Cancer migration factor discovered

With most cancers, it is not the initial growth of tumor cells but rather their ability to travel to other tissues that makes them life-threatening. Now, researchers from the National Cancer Institute (NCI) in Bethesda, Md., and several other government institutions report they have found a substance secreted by tumor cells that enables them to move about. While the work doesn't offer an immediate cancer intervention, it does suggest several new approaches to detection and treatment.

NCI's Lance A. Liotta and his co-workers isolated the substance, a protein they call autocrine motility factor (AMF), from human melanoma (skin cancer) cells that had migrated to brain tissue. When added back to a melanoma cell line in the lab, AMF stimulated the cells to squeeze through small pores in a filter. Its activity, they have found, is independent of growth factors that promote cell division.

"One of the least understood aspects of how tumor cells invade is what makes them move," says Liotta. "We have for the first time a handle on what causes this."

Tumor cells have been shown to secrete growth factors, while normal cells make motility factors, observes Bruce Zetter of Harvard University, who studies new blood vessel formation in tumors and in diseased hearts. "It's an interesting corollary that tumor cells can stimulate themselves to migrate," he says. It makes them less dependent on substances produced by the body, he notes. "They have within them all the components they need to divide and metastasize [spread]."

If the finding is confirmed, AMF may prove to be clinically useful. If it also spreads to the blood, this protein could enable physicians to detect the presence or spread of cancer by a blood test. And blood levels, Liotta says, may suggest just how metastatic the cancer is. In addition, he told SCIENCE NEWS, "If we could figure out an inhibitor we might be able to prevent the transition from a [localized] cancer to a metastatic one."

Liotta suggests that AMF works by changing the chemical composition of a molecule on cell membranes; this change may increase cell motility by making the membrane more fluid. He and his co-workers describe the isolation and purification of AMF in the May PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol. 83, No. 10). Cells also move in wound healing and embryo development, and at recent scientific meetings, several European groups have discussed isolation of motility factors in those processes that may be similar to AMF, Liotta says. — *J. Silberner*

Ariane grounded too

The epidemic of launch-vehicle disasters that has temporarily grounded almost the entire U.S. space program went international on May 30 with the failure of Europe's latest Ariane rocket. The rocket's first two stages performed properly, and the third ignited on time, but then its engine abruptly stopped firing. Flight safety officers on the ground blew it up, also destroying the $55 million Intelsat V communications satellite that was its payload.

The European Space Agency and Arianespace, which markets Ariane and its services, formed a board of inquiry to investigate the mishap, with the hope that it can report its findings by June 30. Early looks at telemetry data from the launching yielded no obvious clue to the problem, unlike the Ariane failure last Sept. 13. At that time, telemetry clearly indicated a third-stage propellant-valve leak, which was corrected on later Arianes.

The type of rocket just destroyed, called an Ariane 2, has been grounded pending the investigation results, but the same uncertainty also faces the larger Ariane 3 (one of which was last September's failure) and the yet untried Ariane 4, which both use the same kind of third-stage engine. □

Ruling out radwaste sites

The Reagan administration has "postponed indefinitely" its effort to find a site for a second high-level nuclear waste dump. Secretary John S. Herrington of the Department of Energy (DOE) last week announced that his agency intends to abandon its controversial search for a suitable site in granite or crystalline rock formations.

Herrington argued that because the volume of spent fuel from nuclear power plants is growing less rapidly than anticipated, one repository would be enough to meet foreseeable future needs. This move, he said, would save millions of dollars that would otherwise be spent to study potential sites for a second repository. The abrupt decision brought a chorus of cheers from officials and residents in seven states where DOE had identified potentially acceptable repository sites (SN: 2/1/86, p. 74).

The administration also eliminated two backup choices for the first high-level nuclear waste repository. One was in Davis Canyon, Utah, and the other at Richton Dome, Miss. That leaves three candidates: a salt formation in Deaf Smith County, Texas; the consolidated volcanic ash of Yucca Mountain, Nev.; and a volcanic basalt site on the Hanford nuclear reservation near Richland, Wash. (SN: 1/5/85, p. 6). □

Magnetic monopol-y: Has it passed Go?

Finding a magnetic monopole seems more difficult than getting rich enough to build a hotel on the Boardwalk. Since Feb. 14, 1982, there has been on record one event that seems to have been the passage of a magnetic monopole — a single magnetic north or south pole — recorded by Blas Cabrera of Stanford University. Now there is a second "candidate event" recorded at 7:06 a.m., British Summer Time, Aug. 11, 1985, in the Blackett Laboratory of Imperial College in London. A. D. Caplin and M. Koratzinos of Imperial College, M. Hardiman of the University of Sussex in Brighton and J. C. Schouten of Oxford Instruments Ltd. in Oxford present their candidate in the May 22 NATURE.

Magnetic monopoles, whose existence was first postulated by P.A.M. Dirac more than 50 years ago, would round off the symmetry between electricity and magnetism. Monopoles should have been produced in the early stages of the development of the cosmos. Exactly how many remain depends on the details of what happened in those early moments (SN: 11/27/82, p. 348; 12/4/82, p. 364).

The detectors used at Stanford and London are loops of superconducting metal through which electric currents flow. Magnetic flux — that is, a magnetic field — is trapped inside these rings and persists at a constant level for a very long time. If a magnetic monopole passes through one of these rings, it will increase the flux in a sudden, stepwise way, and the increase will likewise persist.

Cabrera's original experiment had been turned on only a short time when he recorded his one event. That seemed to indicate that magnetic monopoles were more abundant than they ought to be, in view of the continuing existence of the magnetic field of our galaxy. The galactic field would be destroyed by a flux above a certain abundance.

As a unit of exposure for these detectors, the Imperial College experimenters use the area of the superconducting ring multiplied by the amount of time it has been turned on. They call the exposure of Cabrera's original experiment before his event "1 cabrera." On that basis, the total exposure of their experiment is 400 cabreras and that of the world's other three such experiments is 800 cabreras. Even with that much exposure, two events still indicate a monopole abundance 200 times too large for the survival of the galactic field — suggesting either that previous calculations are wrong or that these are not magnetic monopoles. — *D. E. Thomsen*