Softening the bald facts of chemotherapy

The threat of massive hair loss leads some cancer patients to shun or prematurely discontinue chemotherapy. But unexpected findings from a preliminary study of rats suggest that an experimental drug fights not only leukemia but also the hair loss induced by other anticancer drugs. If confirmed in humans, the discovery might offer a way to shield patients' hair from the ravages of chemotherapy.

Investigators stumbled upon the hair-saving prowess of the drug ImuVert while studying its potential to boost the effectiveness of standard chemotherapy drugs. Human trials of ImuVert's own ability to combat brain cancer had already begun. But University of Miami hematologist Adel A. Yunis suspected the experimental drug might also provide a useful adjunct to cell-killing chemotherapy because it seems to spur the body's white blood cells to release powerful chemicals called cytokines, which in turn destroy malignant cells.

Yunis and his colleagues decided to test that idea against leukemia. They inoculated baby rats with leukemic blood cells, which cause cancer and death within one month in untreated animals. In the week following the inoculations, they injected 23 of the rats with daily doses of the chemotherapy drug cytosine arabinoside. Another 20 cancer-inoculated rats received the same dose of cytosine arabinoside together with ImuVert.

In the Sept. 28 SCIENCE, the researchers report that the one-drug regimen staved off leukemia in two rats, whereas the dual-drug treatment blocked the disease in 18 rats. ImuVert appears to enhance the tumor-busting impact of chemotherapy, perhaps by activating some component of the rat immune system, Yunis says.

The experimental drug also produced an unexpected bonus: All 20 ImuVert-treated rats retained their fluffy white hair. The single-drug regimen, in contrast, denuded 16 of 23 rats and left another seven with mild to moderate hair loss. The researchers found a profound loss of hair follicles in rats treated with cytosine arabinoside alone, but no follicle reduction among those receiving both drugs.

In subsequent experiments by the same group, ImuVert prevented hair loss in leukemic rats treated with the chemotherapy drug doxorubicin, but failed to spare the hair when leukemic rats received it with cyclophosphamide, Yunis says. He has yet to investigate ImuVert's ability to enhance the anticancer effects of either of these two drugs.

Yunis emphasizes that these preliminary studies in rats only hint at ImuVert's potential for sparing human hair, and he warns against jumping to conclusions. However, he says he believes researchers may soon propose trials in humans.

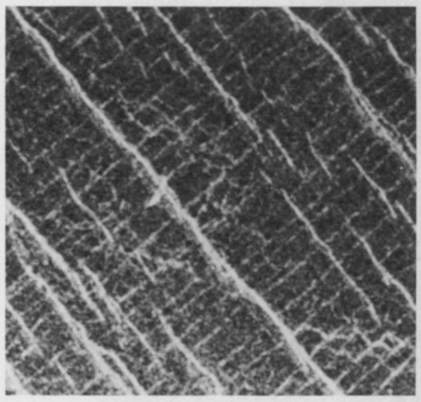
Yunis

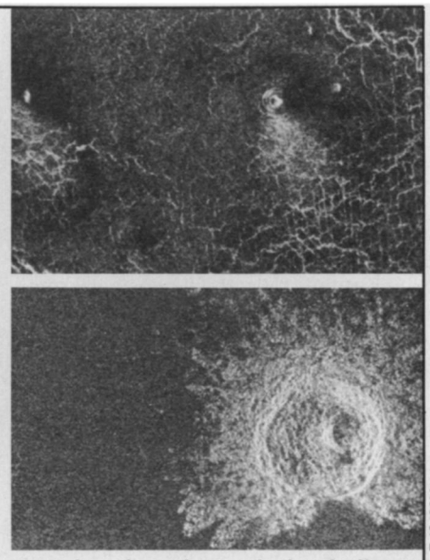
Rats with hair received ImuVert along with their chemotherapy.

Even if the drug had no effect on the cancer itself, the prospect of avoiding hair loss would provide great relief for many patients facing the devastating experience of chemotherapy, says psychologist Morton Bard of the American Cancer Society in New York City. He notes that many people find chemotherapy-triggered nausea more bearable than the emotional distress caused by the daily shedding of once-healthy hair.

– K.A. Fackelmann

Cross-hatched Venus puzzles astronomers





Photos: JPL

Magellan's radar views of cloud-enveloped Venus reveal some clearly unexpected new surface features. The most unusual one recorded since the craft began mapping the planet on Sept. 15 consists of a remarkably regular, cross-hatched pattern (left photo), formed when several parallel, linear features intersect a group of brighter ones at almost right angles. Researchers have never seen such terrain "either on Venus or the other planets," says project scientist R. Stephen Saunders of the Jet Propulsion Laboratory in Pasadena, Calif.

The unusual pattern marks a low rise in the northern hemisphere between two plains called Sedna Planitia and Guinevere Planitia. Lines in the fainter of the two groups are regularly spaced about 1 kilometer apart, Saunders says, and are about as narrow as the radar can detect – roughly 120 meters. The brighter of the cross-hatched lines are less regular, and in some places appear to begin where they intersect the faint lines. Magellan researchers do not know whether the lines represent fractures of some kind, but Saunders says that parts of the puzzling pattern look as though they may be associated with some past volcanic activity.

Magellan has also returned images revealing two craters. Clear differences between them suggest the craters had vastly different origins. Features in the smaller, 1-km-diameter crater (upper right photo) indicate explosive volcanism. For example, the radar-bright surface deposit that broadens away from the south side appears to have been created by erupted debris.

About 37 km across, the larger crater (pictured at lower right), located in Guinevere Planitia, presents the classic look of a meteorite impact. A lack of debris on the crater's south side suggests the meteorite was descending from the south at a shallow angle to the surface when it hit. The crater's central peak probably formed when the floor, compressed by the impact, rebounded.

Other images include what Saunders describes as "lots" of low domes only a few kilometers across and resembling what some geophysicists say are shield volcanoes (SN: 6/23/90, p. 392). There is also "a very curious field of little craters, which have little sinuous channels coming out of them," Saunders says.

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