Half-asleep birds choose which half dozes

Birds that are literally half-asleep—with one brain hemisphere alert and the other snoozing—control which side of the brain remains awake, according to a new study of sleeping ducks.

Earlier studies have documented half-brain sleep in a wide range of birds. The brain hemispheres take turns sinking into the sleep stage characterized by slow brain waves. The eye controlled by the sleeping hemisphere droops shut, while the wakeful hemisphere's eye stays open and vigilant. Birds also can sleep with both hemispheres resting at once.

To check whether birds can control half-brain sleeping, Niels C. Rattenborg and his colleagues from Indiana State University in Terre Haute filmed a row of mallards napping. Decades of studies of bird flocks led researchers to predict extra vigilance in the more vulnerable, end-of-the-row sleepers. Sure enough, the end birds tended to keep peeled the eye on the side away from their buddies. Mallards snuggled into the inner spots showed no preference for gaze direction.

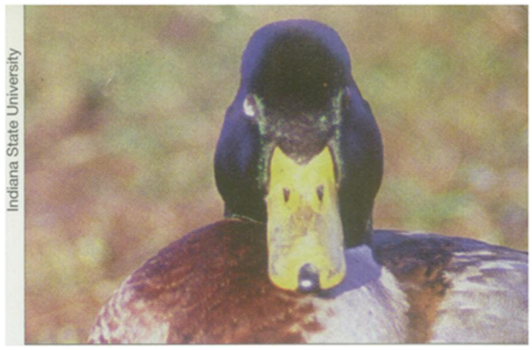
Also, birds dozing at the end of the line resorted to single-hemisphere sleep, rather than total relaxation, more often than inner ducks did. Rotating 16 birds through the positions in a four-duck row, the researchers found outer birds half-asleep during some 32 percent of snoozing time versus about 12 percent for birds in internal spots.

"We believe this is the first evidence for an animal behaviourally controlling sleep and wakefulness simultaneously in different regions of the brain," the researchers say in the Feb. 4 NATURE.

The results provide the best evidence yet for a long-standing conjecture that single-hemisphere sleep evolved as creatures scanned for predators, Rattenborg says. The preference for opening an eye on the lookout side could be widespread, he predicts. He's seen it in a penguin pair napping side-by-side in the zoo and in a pet cockatiel perched by a mirror. The mirror-side eye closed as if the reflection were a pal, and the other eye stayed open.

Useful as half-sleeping might be, it's only been found in birds and such aquatic mammals as dolphins, whales, seals, and manatees. Presumably, keeping one side of the brain awake allows a sleeping animal to surface occasionally to avoid drowning, explains Rattenborg.

Nigel Ball, clinical director of the Sleep Disorders Center at the Virginia Mason Medical Center in Seattle, says the new study "gives us the possibility of looking outside the box." Studies of birds may offer unique insights into sleep because their lineage parted company from mammals' so long ago.



A napping mallard keeps one eye open and one side of its brain awake.

Jerome M. Siegel of the University of California, Los Angeles says he wonders if bird half-brain sleep "is just the tip of the iceberg." He speculates that a closer look at other species might turn up more examples.

Siegel, however, would be surprised to see the half-brain phenomenon during the rapid-eye-movement, or REM, phase of sleep. Birds and many mammals, including the primitive platypus, exhibit signs of REM sleep, which in humans has been associated with dreaming. So far, no one has found a creature half-dreaming. —*S. Milius*

Does tetracycline limit heart attacks?

Try as they may, doctors cannot explain many heart attacks. While patients often have predispositions to heart disease—such as obesity, high blood pressure, diabetes, high cholesterol, or a history of heavy smoking—at least half of heart disease cases go unexplained.

A century ago, infections were suspected to lead to heart disease. With the advent of antibiotics, interest in this theory waned. In the past 2 decades, however, researchers have again begun searching for a tie between infections and atherosclerosis, the formation of fatty plaques in blood vessels.

In the late 1980s, Finnish scientists found that compared with healthy people, cardiac patients carried higher concentrations of antibodies signaling the presence of a bacterium called *Chlamydia pneumoniae,* which causes respiratory infections. That finding launched a flurry of research. Recently, preliminary studies in people who have had heart attacks show that those given antibiotics in addition to typical post–heart attack medicine fare better than those who don't get antibiotics.

Researchers now report in the Feb. 3 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION another hint that certain antibiotics may prevent some heart attacks.

Heart attack patients are less likely than other patients to have taken a common antibiotic, tetracycline, within the past 3 years, says study coauthor Christoph R. Meier, an epidemiologist at Boston University Medical Center in Lexington. Tetracycline is the drug of choice against *C. pneumoniae* and a variety of other pathogens.

Meier and his colleagues analyzed data from 3,315 heart attack patients and 13,139 patients without heart problems. All lived in the United Kingdom. Each heart patient was matched by age, sex, and date of antibiotic treatment with four noncardiac patients. In both groups, people were excluded if they were over 75 years old, were diabetic, had high blood pressure, or had a previous history of cardiovascular disease.

The comparison showed that heart attack patients were only two-thirds as likely to have used tetracycline as were the noncardiac patients. Use of most other antibiotics, including penicillin, was similar in both groups.

Although the study doesn't prove that tetracycline prevented heart attacks, it "provides another piece of evidence that implicates infection as a causative agent in cardiovascular disease," says Paul W. Ewald, an evolutionary biologist at Amherst (Mass.) College.

Moreover, Ewald says, people in this study were taking tetracycline, often at low doses, for a variety of diseases. Cardiac benefits might be greater if doctors were to prescribe doses specifically targeted to *C. pneumoniae*, he says.

The study is limited, however, by its 3-year time frame, says F. Javier Nieto, an epidemiologist at Johns Hopkins Medical Institutions in Baltimore. "Atherosclerosis develops over decades."

Attributing a protective effect to recent antibiotic use "is not very consistent with what we know about the disease, unless the effect . . . is on the acute events that precede a heart attack," Nieto says.

One such event could be inflammation that causes plaque to break off a blood-vessel wall, lodge in an artery, and induce a heart attack. Other research has shown that *C. pneumoniae* can stimulate inflammation in blood vessel walls, says Bill Fong, director of infectious diseases at St. Michael's Hospital in Toronto.

Although the new study supports other recent research linking infections with heart attacks, "it should not be construed [to mean] the general public should start taking antibiotics to prevent heart disease," Fong says.

Even if infections are definitively tied to heart disease, treating them won't exclude high cholesterol and other risk factors from posing dangers, Meier says. Indeed, infections may work with such conditions to cause heart disease, he suggests. —*N. Seppa*