

Owls give a hoot for vision

Barn owls use sight and hearing to locate objects, such as mice. But if, for some reason, these two types of cues indicate different spatial locations for the same object, do the owls follow their eyes or their ears?

To find out, Stanford University neurobiologists Eric and Phyllis Knudsen reared a dozen barn owls fitted with spectacles that displaced their visual fields to the right while leaving hearing virtually unchanged. Using a movable speaker with a light at its center, the researchers monitored the orientation of the owls' heads while presenting them with visual or auditory stimuli from different locations in a pitch-dark room.

While normal owls look directly at a light or sound, the bespectacled owls consistently pointed their heads to the right of both stimuli. With glasses removed, the owls aimed their heads directly at light cues but still to the right of



Knudsen & Knudsen

sound cues coming from the same spot. The birds apparently relied on their misdirected vision to locate the source of a sound, even though their ears provided more accurate spatial cues. The owls' continued reliance on visual cues for locating sounds in space – even after the glasses had been removed – implies that vision innately dominates over hearing in the development of their ability to locate sounds, the Knudsens report in the September JOURNAL OF NEUROSCIENCE.

Hypertension in pregnancy cuts cancer risk

During pregnancy, high blood pressure can signal toxemia, a condition characterized by metabolic disturbances of unknown cause that can threaten the lives of mother and baby. But new research suggests that mothers who weather hypertension during pregnancy may reap an unanticipated benefit – a significant reduction in breast cancer risk.

Recent studies by Herbert I. Jacobson and his colleagues at Albany (N.Y.) Medical College showed that alpha-feto protein (AFP), produced in substantial amounts by the fetal liver, promotes the regression of estrogen-dependent breast cancers in rats. Since significantly elevated AFP levels have been found in the blood of hypertensive pregnant women, Jacobson teamed up with researchers at the Yale University School of Medicine to examine the breast cancer risk of such women. They compared information on hypertension for 4,668 women who developed breast cancer with that for 4,635 others matched by age and geographic region. All data had been collected from women 20 to 54 years old by the Atlanta-based Centers for Disease Control (CDC) as part of its Cancer and Steroid Hormone Study.

Compared with women who never developed high blood pressure or who became hypertensive only after childbearing, those developing hypertension during at least one pregnancy ultimately experienced 28 percent fewer breast cancers, the team reports in the Oct. 18 JOURNAL OF THE NATIONAL CANCER INSTITUTE. A related study using the same set of data and described in the May AMERICAN JOURNAL OF EPIDEMIOLOGY

showed that women whose most recent pregnancy involved twins experienced an even greater reduction – 40 percent – in breast cancer risk compared with women who had single births only.

With two fetal livers releasing AFP, a woman carrying twins will have double the normal blood level of AFP seen during pregnancy, explains epidemiologist W. Douglas Thompson, who led the most recent study. Though AFP measurements were not available for the women in the CDC data, “both studies indirectly support the idea that highly elevated AFP levels during pregnancy protect against breast cancer,” says Thompson, now at the University of Southern Maine in Portland.

The Yale/Albany team “puts too much emphasis on AFP,” argues University of Miami oncologist Niramol Savaraj, noting that “they have no data to substantiate that AFP is reducing the cancer risk.” Thompson acknowledges the possibility that other pregnancy-associated factors led to the lower risk.

Jacobson, however, points out that the AFP released during pregnancy isn't inert, as many scientists once believed. His recent data show that AFP reacts with the most potent natural estrogen. This reaction, he says, converts AFP “into a new substance with hormone-like properties” that targets estrogen-responsive cells – including some breast cancer cells. Jacobson says he has found that cultured human-breast-cancer cells are very sensitive to AFP. The amount “needed to turn off these [cancer] cells and their replication is less than a nanogram per milliliter,” he says.

– J. Raloff

Old pseudoscorpion had modern features

Scientists digging in upstate New York have discovered 380-million-year-old fossils of a tiny land-dwelling animal called a pseudoscorpion, pushing the history of this creature back to Earth's Devonian period, when animal communities were beginning to develop on land.

Though only distantly related to their namesake, pseudoscorpions resemble miniature scorpions without the trademark tail and stinger. Today, more than 3,000 known species exist around the world. Before the new finds established the great antiquity of these animals, the pseudoscorpion fossil record went back only 35 million years. William A. Shear of Hampden-Sydney (Va.) College, Wolfgang Schawaller of the State Museum of Natural History in Stuttgart, West Germany, and Patricia M. Bonamo of the State University of New York at Binghamton describe the latest fossils in the Oct. 12 NATURE.

Despite their great age, the Devonian pseudoscorpions do not seem primitive compared with modern species, according to Shear. He says this suggests that evolutionary forces have not severely altered pseudoscorpions since then.

“These things developed adaptations to a particular way of life, and that has seemed to be suitable for all the rest of time since then,” says William B. Muchmore, an expert in pseudoscorpions at the University of Rochester (N.Y.).

Shear and Bonamo have found many other types of Devonian predatory arthropods at the same site, including the oldest known centipede and spider fossils, which they will describe in the Oct. 27 SCIENCE. So far, they have found no evidence there of herbivorous animals that would have filled in the food web.

The first land animals appear in the fossil record at the end of the Silurian period and the beginning of the Devonian period, roughly 400 million years ago. But many of these earliest fossils, including the newly found pseudoscorpions, show highly evolved features, including evidence of well-developed sensory hairs. Shear says this indicates either that early land creatures evolved rapidly after leaving an aquatic environment or that animals established themselves on land long before they appeared in the fossil record – a distinct possibility because of the rarity of fossils from that time. If the latter is true, the earliest land animals may have lived on continents before vascular plants developed. In that case, the researchers say, these tiny arthropods – which today live under leaves and soil – probably would have dwelled in the crevices of bacterial and algal mats that scientists think carpeted the Devonian ground.

– R. Monastersky