Eye-grabbing insights
Bruce Bower
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HPV infections go unnoticed. Some types of HPV cause only genital warts, or papillomas, which are unrelated to herpes. Two other types, HPV 16 and 18, are linked to cervical cancer.

To probe any herpes-cancer connections, Jennifer S. Smith, an epidemiologist at the International Agency for Research on Cancer in Lyon, France, and her coworkers analyzed blood and cervical cells obtained from women with and without cervical cancer who visited hospitals in Brazil, Colombia, Peru, Spain, Morocco, Thailand, and the Philippines. They ranged in age from 18 to 84, averaging 49 years. Overall, of 1,263 women with cervical cancer, nearly all also had detectable HPV. Of 1,117 women who didn't have the cancer, only 15 percent were infected with HPV.

Smith's team then compared women who were of similar age and had HPV infections of the same type but who differed in whether they had cervical cancer. Of those with cervical cancer, 44 percent had genital herpes. Among the women without the cancer, less than 26 percent had herpes. So, women with cancer were about 70 percent more likely to have herpes than were the other women. The researchers report their findings in the Nov. 6 *Journal of the National Cancer Institute.*

Precancerous sores on the cervix are detectable by a pap smear. If caught early, these lesions can be removed. This often prevents aberrant cells from progressing into a full-blown cancer. Once cancer develops, however, it can penetrate deeper and become far more difficult to treat.

The virus that causes genital herpes can also produce a lesion on the cervix. Although scientists don't know whether there's interplay between the herpes virus and HPV, a herpes infection might rev up HPV growth or help HPV spread deeper into cervical tissue, Smith says. Some scientists have proposed a hit-and-run theory, in which herpes changes some genetic material in a cell and then moves on, leaving it susceptible to further damage from an HPV infection.

Nancy Kiviat, a pathologist at the University of Washington and Harborview Medical Center in Seattle, focuses on chronic inflammation, which has been linked to liver and stomach cancers. "There's a tremendous inflammatory response to herpes," Kiviat says. This may exacerbate the HPV-induced cell damage that leads to cancer.

Moreover, gonorrhea and chlamydia infections, both of which can induce inflammation of the cervix, seem to hike the chance of HPV infections progressing to cervical cancer. Further research into the biological mechanisms by which various infections conspire with HPV to abet cervical cancer may lead to novel approaches for preventing the malignancy, Kiviat says. —N. SEPPA

Lizard's Choice

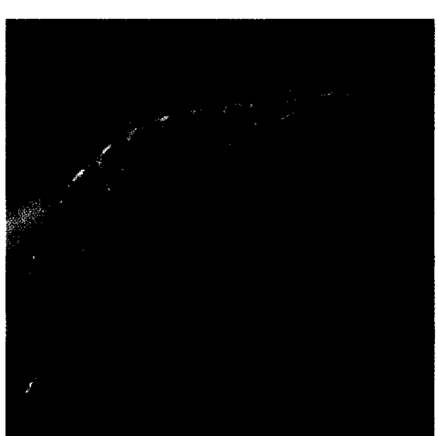
Mating test pits physique versus domain

When a female moves into her intended's home, is she choosing the guy or his real estate? A novel experiment says that it's the landscaping that counts, at least among side blotched lizards. Moreover, the ladies have their own ways to improve life with a puny gent.

Females of this common Western lizard, *Uta stansburiana*, usually prefer big dominant males, explains Ryan Calsbeek of the University of California, Los Angeles. Those males typically control the best rocks for sun and shade throughout the day, so it's hard to tell what drives a female's decision.

Calsbeek and Barry Sinervo of the University of California, Santa Cruz took rocks from the lizard haves and gave them to the have-nots. Each male, nonetheless, remained loyal to his site. Most females deserted the large dominant males and moved to the better rock collections, Calsbeek and Sinervo report in an upcoming *Proceedings of the National Academy of Sciences.* This is the first experiment in the wild that has differentiated masculine allure from the power of real estate, says Calsbeek.

The researchers found yet another twist in the mating system. The females still visited their previous, studlier partners and, somehow, used their sperm to fertilize eggs that turned into sons. Daughters, however, had received sperm from Mom's smaller rockmates.



CALSBEEK

PROPERTY PRIORITY A female side blotched lizard perches on prime territory.

"These females really can have their cake and eat it, too," says Calsbeek.

Researchers had already established that what makes a territory desirable is its wide variety of rocks. During spring, Calsbeek monitored a group of males, all with blue blotches on their throats, as they staked out their domains. Then he spent a day playing Robin Hood, moving some 1,500 pounds of stones.

Afterward, lizards were in "complete chaos. Everybody was wandering around looking for rocks," Calsbeek says. Out of 51 female lizards that started out in a big male's empire, 37 eventually moved to territories with better rocks. As far as the researchers could tell, most of these new homes had had no female inhabitant because of their pitiful rock supply.

Later, it was easy to recognize and catch females just before they laid their eggs, Calsbeek says. "They looked like beanbags, waddling around on their little legs," he recalls. The researchers brought them into the lab and checked their offsprings' DNA to determine paternity.

Work in progress by Sinervo and Calsbeek suggests a genetic advantage for the lizards' siring pattern. Large males pass on their advantageous size to their sons but handicap their daughters with a tendency to delay egg laying, says Calsbeek.

Research on other animals has turned up evidence that females somehow skew the sex ratio of offspring to fit conditions of greater or lesser food abundance, says evolutionary biologist John Alcock at Arizona State University in Tempe. He calls the newly described sperm allocation "astonishing."

The question of whether rock abundance or male size influences females may pose an artificial dilemma. Mark Elgar of the University of Melbourne in Australia says, "Clearly, it's both." —S. MILIUS

Eye-Grabbing Insights

Visual structure grips infants' attention

Babies take their first major strides with their eyes, not their legs, as they rapidly distinguish among playpens, pacifiers, and a plethora of other objects. These feats of sight draw on infants' ability to keep track of pairs of shapes that regularly appear in the same spatial arrangement, according to a new study.

Sensitivity to such pairings in the visual world provides babies—by 9 months of age—with a foothold for learning to recognize all sorts of items, propose József Fiser and Richard N. Aslin of the University of Rochester (N.Y.) in an upcoming *Proceedings of the National Academy of Sciences.*

"Infants prefer to look at pairs of [shapes] that have frequently co-occurred in visual scenes and may use them to learn about more-complex visual features," the scientists note.

Fiser and Aslin studied 72 infants, all 9 months old. While sitting on a parent's lap, each child watched a set of randomly displayed scenes on a computer screen. Each scene contained three colored geometric shapes from a pool of 12 shapes. Eight shapes were grouped into four pairs that always appeared in the same arrangement, either one above the other or side-to-side. Each of the remaining four shapes was shown with a specific pairmate, but their relative locations varied from one scene to another.

The researchers presented the babies with an initial series of 16 scenes that was repeated until infant interest flagged. This usually took about seven repetitions. A new trial then presented a series of paired shapes, including the four pairs from the initial trials, shown on a plain background. Babies usually looked much longer at the pairings that had appeared in the scenes.

This result jibes with prior "looking-time" studies, which suggest that infants prefer to look at familiar material after they've tackled a complex task like viewing series of scenes. When faced with simpler tasks, babies look longer at novel stimuli.

In a second experiment, Fiser and Aslin varied the frequency with which specific pairs of shapes appeared in initial trials. In a subsequent trial, infants looked longer at the pairs that they had seen the greatest number of times.

"It's striking that 9-month-olds are exquisitely attuned to the spatial location of items and the frequency with which they occur together," comments psychologist Scott P. Johnson of Cornell University.

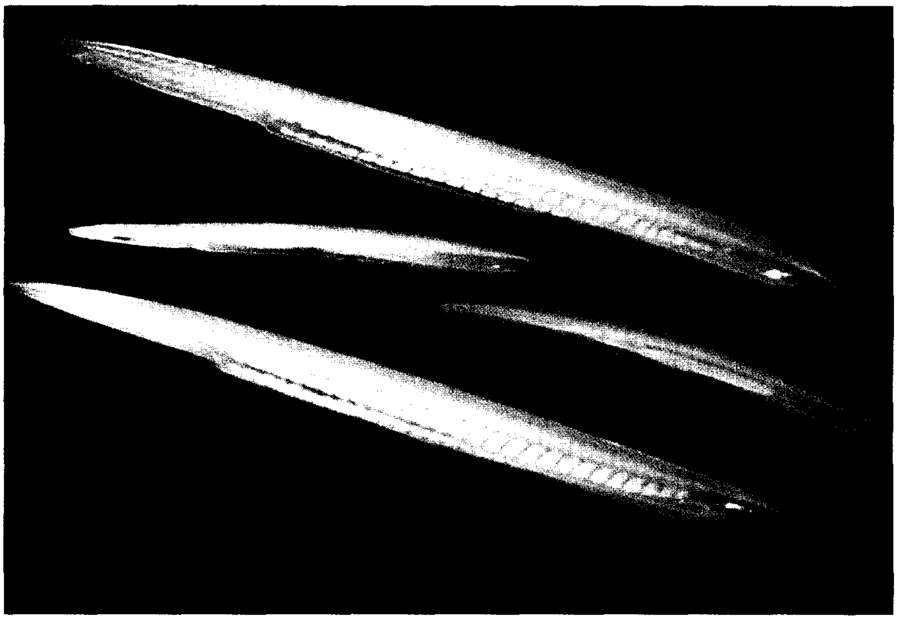
In the March *Cognition*, Johnson and his coworkers reported that infants as young as 2 months apparently recognize a simple and familiar sequence of six colored shapes shown to them earlier. In that experiment, the babies looked longer at novel sequences of shapes than at familiar sequences.

The precise ways in which such visual recognition by infants fosters their learning of different objects in the environment remain unclear. —B. BOWER

First Line of Defense

Hints of primitive antibodies

The lowly lancelet makes a living by burying itself in the sand, sticking out its mouth, and filtering tiny critters from seawater. Such feeding behavior probably exposes this common marine invertebrate to a wealth of infectious microbes. So, the finger-length animal may require something special in its immune system.



EARLY PROTECTION These spineless, 2-to-5-centimeter-long lancelets have only primitive immune systems but may harbor precursors to genes that make antibodies in vertebrates.

C. ANDREWS

Scientists have now discovered in the animals' guts molecules that resemble the antibodies of more-sophisticated animals. The finding may also offer a clue to how complex immune systems evolved.

Lancelets and other invertebrates wield a primitive, or innate, immune system. It can recognize the creature's own cells and reject foreign bodies. In contrast, people and other jawed vertebrates brandish adaptive immune systems. These can mount tailor-made defensive actions by producing antibodies chemically matched to molecular motifs on invading microbes.

Scientists know little about the emergence of these sophisticated immune systems about 500 million years ago, which occurred as vertebrates evolved from jawless into jawed creatures. "Our adaptive immunity just springs into being," comments Gregory W. Warr, an immunologist at the Medical University of South Carolina in Charleston.

To tease out the details of the transition, other researchers recently turned to lancelets, vertebrates' closest spineless relatives. Molecular immunologist Gary W. Litman of All Children's Hospital in St. Petersburg, Fla., and his colleagues at the H. Lee Moffitt Cancer Center and Research Institute in Tampa used a new technique that identifies short sequences of DNA.

The team scoured the lancelet genome for precursors to a class of genes known as variable-region, or V-region, genes. They're responsible for the enormous range of antibody molecules in adaptive immune systems. No one had unambiguously located such genes in animals more primitive than the jawed vertebrates.

Litman's team found small DNA sequences that resemble V-region genes. The group was surprised to find five distinct families of these sequences.

"We think that we've homed in on gene families that have many characters that are reminiscent of the types of genes that went on to become the diversified families of immune molecules," including antibodies, Litman says. He and his colleagues report their findings in the December *Nature Immunology*.

John J. Marchalonis, a molecular geneticist at the University of Arizona in Tucson, doesn't doubt that these lancelet genes are distantly related to V-region genes. Still, he says, there's no evidence that these genes mix and match, the way true V-region genes do, to encode a huge variety of antibodies. Indeed, the functions of the newly found lancelet genes remain unknown.

Marchalonis says, "It is premature [for Litman's group] to make a strong link with adaptive-type immunity."

Warr contends that the newly identified genes probably do represent the first diversified V-region families to be found in animals more primitive than jawed fish. Says Warr, "There's a possibility that [Litman's team is] looking at a set of molecules that somehow bridge, or are related to, the border between adaptive and innate immunity."

Litman next plans to look for novel immune genes in jawless vertebrates, such as lamprey and hagfish. "We think there is a lot of information buried in the evolutionary history," he says. —C. MARZUOLA