

# SCIENCE NEWS of the week

## Cancer Cells Caught in the (Metastatic) Act

Despite thorough surgical excisions and ever more sophisticated radiation and drug treatments, some cancer cells manage to get away from physicians trying to destroy them. Tumor cells that escape capture or destruction can spread to other parts of the body and start cancer anew.

Now, scientists have caught this process, called metastasis, on videotape. The images call into question theories about why refugee cancer cells settle where they do, and they offer researchers a new way to study potential treatments, says Ann F. Chambers, an experimental oncologist at the London (Ontario) Regional Cancer Center.

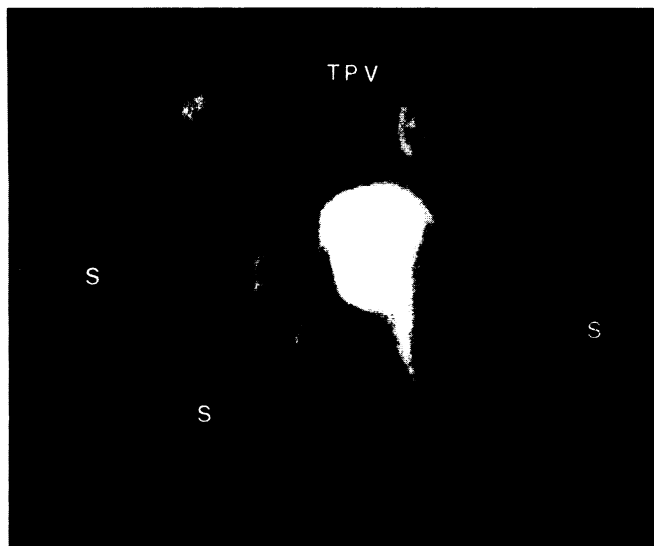
Most scientists study metastasis by injecting tumor cells into mice and then, weeks later, examining the tumors that form. But working with biophysicist Alan C. Groom and his colleagues at the University of Western Ontario in London, Chambers can monitor the process as it occurs.

To do this, the researchers put an

anesthetized mouse on a fluorescence microscope stage positioned over the instrument's optics. They cut open the mouse and pull out the still-attached and functioning liver, lung, or muscle to be studied. Fiber-optic filaments placed at a 45° angle to the stage light the specimen and make possible a three-dimensional view of the tissue, says Chambers.

With a video camera tuned to red wavelengths of light, the researchers record injected cancer cells as they course through the organ's blood vessels. Dye in the cells makes them fluoresce.

Typically, researchers depict cancer



Vincent Morris, Eric Schmidt, et al./CLINICAL & EXPERIMENTAL METASTASIS

*Stuck in a tiny vein of the liver, this breast-cancer cell (white) may begin to grow and form a new tumor. TPV stands for the terminal portal venule; S indicates even smaller blood vessels, or sinusoids.*

### Young scientists honored for research

Legions of high school science enthusiasts converged on Mississippi Beach, Miss., last week for the 44th International Science and Engineering Fair (ISEF). The May 9 to 15 event attracted 831 students, who brought with them projects previously exhibited in ISEF-affiliated fairs held in 46 U.S. states, Guam, American Samoa, Puerto Rico, the District of Columbia, and 16 foreign nations.

For many, their work garnered monetary rewards as well as praise from adult scientists.

Two students received the Glenn T. Seaborg Nobel Prize Visit Award: a trip to Stockholm, Sweden, in December to witness the Nobel prize ceremonies. Lana Israel, a senior at North Miami Beach Senior High School in North Miami Beach, Fla., won recognition for five years of research on an innovative learning technique — mind mapping — that enables students to better organize, process, and communicate information. Mahesh Kalyana Mahanthappa, a senior at Fairview High School in Boulder, Colo., received his Seaborg prize for providing a more general solution to an equation first solved in 1913 by Indian mathematician Srinivasa Ramanujan.

Two students earned all-expenses-paid trips to the European Community Contest for Young Scientists in Berlin, Germany, in September, where they will represent the United States but not com-

pete for awards. Robert John Knorr, a senior at Sawyer Public School in Sawyer, N.D., will exhibit his genetic study of the interaction between soybean plants and nitrogen-fixing bacteria. Lea Gabrielle Potts, a senior at Mount Vernon High School in Alexandria, Va., will present her research on the formation of synthetic diamond crystals on surfaces.

George C. Lee, a senior at Mission San Jose High School in Fremont, Calif., won a scholarship to the Bessie Lawrence International Summer Science Institute at the Weizmann Institute of Science in Rehovot, Israel, for his research on the feasibility of using microbes to break down oil spills.

In three ceremonies, Science Service, Inc., of Washington, D.C., which administers the annual ISEF, and dozens of academic, corporate, and federal sponsors presented 624 individual prizes to students who demonstrated excellence and creativity in their research. The prizes ranged from \$75 cash awards to \$8,000 college scholarships, computers, and overseas trips.

ISEF organizers added a new category this year — team projects — to encourage participation by more students. The collaborative projects, involving up to three students, are intended to give students a feel for how many professional scientists do their work, ISEF officials say.

— D. Pendick

cells as settling in blood vessels larger than the cells themselves and sticking there because of special adhesion molecules. But the new action images reveal that the 15- to 20-micron-wide cancer cells zip by too fast to get snagged, Chambers reported this week in Orlando at the annual American Association for Cancer Research meeting. The Canadian group thinks that cancer cells may start new tumors when they get stuck in vessels too narrow for the cells to pass through.

From there, the cells make their way into nearby tissue. The Canadians have observed that after about 26 hours, all the cancer cells injected into blood vessels in chick embryo membranes have moved out of the vessels.

"We thought the [exiting] cell would just destroy everything in its path, but it seems to ooze its way through," says Chambers. "It may clear a small path [through the vessel wall]."

Surprisingly, a malignant cell can also change shape as it whizzes through the body. The cell is rotund in the liver but long and skinny as it maneuvers through vessels that supply blood to muscle, Chambers says.

Scientists had thought that cancer cells burst if the pressure inside blood vessels becomes too great; instead, the cells pinch off bits of their cytoplasm and remain functional, she adds.

The team hopes to quantify metastasis and expects video microscopy to enable pharmaceutical companies to watch how new drugs affect this process. — E. Pennisi