

Biology

Richard Monastersky reports from McMurdo Station, Antarctica

Do Antarctic seals feel El Niño?

Living in the near-frozen waters around Antarctica, Weddell seals rank among the world's most southern animals. But even in their home waters around the icy continent, Weddell seals apparently feel the effect of climate disruptions in the tropics, more than 6,000 kilometers distant.

For the last 12 years, James W. Testa of the University of Alaska in Fairbanks has monitored changes in population in a seal community in the Antarctic, just offshore from Ross Island where the National Science Foundation supports a research center. Testa has recorded an average of 400 seal pups born every year near his study site. But this was a bad year for baby seals: Only 317 have been born so far, and few more are expected this late in the season.

Several years ago, Testa noticed that the number of births declines every four to six years, apparently coincident with a climate phenomenon known as the El Niño/Southern Oscillation (ENSO). An ENSO occurs when a tropical pool of warm water shifts from the western Pacific eastward and alters weather in much of the tropical and temperate latitudes. Since an ENSO developed last year and gripped the Pacific through the middle of this year, the current dip in birth rates supports Testa's theory that tropical weather can disturb seal populations. He suggests that the seal declines may result from changes in the fish population, caused possibly by shifts in ocean currents.

The lowered birth rate for seals represents the most southern biological effect ever recorded for an ENSO, Testa says. Because biologists have not tracked other Antarctic animals over such a long period, it remains unclear whether ENSOs also affect neighboring creatures.

Work at Britain's Signy Station on the Antarctic peninsula has revealed a similar pattern of population swings among Weddell seals there. But the seals have not shown the same variations at Australia's Davis Station.

Finding the chemical weapons

Because sponges and other stationary animals on the ocean floor can't flee when confronted by a hungry predator, they often develop protective weapons. Some animals take the brute force approach, forming hard shells or spines, while others fashion chemical defenses to keep away starfish and other attackers. For the last few decades, biologists have studied chemical weapons in the crowded ecosystems of the tropics, but several researchers have recently turned their attention to the less diverse waters around Antarctica.

Most oceanographers presumed that stationary animals in the polar regions would need fewer chemical defenses than their tropical counterparts because polar ecosystems have far fewer species, suggesting animals there might face fewer potential predators. But work over the last few years by James B. McClintock of the University of Alabama at Birmingham shows that despite their relatively spare ecosystem, stationary Antarctic animals employ chemical defenses just as often as their tropical cousins.

McClintock and William Baker of the Florida Institute of Technology in Melbourne are now trying to identify which particular chemicals protect these animals. Some of the weapons may work by killing predators; others could simply taste bad; still others might help prevent bacterial and other harmful organisms from establishing a home on the stationary creatures. Although the project aims to help biologists understand how animals protect themselves, it could also have far-reaching effects, says Baker, who believes some of these defensive molecules may have uses in fighting illnesses in humans. He routinely sends extracts of the animals, as well as isolated molecules, to drug companies for testing.

Biomedicine

Kathy A. Fackelmann reports from New Orleans at the American Heart Association's 65th scientific sessions

Wine: It's good for the heart

The Chardonnay and Chablis crowd can take heart: It's not just red wine that provides protection against heart disease.

Previous studies have suggested that a substance in red wine helps lower a person's risk of coronary artery disease (SN: 7/18/92, p.47). Arthur L. Klatsky of the Kaiser Permanente Medical Center in Oakland, Calif., and his colleagues wanted to learn more about the alcohol and heart disease connection.

Starting in 1978, Klatsky's team collected information on 81,825 men and women who said they drank alcoholic beverages. Over the next 10 years, the researchers also recorded deaths in this group attributed to heart disease.

The California researchers discovered that all alcoholic beverages seem to ward off coronary artery disease, a finding that confirms previous research. However, wine drinkers enjoyed greater protection than those who regularly imbibed beer or hard liquor.

The new study found no particular benefit to picking red wine over white. Indeed, the new findings suggest that women who drank white wine lowered their risk of coronary disease more than women who preferred red wine.

Klatsky believes that moderate drinking of any kind offers a shield against heart attacks. However, he's not ready to say that wine offers the best hedge against coronary artery disease. It may be that wine drinkers have other attributes, such as smoking less, that help keep heart disease away, he says.

Nobody's advising people to go out and tank up. "When you talk about the possible protective effect of alcohol, you always have to put it in context," Klatsky says. Heavy drinking can lead to numerous health problems — including liver disease, high blood pressure, and certain heart rhythm abnormalities — that can cause a heart attack, he adds. For people who already drink, Klatsky advises limiting their alcohol intake to fewer than three drinks per day.

Finding Marfan syndrome in the womb

Although doctors have long had the ability to flag a variety of genetic diseases before birth, they had no way of determining whether a developing fetus had inherited the defective gene for Marfan syndrome. This connective tissue disorder can severely damage the heart and arteries.

Now, for the first time, researchers have diagnosed Marfan syndrome in an affected fetus. Last year, other researchers described the genetic defect causing Marfan syndrome (SN: 7/27/91, p.55). Using that information, Natalie Vandemark of the University of Nebraska Medical Center in Omaha and her colleagues devised a prenatal test for the disorder.

In this case, a pregnant woman with a mild case of Marfan syndrome wanted to know whether her baby would also suffer the disorder. Vandemark's team took a small sample of the membrane that surrounds the developing fetus and tested it for the Marfan mutation, which runs in the mother's family. The test showed that the baby had inherited the faulty gene.

The gene codes for fibrillin, a protein that helps support blood vessels, such as the aorta, and other body structures, says Maurice Godfrey, also at the University of Nebraska Medical Center. Abnormal fibrillin leads to a weak-walled aorta, which can blow out under the increased stress that labor — or any strenuous activity — puts on this blood vessel.

Doctors still don't know how severely affected the child will be. In addition to cardiovascular complications, the defective gene can cause curvature of the spine and eye problems.

It's important for parents to know early that their children have this disorder, Godfrey adds. Kids with Marfan syndrome should be counseled against participating in strenuous activities, such as basketball, that can cause a weak-walled aorta to rupture and cause sudden death, Godfrey says.