Biology

New drugs from the dreaded deerfly?

Deerflies — nasty, green-eyed flies found along the New England coast — have driven many a sunbather from the beach with their nasty, persistent biting.

But even these pests have a positive side. So that the deerfly can sip its meal at leisure (or until a hand slaps it away), the insect's spit contains a potent compound that helps keep the blood flowing, says Ethan A. Lerner, a dermatologist at Massachusetts General Hospital-East (MGH) in Charlestown. That compound, called chrysoptin by its discoverers, prevents particles in the blood from plugging up the nick, MGH's Suzanne A. Grevelink, Lerner, and their colleagues report in the Oct. 1 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

Last year, Lerner's group found a chemical for keeping blood vessels open in the sandfly, a tropical insect. But Lerner and Grevelink decided to look for new fly substances locally. They collected live deerflies at nearby marshes and beaches using a modified Dustbuster. Then they extracted liquid from the flies' salivary glands and tested it by adding it to solutions of platelets, tiny bloodborne particles of cytoplasm that help plug damaged blood vessels and initiate clotting.

Chrysoptin, a salivary protein, prevents the chemical changes that make platelets sticky. This protein acts by blocking certain docking sites, or receptors, on the platelets' surfaces. Normally, these receptors bind the substance that triggers stickiness, says Lerner. Without this binding, the platelets do not clump.

Substances in viper venom also work this way, says Lerner. In fact, several pharmaceutical companies are using venom to develop medications to stem blood clots involved in heart attacks or strokes. Because chrysoptin is more potent than venom, it may prove even more promising, Lerner adds.

In Sweden, the beavers are all cousins

Although biologists have long thought that a species needs genetic variation in order to thrive (SN: 9/25/93, p.200), beavers are proving this assumption wrong. Supposedly, variation ensures that individuals can adapt to varying living conditions. Also, even if one individual's immune system can't fend off a particular infection, another individual's slightly different system can. But *Castor fiber* seems to do just fine without this variation, says Hans Ellegren from the Swedish University of Agricultural Sciences in Uppsala.

Hunters killed off Sweden's beavers during the 1800s. Then, during the 1920s and 1930s, conservationists reintroduced a small number of Norwegian animals, of which 46 survived in 11 locations in Sweden. The Swedish beaver population now numbers 100,000, says Ellegren. In Sweden, he and his colleagues obtained DNA from 31 beavers, 25 that lived in the same river system and six from varying distances away. They also examined genetic material from 15 Norwegian beavers and six Russian ones.

The researchers compared the animals' major histocompatibility complex (MHC) genes, highly variable sections of DNA that enable organisms to fight many kinds of pathogens. They observed that none of the beavers showed much diversity in their MHC genes.

The Swedish animals proved as genetically identical as populations of animals restricted to small islands, where incestuous matings often occur, the researchers reported in the Sept. 1 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. The Norwegian animals didn't prove any more diverse. Beavers may be able to tolerate the negative effects of inbreeding because they naturally live in small colonies and never move beyond their native river, the scientists propose. However, genetic differences among the DNA "fingerprints" of the Russian beavers show that this species does possess genetic variation.

Science & Society

Beaches awash in plastic

Last year, some 160,000 volunteers scoured more than 5,000 miles of beach for litter as part of an international program coordinated by the Center for Marine Conservation (CMC) in Washington, D.C. Trash brigades in the United States and 32 other countries retrieved 5,328,000 pieces of debris, 58.8 percent of which was made from plastic (including styrofoam). As such, plastic remains "the leading and most dangerous contributor to the marine debris problem," CMC concludes in *International Coastal Cleanup Results,* its recently published, 217-page report.

Leading the list of discards, at 16.8 percent, were the nearly 900,000 cigarette filters collected. At 12.7 percent, bottles and associated materials — including beverage cans, pull tabs, and bottle caps — constituted the next most prevalent beached trash. However, the CMC survey points out, raw totals do not tell the whole story. While fishing paraphernalia (monofilament line, floats, and lures) kills more marine wildlife than any other category of beach debris, it accounts for only 1 percent of the retrieved litter.

Calorie labeling: Whom can you trust?

Many products marketed as "health" or "diet" foods provide calorie information on their labels. But the reliability of a packaged food's calorie count tends to vary with how widely that product is distributed, according to a new study by Steven B. Heymsfield and his co-workers at the Obesity Research Center of Saint Luke's-Roosevelt Hospital Center in New York City.

The researchers purchased 40 different prepared foods, quantified their calorie content, and compared those values to information on the product's label. In the Sept. 22-29 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, they report that although nationally advertised foods provide accurate calorie counts, regional brands tend to contain an average of 25 percent more calories than labeled. "Buyer beware" was their caution when it comes to local brands: These products averaged 85 percent more calories than stated on their labels.

In the Dec. 31, 1992 NEW ENGLAND JOURNAL OF MEDICINE, Heymsfield's team reported data indicating that some patients fail to lose weight, though claiming to eat low-calorie diets, because of a "substantial misreporting" of calories eaten. The researchers now suspect that some of that failure is due to "people honestly believing that they eat fewer [calories] than they do because they have been misinformed by food labels." Unless the government steps up its policing, the team concludes, food labeling laws may not benefit obese consumers.

On the road: A shocking tale

There's no question that surgically implanted, battery-powered defibrillators can save the lives of people who suffer from a heart rhythm disorder, which can cause sudden cardiac arrest and death.

And many patients with the devices continue to drive a car, according to a report in the Oct. 6 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

So, what's wrong? Plenty, say Nancy J. Finch and her colleagues at the Medical University of South Carolina in Charleston. When the heart starts beating wildly, the device delivers a lifesaving electric shock. However, that same jolt can knock the patient out cold.

In a survey of 40 patients, the researchers discovered that 28 (70 percent) had resumed driving after getting their implant. (One patient drove himself home from the hospital after receiving the device.) Eleven of the 28 even identified themselves as the primary driver in their household. All implant patients had been told by doctors and nurses before and after the operation never to drive a car again, the authors note.