

Phytoplankton and climate change



Benner works on understanding the effects of climate change using phytoplankton. *Clay Steell/Argosy.*

CLAY STEELL
Science Reporter

A lab down the hall from Flemington Auditorium is creating what may be the life we see in Arctic oceans, as climate change continues to cause unprecedented change in

this environment. Ina Benner, a postdoctoral fellow working with Zoe Finkel in Mount Allison's Department of Geography and Environment, is studying how phytoplankton living in these oceans will respond to a warming climate and the environmental changes that come with it.

"It's about what will happen to the ocean in the future, with all the changes that we see and will keep happening," said Benner.

Phytoplankton are microscopic organisms that live in the ocean, and through photosynthesis they create about half of the oxygen we breathe. They are highly diverse compared to

land plants, with numerous major evolutionary lineages. Benner says different types of phytoplankton may be more or less tolerant to the changes expected in Earth's oceans due to climate change, and that Arctic phytoplankton communities will experience some of the greatest changes.

Benner is incorporating phytoplankton's ability to evolve and adapt to a changing ocean environment in her experiments. She said most experiments on phytoplankton response to climate change took cells directly from their natural environment to a warmer one. Doing so did not give the phytoplankton a chance to adapt to their new surroundings.

"It's like taking a polar bear and transferring it to the tropics to see how it performs," said Benner. "Most likely he does worse, but does that mean if he were there for 100 years, would he be worse?"

One of Benner's experiments involves comparing the range of temperatures in which 10 different species of Arctic phytoplankton can grow. Species that grow better than others at higher temperatures may become increasingly dominant as the climate warms, and in turn may affect ocean food chains.

A more ambitious component of Benner's research is to look at how

several Arctic phytoplankton species will evolve in response to a changing environment. Phytoplankton have very short lifespans, with some species creating over 200 generations in a single year, giving them greater potential to evolve in a short amount of time than longer-lived organisms. Benner said that while she hasn't decided exactly which parameters to use in this experiment, she expects to see the phytoplankton slowly adapt to changing environmental conditions. By giving these phytoplankton species the chance to adapt to a changing environment, Benner said she could better predict how species in the wild will respond to climate change.

While the focus of Benner's research is in the context of predicting how phytoplankton will respond to a changing climate, her findings may also help reveal what goes on in a phytoplankton cell that results in changes we see on its surface.

"It's not like we can build a model of a cell and ask what happens if we change something," said Benner, "so hopefully this will bring more light into that."