.S. Geological Survey, U.S. Fish and Wildlife Service, California Regional Water Quality Control Board, California Mussel Watch Program, Bay Foundation, Morro Bay.

Award

Melissa (Chechowitz) Miller received the Wildlife Disease Association Graduate Student Research Award for her doctoral research, which was funded by this grant.

Publications

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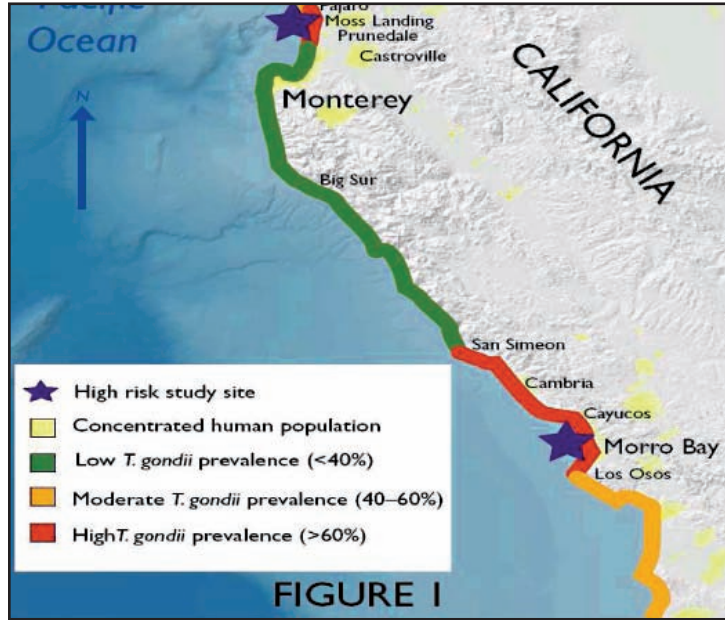
Miller, M.A., I.A. Gardner, C. Kreuder, D.M. Paradies, K.R. Worcester, D.A. Jessup, E. Dodd, M.D. Harris, J.A. Ames, A.E. Packham and P.A. Conrad 2002. (continued)

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Miller, M.A., I. A. Gardner, A. Packham, J. K. Mazet, K. D. Hanni, D. Jessup, R. Jameson, E. Dodd, B. C. Barr, L. J. Lowenstine, F. M. Gulland and P. A. Conrad. 2002. Evaluation of an indirect fluorescent antibody test (IFAT) for demonstration of antibodies to *Toxoplasma gondii* in the sea otter (*Enhydra lutris*). J. of Parasitol. 88:594-599.



Student

Melissa A. Miller, Ph.D., 2003, UC Davis, Characterization and Epidemiologic Investigation of Apicomplexan Parasites Associated With Meningoencephalitis in California Sea Otters (*Enhydra lutris nereis*) and Pacific Harbor Seals (*Phoca vitulina richardsi*).

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