Biology

Food snitches threaten rare dogs

It's a dog's life, and it's even harder than we thought.

African wild dogs need so much energy during a day—more than twice what some scientists had thought—that losing just a quarter of their food to thieving hyenas may threaten the dogs' survival. Martyn L. Gorman of the University of Aberdeen in Scotland and his colleagues, who have taken the first energy measurements of these dogs in their natural habitat, report the findings in the Jan. 29 NATURE.

The new data could guide efforts to preserve the vanishing species, which has dwindled to some 5,000 animals in the wild, Gorman says. His data bolster the contentions of some field biologists that dogs and the food-stealing hyenas don't mix.

The measurements may also jolt zoologists into taking another look at the energetics of hunting. "I think what we've done in the past was really underestimate how hard you have to work to catch your own food," Gorman says. Much of the previous work relied on captive animals in laboratories.

Gorman and his colleagues injected water containing distinctive isotopes of hydrogen and oxygen into six free-ranging dogs. By measuring the isotopes in blood samples taken 24 hours later, the researchers could estimate the dogs' rate of respiration; from the respiration rate, they calculated that each animal used an average of 15.3 megajoules of energy per day. Earlier calculations predicted 6.7 megajoules per day for any active dog, whereas studies of working border collies found that these dogs need 8.2 megajoules.

Joshua Ginsberg, a researcher from the Wildlife Conservation Society based at the Bronx Zoo in New York, says biologists have long suspected that wild dogs don't cope well with food theft. "What we haven't known is that they are such incredible energy machines." —*S.M.*

Gorman

New measurements of the energy used by African wild dogs show that hunting is surprisingly strenuous.

What's so sexy about a canary song?

Male canaries sing to attract mates, but the whistling parts of their songs don't seem to interest the females much. A particular two-note trill, however, drives the ladies wild, prompting frequent sexual displays.

Eric Vallet of the University of Paris and his colleagues described the female taste for trills in 1995 and have since been trying to figure out why the sound proves so thrilling.

In the February ANIMAL BEHAVIOUR, the researchers describe experiments comparing the number of sexual displays prompted by edited recordings of the trills. Repetitions of two notes appealed to females more than strings of a single note, and they seemed to prefer the faster runs. Males may repeat the two-note call 16 to 20 times in a single second.

Vallet sees this taste for complexity and speed as evidence that the trill serves as a stunt, giving clues about the males' physical condition. "We thought this type of syllable might be a good index for females," Vallet says.

This summer, he plans to investigate whether the canary trill demands fancy interplay between two sides of a bird's vocal organ. Other work has hinted that such interplay may be involved in the sexy parts of cowbird calls. —*S.M.*

The promise of strung-out flies

Studying fruit flies high on crack cocaine may be the next hot avenue of research for scientists bent on exposing the biochemical pathways by which repeated ingestion of the drug leads to addiction in people.

Jay Hirsh and Colleen McClung of the University of Virginia in Charlottesville report in the Jan. 15 CURRENT BIOLOGY that the behavioral responses of *Drosophila melanogaster* to multiple doses of cocaine are "strikingly similar" to those of vertebrates, including people. The researchers vaporized a pure form of cocaine inside a fly-filled vial, where it was absorbed by the creatures.

The flies exhibited a number of involuntary behaviors, such as intense grooming and protracted circling, the severity of which varied with dose. Repeated exposure resulted in sensitization, a phenomenon that produces progressively more vigorous motor activity in response to the same amount of the drug. The same physiological mechanism appears to underlie cocaine addiction and sensitization in people. In contrast, alcoholics require increasing amounts of the intoxicant to produce the same response.

Since the fruit fly responses closely mirror those of vertebrates, the experiments raise the possibility that the insects could be an effective model for studies of cocaine's effects on people, the researchers say. Biologists prize fruit flies because of the speed with which the insects breed and the ease with which they can be manipulated genetically.

"It's a foot in the door," says Ralph J. Greenspan of the Neurosciences Institute in San Diego. "Genetic analysis in fruit flies lets us go very far, very fast." At the same time, he cautions against assuming that behavioral similarities translate into cellular ones.

The research did provide a clue to the molecular basis of addiction, however. Hirsh and McClung discovered that flies exposed to cocaine at intervals of less than 6 hours did not exhibit sensitization, whereas flies that got high after longer intervals did. That finding undermines the notion that sensitization results from mere accumulation of the drug and suggests that a more complicated pathway underlies the phenomenon. —*M.M.*

Toward more efficient cloning

The burgeoning field of pharming—the practice of genetically engineering animals to produce pharmaceuticals for human use—got another boost last month with the arrival of a pair of spindly legged calves.

George and Charlie, genetically identical and carrying an introduced gene, are the brainchildren of James Robl and Steven Stice of the University of Massachusetts at Amherst. The method they used to clone the calves varied only slightly from the ones used by Scottish researchers to produce Dolly, Molly, and Polly (SN: 4/5/97, p. 214; 8/23/97, p. 127), but it turned out to be significantly more efficient.

The technology transfers nuclei from rapidly dividing fetal cells rather than from cells that have been induced to enter a temporarily nondividing state. The new method boasts roughly one full-term pregnancy for every 50 nuclear transfers, a success rate markedly higher than that achieved by the scientists who produced the cloned sheep, say the researchers. They announced their accomplishment on Jan. 20 at a meeting in Boston of the International Embryo Transfer Society.

George and Charlie are the products of a dry run—they carry a marker gene that is easily detected but produces no physiological effects. Next time, the scientists intend to clone female calves that will produce milk containing a human protein that enhances blood volume. Robl and Stice have focused on cloning cattle because cows produce large amounts of milk—and could thus churn out drugs in bulk. —*M.M.*