

Study finds contagious cancers are spreading among several species of shellfish

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Left to right: 1. Mussels (*Mytilus trossulus*) at Copper Beach in West Vancouver, Canada 2. Cockles (*Cerastoderma edule*) collected in the ria of Arousa in Galicia, Spain 3. Golden carpet shell clams (*Polititapes aureus*) collected in the ria of Arousa in Galicia, Spain Credit: 1. Annette F. Muttray; 2. and 3. David Iglesias

The oceans are home to innumerable and diverse species of marine life. A new paper, published in *Nature*, suggests that the watery medium that nourishes and protects this life may also promote the spread of certain cancers, both within and across species.

The study, performed by researchers at Columbia University Medical Center, with collaborators in Canada and Spain, examined a variety of mollusks harboring a form of cancer known as disseminated neoplasia, a leukemia-like disease that affects populations of bivalves in many parts of the world. The team has discovered that in several species, [cancer cells](#) themselves were spreading from animal to animal as a contagious clonal cell line.

"Our results suggest that direct transmission of cancer among [marine animals](#) may be much more common than once thought," said senior author,

Stephen Goff, PhD, the Higgins Professor of Biochemistry in the Department of Biochemistry & Molecular Biophysics and the Department of Microbiology & Immunology at Columbia University Medical Center.

In earlier efforts, Dr. Goff's team initially looked for viruses that might have been causing cancers in the soft shell clam (*Mya arenaria*). But it turned out not to be the case that a virus was spreading in the oceans - instead, the cancer cells themselves were spreading from animal to animal. Direct transmission of cancer cells is quite rare—so far, the phenomenon had only been observed in two species of mammals.

The team has now tested to see if cancers in other mollusks might also be due to contagious cell lines. Goff's team examined the DNA of cancers and the affected host animals of mussels (*Mytilus trossulus*), cockles (*Cerastoderma edule*), and golden carpet shell clams (*Polititapes aureus*) collected from the coasts of Canada and Spain.

In each species, the researchers discovered that the cancers were caused by independent clones of cancer cells that were genetically distinct from their hosts. They also found that in one species, the carpet shell clam, the infectious clone of cancer cells was derived from a related but distinct species. The researchers concluded that this cancer was due to a case of cross-species transmission.

"Now that we have observed the spread of cancer among several marine [species](#), our future research will investigate the mutations that are responsible for these cancer cell transmissions," said Goff.

More information: *Nature*, nature.com/articles/doi:10.1038/nature18599

Provided by Columbia University Medical Center

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