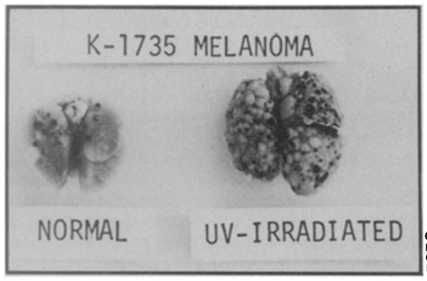
BIOLOGY

Aggressive skin cancer and ultraviolet



FCRC

Although skin cancers are a common malignancy, most can be successfully treated surgically. One class of skin cancer, however, is among the most aggressive cancers known and is one of those most resistant to therapy. This cancer, malignant melanoma, is characterized by tumors of cells containing dark pigment. Although the disease is relatively rare, its incidence is increasing at a rapid rate. Ultraviolet light is responsible for most skin cancers, but its link to melanoma has been obscure.

One serious obstacle to the investigation of melanoma and ultraviolet radiation has been lack of an appropriate animal model. "We have now had the good fortune to produce melanoma in an inbred mouse," Margaret L. Kripke of the Frederick Cancer Research Center told a recent science writers' conference. She gave mice ten one-hour exposures to ultraviolet radiation and then painted their shoulders with a tumor promoter, croton oil, twice weekly for 2 years. In one animal out of 40 a tumor arose that Kripke believes to be an ultraviolet radiation-induced melanoma. She explains that no spontaneous melanoma has ever been reported in that mouse strain. The induced tumor contains dark pigment, and cells from it cause tumors in other mice. For other types of skin cancer, ultraviolet exposure reduces an animal's defense against the spread of disease initiated by cells from ultraviolet radiation induced tumors. Kripke now finds that cells from the melanoma similarly spread to cause more tumors in the lungs of mice previously exposed to ultraviolet radiation than in lungs of mice not so exposed (photograph above). "It may now be possible to develop an experimental model in which to assess the role of UV radiation and chemical promoters in melanoma induction," Kripke says. "UV radiation may also play an indirect role in the progression of this disease."

Spot test for cancer chemicals

A quick and inexpensive method has been developed to screen chemicals for potential use in cancer therapy as well as for those suspected of being cancer-causing agents. Rosalie K. Elespuru of the Frederick Cancer Research Center describes a test that, in a matter of hours, can detect damage to bacterial genetic material. The ability of a chemical to interact with, and thereby damage, DNA is one property that anti-tumor chemicals and cancer-causing chemicals often have in common. Researchers worked for two years to find the bacterium (a genetically selected *Escherichia coli)* best suited for the new "Biochemical Induction Assay." The genes of a virus called bacteriophage lambda normally sit quietly in the bacterial chromosome. But if the bacterial DNA is damaged, the virus becomes active and begins to multiply. In the specially selected bacteria, that activity also produces an enzyme called beta-galactosidase. When scientists add a substrate that changes color in the presence of the enzyme, they can detect DNA damage by the color change. In the simplest version of the assay, chemicals are dotted on a plate of bacteria and the ones of interest produce a red, blue or yellow spot. Among the method's advantages are minimal handling of the suspected chemical and an ability to test samples contaminated with microorganisms. Elespuru says this is the simplest existing assay for DNA damage.

EARTH SCIENCES

Sensing a hurricane's turn

Liquor stores and grocery stores sold out and boards went up as Miami battened down for Hurricane David last month. But it was all for naught: David skipped unexpectedly northward and lashed Florida's Atlantic coast (SN: 9/8/79, p. 167). Soon, however, forecasters may be better able to predict a hurricane's typically capricious turns.

William M. Gray and co-workers at Colorado State University in Ft. Collins believe they have found a meteorological handle — the speed of the winds and the temperatures at the perimeter of a hurricane — that can give warning to a hurricane's apparently sudden change of course. Gray and co-workers studied the tracks and wind and temperature data of 1961 to 1977 hurricanes in the western Atlantic Ocean, the West Indies and the Caribbean Sea. They found that 24 to 36 hours before a storm veers to the left, the flow of the winds 300 to 600 miles from the storm's center is stronger at upper levels of the troposphere than at lower levels. Conversely, before a storm flanks right, the winds are stronger — by about 10 meters per second — at lower levels than at upper levels. Moreover, the difference in wind speeds is accompanied by a difference in temperature, according to Gray, which can be detected by satellite. Satellite sensing of a right to left temperature gradient, therefore, may signal a turn in the hurricane's path within 36 hours, he suggests.

Growing real estate

Interested in a *very* speculative real estate investment? A good bet, judging from an article in the October NATURAL HISTORY, would be in the Caribbean. According to University of Rhode Island's Haraldur Sigurdsson and Stephen Sparks of Cambridge University, an underwater volcano dubbed Kick'em-Jenny may be the next island of the Lesser Antilles chain, possibly by the year 2000. The researchers have spot-checked the volcano, which first announced itself by a 1939 explosion, since 1972. Located 5 nautical miles north of the island of Grenada, it is growing at a mean rate of 15 feet per year. As of April 1978, its summit was about 525 feet below the sea surface. If and when it emerges, say the researchers, it will probably resemble Isle de Caille, its 1,000-year-old sister 4 miles to the east — barren, dry and uninhabited.

Seismicity-nuke plant atlas available

Earthquake plus nuclear power plant can be a deadly combination. So just where are nuclear plants situated with respect to seismically active areas? Funny you should ask. Wyle Laboratories of El Segundo, Calif., which tests the quake strength of nuclear systems, has published a "World Atlas of Seismic Zones and Nuclear Power Plants." The U.S. map is shown below. (In the legend, g equals units of gravity. One g is a horizontal movement of the earth during a quake that is equal to 32 feet per second.) To obtain the 12-page atlas, write to: Director of Nuclear Programs, Wyle Laboratories, 1841 Hillside Ave., Norco, Calif., 91760.