RANDOM SAMPLES

edited by LISA SEACHRIST

Tinkering With the Death Program

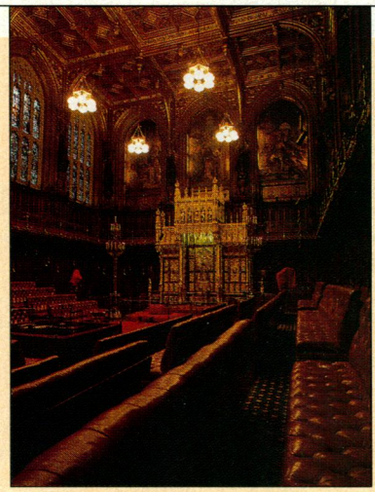
Over the past few years, cancer researchers have begun to consider the disease's flip side: Tumors are caused not just by the rampant growth of malignant cells, but also by their failure to die when they should (*Science*, 5 February 1993, p. 760).

Now, cancer researchers are beginning to learn why tumor cells cling so stubbornly to life: A team headed by Gerard Evan of the Imperial Cancer Research Fund (ICRF) in London reports in the July issue of the *EMBO Journal* that it has identified a biochemical signal that prevents one type of cancerous cell from switching on its "death program."

Evan's team studies *myc*, an oncogene with opposite effects. It causes fibroblast cells to divide uncontrollably, but it also induces cell death. The cells won't die if they receive "survival signals" from cell growth factors called cytokines. And the researchers found which growth factors provide this signal: The most important, they say, is insulinlike growth factor–1 (IGF-1).

Myc, says Evan, appears to prime cells to self-destruct as soon as they stop receiving the survival signal from IGF-1. This means that when a gene like *myc* starts causing uncontrolled cell proliferation it will not necessarily cause cancer: If the survival signal is not coming through, the increase in new cells will be balanced by accelerated cell death. A tumor, says Evan, will only develop when some other mutation boosts the survival signal's biochemical pathway.

Evan says this finding means that it may someday be possible to design drugs to block specific survival-signal pathways and so induce tumors to recede. What's not clear yet, though, is how the survival signal is transmitted to a cell's interior after the cytokine interacts with its receptor on the cell surface. "This is going to place a very big impetus on studying signal transduction beneath the IGF-1 receptor," predicts Douglas Green, who heads a competing group at the La Jolla Institute for Allergy and Immunology in California. Evan expects similar mechanisms to operate for other cell types and oncogenes.



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Lordly laments. British House of Lords wants more defense conversion.

U.K. Is Too Defensive

While academics in the United Kingdom are being pressed to make their work more industry-relevant (*Science*, 29 July, p. 596), golden opportunities to commercialize British military research are being missed, says a report released last month from the House of Lords.

The Lords' science and technology committee investigated the work of the Defense Research Agency (DRA), a semi-autonomous body with a yearly budget of some $1.2 billion and which is part of the U.K. Ministry of Defense (MOD). The new report says that MOD should take a cue from DRA's U.S. counterpart, the former Defense Advanced Research Projects Agency (DARPA). DARPA has evolved into ARPA and stresses civilian uses for high technology.

DRA may compete for external research contracts, but 90% of its budget comes from MOD and its freedom to use this money for civilian spin-offs is limited, say the Lords. The blame for this, say scientists familiar with the MOD system, lies with the U.K. Treasury, which stipulates that MOD money be spent on defense.

The Lords suggest several ways around this limitation. In particular, the report urges the government's main nonmilitary sponsors of research, the Office of Science and Technology and the Department of Trade and Industry, to increase their support of DRA research with civilian applications, like improved liquid crystal displays and thermal imaging.

Judging from current spending plans, however, the prospects look bleak. The money coming to DRA from the Department of Trade and Industry, for instance, is slated to shrink from about $30 million in 1992–93 to nearly $15 million by 1996–97.

Russian Laser Set to Sing a U.S. Tune

After 2 years of planning, a project to build the world's most versatile ultraviolet (UV) laser from Russian and U.S. components is finally under way. U.S. funding has come through to ship a laser from the Budker Institute of Nuclear Physics in Novosibirsk, Russia, to its new power source at Duke University.

The laser project idea was hatched when Vladimir Litvinenko, designer of the Budker's UV-range free electron laser (FEL), left Russia and joined the Duke faculty in 1991. The device has the potential to produce tunable, very short UV laser light and even high-intensity gamma rays to probe molecular and atomic structures with unparalleled precision. However, the Budker's laser could not realize its full capacity because the Russians were using an out-of-date electron source to power their FEL. Duke physicist John Madey was developing a powerful electron accelerator to fuel FELs. So Litvinenko and Madey opted for a merger.

Russian officials agreed 2 years ago to let Duke take the laser for collaborative research, but there remained the question of how to pay for the move (*Science*, 31 July 1992, p. 611). Earlier this summer, the Office of Naval Research approved a $500,000 grant to fund the project—$250,000 of which goes to ship the laser. Once both pieces of the FEL are on the same continent and running—tentatively by September 1995—it will push the wave range higher than ever before achieved with a tunable UV laser.

Only Japan has a comparable laser under construction, Madey says—but it's "4 or 5 years" from being on line. "There's no chance of anybody beating us to the punch on this one."

Gag on Animal Activist

An outspoken Oxford University physiologist, who has been attacked and threatened by animal-rights activists, won a gag order last week prohibiting a free-lance journalist from printing his home address and telephone number. Colin Blakemore, who does animal research, won a decision from London's High Court against journalist and animal activist Vernon Coleman. Says Blakemore, "This is an enormous relief."

Blakemore studies visual system development, and his work is vital to studies of childhood blindness. Unfortunately, his animal work, such as experiments that involved sewing kittens' eyes closed, aroused the interest of the British press and drew the ire of animal-rights groups.

The media exposure and Blakemore's willingness—rare among the research community—to publicly discuss the issue of animal experimentation made him an easy target of anti-vivisectionists. In addition to kidnapping and death threats against his three daughters, on 23 December 1993 he received a letter bomb

ILLUSTRATION: TERRY E. SMITH

filled with needles and a half-pound of explosives. The police defused the bomb.

But they couldn't defuse Coleman. Since 1987, Coleman has attacked Blakemore in articles in tabloid newspapers, local papers, and magazines. Blakemore took legal action when Coleman informed him that he would publish his home address and telephone number in an upcoming article. The scientist obtained a temporary injunction against Coleman—an order that became permanent when the court ruled in Blakemore's favor. It also awarded him $5600 in damages.

Coleman isn't getting much support from other British animal-rights activists, either. "What Coleman was threatening to do was highly irresponsible," says Stan Blackley, spokesperson for Advocates for Animals. "Why should we cause Professor Blakemore personal suffering?"

Blakemore says, "I accept that there is a very narrow line between protection from harassment and trying to preserve freedom of speech. Releasing my address is not necessary for public debate" on the use of animals in research.

Fields Medal Honorees Announced

Mathematics' version of the Nobel Prize was awarded at the quadrennial International Congress of Mathematicians, held last week in Zurich, Switzerland. Fields Medals, reserved for mathematicians under the age of 40, went to Jean Bourgain of the Institute for Advanced Study in Princeton; Pierre-Louis Lions of the University of Paris-Dauphine; Jean-Christophe Yoccoz of the University of Paris-Sud, Orsay; and Efim Zelmanov of the University of Chicago.

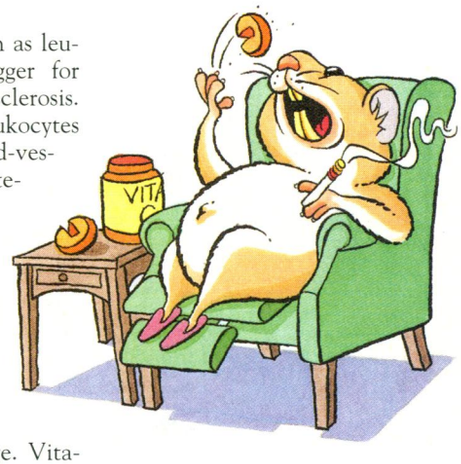
Bourgain's work in the area of harmonic analysis touches on areas of mathematics such as the geometry of infinite-dimensional space, number theory, and probability. Lions has introduced new methods to the theory of partial differential equations, influencing numerical analysis, fluid mechanics, and image processing.

Yoccoz was honored for work in nonlinear dynamics, the mathematics underlying the theory of chaos. Zelmanov's work has contributed new techniques for two problems in algebra—the "restricted Burnside problem" and the classification of Jordan algebras, which provide an algebraic setting for quantum mechanics.

Does Vitamin C Clear the Smoke?

Rodents can smoke without fear of emphysema as long as they gobble vitamin C. Recent research by a team of German and U.S. scientists indicates that vitamin C supplements for smoking hamsters seem to prevent tissue damage related to the disease.

University of Munich pathologist Hans-Anton Lehr and colleagues reported in last week's *Proceedings of the National Academy of Sciences* that vitamin C halts more than 90% of the damage from cigarette smoke to white blood cells known as leukocytes—the main trigger for emphysema and atherosclerosis. Once damaged, the leukocytes clump and stick to blood-vessel walls, collecting platelets and closing the blood vessels.

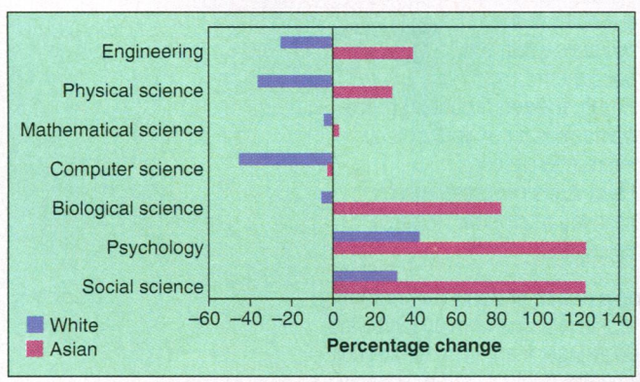


The researchers tested vitamin C in addition to vitamin E and the drug probucol, all of which have anti-oxidant properties, destroying oxygen free radicals that cause tissue damage. Vitamin E and probucol had no effect on leukocyte aggregation, but increasing blood levels of vitamin C threefold protected the animals. Lehr says "such an increase in humans can easily be reached by simple dietary supplementation between 500 and 1000 milligrams" per day.

Lehr speculates that vitamin C stops leukocyte aggregation by deactivating free radicals in smoke. He says more studies are needed to determine why only vitamin C has this effect.

Epidemiologist Eric Rimm of Harvard School of Public Health agrees that the mechanism Lehr's group found "could also operate in humans." But he warns against concluding that humans can "make up for their smoking" by taking vitamin C: The study did not deal with cancer, the biggest risk for smokers.

White Flight From Science



SOURCE: NSF

When compared to their Asian counterparts, white undergrads are forsaking "hard" science in droves. According to the National Science Foundation report, "Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1977–91," far fewer whites than Asians are choosing degrees in the harder sciences. According to University of Colorado sociologist Elaine Seymour, who studies why undergraduate students leave science, white families don't see a payoff from a science degree and are less likely to support a student through such a degree. Asian families, however, may place more value on education, she says. But Seymour also points out that the label "Asian" actually covers several ethnicities, and therefore "any generality about minorities is likely to be misleading."

Space Rock Gets Zappa'd

There's a little more music among the stars. It may be playing tongue-in-cheek, but it's up there. Last month, the late rocker Frank Zappa joined the likes of musical luminaries Bach, Beethoven, and all four Beatles when the International Astronomical Union (IAU) named an asteroid after him. "Zappafrank" orbits between Mars and Jupiter.

Naming the asteroid Zappafrank was the result of an intense lobbying effort by Arizona psychiatrist and Zappa fan John Scialli. After receiving over 200 requests—many by e-mail—for a planet named after Zappa, Brian Marsden, director of IAU's Minor Planets Center in Cambridge, Massachusetts, suggested to the director of the Clet Observatory in the Czech Republic that an asteroid discovered there in 1980 be named for Zappa. Because Zappa, a vocal opponent of government censorship, and former Czechoslovakian president Vaclav Havel were close friends, the Czech astronomers agreed.

Like its namesake, who named his daughter Moon Unit, Zappafrank's "orbit is a bit eccentric," Marsden says.