

BIOLOGY

Coat of hydrocarbons: Insect disguise

Many insects live as permanent guests in the nests of ants and termites. Some seem to infiltrate by mimicking the behavior of their hosts. Others appear to mimic the host's shape. The staphylinid beetle *Trichopsenius frosti*, which lives among the termites *Reticulitermes flavipes*, mimics its host's chemistry. In the Oct. 24 *SCIENCE*, Ralph W. Howard of the U.S. Department of Agriculture Forest Service in Gulfport, Miss., and colleagues report that these beetles have exactly the same 21 hydrocarbons in their cuticle, the horny covering layer, as do their termite hosts. Furthermore, the beetles themselves synthesize the hydrocarbons; they do not pick up the compounds from their hosts.

Such a similarity in hydrocarbon composition is rare among closely related organisms and had never been observed in phylogenetically remote animals. Howard and colleagues also find similarities of hydrocarbon composition in the cuticles of other termitophiles and those of their hosts. "If termites use cuticular hydrocarbons as species-recognition cues, then *T. frosti* has acquired an infallible integrating mechanism," the scientists suggest.

Alaska to Hawaii non-stop

Biologists using radar have just recorded the longest known non-stop flight by land birds. It is the 48- to 72-hour journey of the ducks and shorebirds that migrate 2,500 miles from Alaska's Aleutian Islands to Hawaii. Timothy C. Williams and Janet M. Williams of Swarthmore College report that the birds gather for take-off in Alaska and wait for a brisk wind from the north. A good tail wind can double a bird's speed. Ducks and large shorebirds can travel 60 miles per hour, the Williamses find.

Because so few species of birds migrate in large numbers to Hawaii, scientists can identify birds by correlating sightings with the white dots on the radar screen. Four species of shorebird arrive in Hawaii in August and September, and two species of duck show up in October and November. Some of the shorebirds, the golden plovers and the ruddy turnstones, only stop over to refuel. Once they have fattened up, they continue on to the South Pacific. The Williamses' project is the first use of radar over the Pacific Ocean to study birds.

The other interferon: A little more

Interferon comes in several varieties. The interferon that has been used in clinical trials (SN: 6/7/80, p. 358) and that has been produced by genetically engineered bacteria (SN: 6/14/80, p. 372) is of two kinds: leukocyte and fibroblast. Both these interferons are considered type 1. A second type—called immune interferon—appears to be 200 times more powerful. Few studies have been done with this material because it is difficult to obtain and rapidly deteriorates. At the annual clinical congress of the American College of Surgeons in Atlanta, Ga., scientists reported a new technique for obtaining the rare material. William J. Catalona and Timothy Ratliff of Washington University School of Medicine in St. Louis, Mo., exposed white blood cells to protein A, a component of the bacterium *Staphylococcus aureus*. This protein induces production of more immune interferon than do agents used previously. The interferon can be harvested daily for three days, instead of once after three days, and it is more concentrated in the cell medium. Catalona and colleagues now plan to test the immune interferon's activity against bladder and prostate tumors in mice. Later they may attempt to purify the material and analyze it. Ratliff says the new method is not expected to produce sufficient immune interferon for clinical studies.

NOVEMBER 8, 1980

BIOMEDICINE

Animal lignans found

Lignans, a class of chemical compounds found in certain plants, have been identified in mammalian urine, according to the Oct. 23 *NATURE*. The researchers, from labs in England, Finland and Sweden, report finding lignans in human, baboon, vervet monkey and rat urine.

The structure of the mammalian lignans "might suggest a dietary or bacterial origin or formation by intestinal bacteria. Preliminary results, however, indicate that they may be ovarian in origin or that their production is influenced by ovarian function," the researchers note. Their studies show that excretion in post-menopausal women is lower than in ovulating women and varies with the stage of the menstrual cycle. Lignans may be associated with the regulation of the length of the second phase of the cycle, they suggest.

"The existence of lignans in humans, and preliminary observations on their disposition, pose questions as to their physiological and biological significance," say the researchers. The National Cancer Institute for years has been studying the antitumor activity of lignans. A synthetic derivative is currently undergoing human trials for lung tumor treatment.

Hepatitis and AML

Viral hepatitis has been implicated as a cause of cancer. In a turnaround, acute myelogenous leukemia (AML) victims who developed hepatitis following blood transfusion were found to live longer than hepatitis-free AML victims, according to the Oct. 17 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*. "Median remission duration for patients with hepatitis was 635 days versus 327 days for patients without hepatitis," researchers from the University of California at Los Angeles report. "Median survival for patients with hepatitis was 765 days versus 496 days for patients who did not have hepatitis."

The reason for this longer survival is not known. The researchers offer two hypotheses, both of which they note are highly speculative. One possibility— hepatitis viruses damage leukemic cell precursors. The second suggestion is that the intact immune system associated with the development of hepatitis may allow longer survival.

First aid for flatulence

Activated charcoal is used in cigarette filters, as an antidote to poison and for many other purposes. It may also offer relief from flatulence, according to a study by physiologist Raymond Hall of Loma Linda University in Loma Linda, Calif.

Hall and his co-workers measured intestinal gas production in 30 volunteers by having them count their episodes of flatulence and by monitoring levels of exhaled hydrogen. Hydrogen gas is produced only in the intestine, so hydrogen absorbed from the intestines by the blood and exhaled through the lungs accurately reflects gas production in the intestine, Hall explains.

The volunteers were fed bland, non-gassy meals; gassy meals of beans, whole wheat toast, peaches and fruit juices; and gassy meals with activated charcoal capsules as a side dish. Measured by hydrogen gas analysis, five times as much gas was produced with the gassy meals as with the bland meals and the gassy meals with charcoal. When measured by flatus events, the difference was six- or sevenfold, says Hall. Presumably the activated charcoal adsorbs components of intestinal gas the way it adsorbs toxins when used as a poison antidote. The manufacturer of activated charcoal that sponsored the study has high hopes for its product—it has applied for Food and Drug Administration approval to add to its product's "safe and effective" uses the treatment of diarrhea and hangers as well as of flatulence.

301