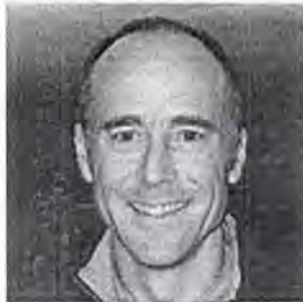


Researchers have discovered an infectious parasite in Arctic Beluga. Photo: Wikimedia Commons

University of British Columbia scientists have found for the first time an infectious form of the cat parasite *Toxoplasma gondii* in western Arctic Beluga, prompting a call for caution for the Inuit people who eat whale meat.

The same team also discovered a new strain of the parasite, previously sequestered in the icy north, that is responsible for killing 406 grey seals in the north Atlantic in 2012.

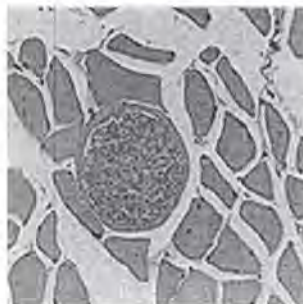


Michael Grigg, UBC Marine Mammal Research Unit

Presenting their findings today at the [2014 Annual Meeting of the American Association for the Advancement of Science \(AAAS\)](#), [Michael Grigg](#) and [Stephen Raverty](#) from UBC's [Marine Mammal Research Unit](#) say that the "big thaw" occurring in the Arctic is allowing never-before-seen movement of pathogens between the Arctic and the lower latitudes.

"Ice is a major eco-barrier for pathogens," says Michael Grigg, a molecular parasitologist with the U.S. National Institutes of Health and an adjunct professor at UBC. "What we're seeing with the big thaw is the liberation of pathogens gaining access to vulnerable new hosts and wreaking havoc."

Toxoplasmosis, also known as kitty litter disease, is the leading cause of infectious blindness in humans and can be fatal to fetuses and to people and animals with compromised immune systems.



A new strain of Sarcocystis has been liberated from the Arctic by climate change, causing disease in marine mammals.

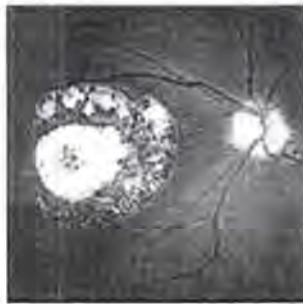
"Belugas are not only an integral part of Inuit culture and folklore, but also a major staple of the traditional diet. Hunters and community members are very concerned about food safety and security," says Raverty, a veterinary pathologist with the B.C. Ministry of Agriculture and Lands' Animal Health Centre and an adjunct professor at UBC. Raverty has led the systematic sampling and screening of hunter-harvested Beluga for 14 years.

Grigg has also identified the culprit of the 2012 grey seal die-off as a new strain of *Sarcocystis*. While not harmful to humans, the Arctic parasite, which was named *Sarcocystis pinnipedi* at the AAAS meeting today, has now killed an endangered Steller sea lion, seals, Hawaiian monk seals, walrus, polar and grizzly bears in Alaska and as far south as British Columbia.

NB: Related images, a ready-to-post video, raw interviews and b-roll are available at <https://db.tt/WdIIIQeI>. Visit news.ubc.ca/category/aaas for more story ideas, media-friendly experts and subscribe to UBC science media releases.

BACKGROUND

Toxoplasmosis and health concerns



Toxoplasma is the leading cause of infectious blindness.

Toxoplasma is spread mainly through consuming of undercooked meat or water that has come in contact with soil contaminated by cat feces.

It is estimated that up to one-third of the world's human population carry *Toxoplasma*. While not a major concern for healthy individuals, *Toxoplasmosis* can be fatal to the fetuses of pregnant women and immune-deficient individuals. It first gained notoriety as an AIDS-defining infection.

In 1987, all four out of 30 women in a northern Quebec village exposed to *Toxoplasma* during pregnancy gave birth to congenitally infected children. The most significant risk factor attributed to this high incidence rate in northern Quebec was the consumption of dried seal meat. The rate of maternal infection during pregnancy in North America is six in every 1,000 pregnancies.

UBC researchers had previously identified *Toxoplasma* infecting marine mammals in the northern Pacific region, but finding the parasite in hunter-harvested Belugas of the western Arctic raises public health concerns. These animals are consumed by the Inuit people as a recognized part of their traditional culture.



For 14 years, researchers have screened hunter-harvested Beluga.

"The Inuit's traditional processing and cooking methods should be enough to kill *Toxoplasma*, but vulnerable populations like pregnant women need to be extra vigilant around handling and consuming raw whale meat," says Grigg.

Pathogens and ecological barriers

Protozoan parasites like *Toxoplasma* and *Sarcocystis* infect and remain dormant in many animal hosts. Infectious forms of the parasite are only shed in the environment by "definitive hosts." Cats are definitive hosts for *Toxoplasma*. A variety of definitive hosts exist for the *Sarcocystis* parasites.

Arctic ice sheets have previously served as an ecological barrier, limiting the circulation of pathogens between cold and warm climates. Climate change has affected the ice sheet barrier, facilitating pathogen spread to new, susceptible marine and land animals that now access the Arctic.

Marine mammals: Sentinels of ecosystem health

Seals, walruses and polar bears rely on seasonal sea ice for habitat and must adapt to the sudden loss of ice, while migratory species such as whales appear to be finding new prey, altering migration timing and moving to new habitats.

"Marine mammals can act as ecosystem sentinels because they respond to climate change through shifts in distribution, timing of their movements and feeding locations," says Sue Moore, an oceanographer with the National Oceanic and Atmospheric Administration and a collaborator of Grigg and Raverty. "These long-lived mammals also reflect changes to the ecosystem in their shifts in diet, body condition and physical health."