

Kucewicz recognized that the emigré testimony by itself was insufficient, so he looked for outside confirmation. He was referred to Richard Lukens, a biochemist who works for IRT Corp. (San Diego, CA).

Lukens reviewed the Soviet biotechnology entries from *Biological Abstracts* and other published literature, and found reports on membrane receptors, ricin, botulin, snake venom, other toxins, and genetic engineering. This, Lukens concluded, indicated that the Soviets were working on biological warfare.

(Lukens could not secure his employer's permission in time to be interviewed. He hasn't yet published his account of this analysis.)

Another scientist quoted in Kucewicz's article, a specialist in Soviet biotechnology literature, said that his writings were quoted out of context. The *Journal* story was "yellow journalism, a really far-fetched story," based on "hearsay and rumors," with "no hard facts," he said. "I saw absolutely no sign" of biological warfare research, he added. (He declined to be quoted by name because his public statements, too, must be approved by his employer.)

J. Leslie Glick, chairman of Genex

Corp. (Rockville, MD), criticized Lukens' conclusions in testimony before the House Subcommittee on Science, Research and Technology. "A similar survey of the scientific literature in this country and the Western world would uncover hundreds of papers" on the same subjects, said Glick.

"I wouldn't pay much attention to [Lukens'] argument if he isn't willing to publish," said Clifford Grobstein, professor of Biological Sciences and Public Policy at the University of California (San Diego).

Stanley Falkow, a microbiology professor at Stanford, doubted that genetic engineering could develop any useful weapons. "The idea that one could tailor-make an organism to produce a disease is surely a long way off from anything we have seen. It's very difficult under laboratory conditions to effect the natural kind of disease process," he said.

But some had their suspicions. "I feel that Dr. Lukens' conclusion, that the Soviets are using these toxins for CBW, is a reasonable speculation, although we can't know for sure from the open literature," said Anthony Tu, professor of biochemistry at Colorado State University and author of *Venoms: Chemistry and Molecular Biolo-*

*gy*. "If the Soviets are using mycotoxins and other CBW, why not snake neurotoxin? It's very toxic, very small, and very easy to isolate. But it's only a speculation. Russia is a closed society, so we can't know."

"From the experiences I've had with the Eastern bloc countries, I wouldn't put it past them," said Dr. Alfred Hellman of the National Cancer Institute, a consultant to the Department of Commerce on biotechnology export controls. The Soviets have a "mindframe" for biological warfare, he said. Hellman recalled showing a Soviet visitor through the NCI's containment facilities after the first Asilomar meeting, and not being able to convince him that the lab wasn't used for biological warfare.

The DOD's April report, *Soviet Military Power 1984*, asserted that the Soviets were using genetic engineering for "improving the effectiveness of disease-causing biological warfare agents." One DOD analyst said there was a "better than even chance" that this was true, though he called it an "hypothesis for verification." The DOD conclusions are based on secret information, mainly emigré and defector accounts and analysis of the open literature. —Norman Bauman

## CHRONICLE

**Japan's Ministry of International Trade and Industry** has compiled a report on promoting bio-industry. It emphasizes personnel training and establishing biotech research conferences and information centers.

**The U.S. Department of Agriculture** formed a Plant Gene Expression Center in Berkeley, CA. Initially, the USDA will provide \$4 million a year for research on improvement plants.

**In the second largest biotech R&D limited partnership** to date, Hybritech closed its \$70 million private placement. Hybritech Clinical Partners, Ltd. will conduct R&D on products to diagnose and treat cancer.

**Bulgaria's current drive** for greater productivity and profitability from industry emphasizes biotechnology and computer control of fermentation. A recent official press agency dispatch notes the introduction of a microprocessor-control led system at the Razgrad antibiotics combine that monitors and controls a 60,000-liter tetracycline fermentor.

**Corporate interest in biotech compa-**

**nies** continues. Becton Dickinson agreed to acquire 10 percent of Applied Biosystems for \$26 a share, and Du Pont will purchase 7 percent of Biotech Research Laboratories for \$4.5 million. Both collaborations will involve more than money as joint R&D is planned.

**In other financing**, Gulf Applied Technologies will lend BioTechnica International \$2 million, repayable on July 1, 1986, to cover short-term needs. Under the agreement, Gulf receives warrants to purchase 50,000 shares of BioTechnica stock at \$8 and 50,000 shares at \$11.

**The U.S. Patent Office formally allowed** Diagnostic, Inc.'s patent governing the production of sodium hyaluronate by a biotechnological method. The company is researching novel medical and personal care applications of the substance.

**All three human fertility hormones** have now been cloned by Integrated Genetics. In work funded by Serono Laboratories, the company has expressed biologically active human luteinizing hormone and human chori-

onic gonadotropin and is working on expression for follicle stimulating hormone.

**A marketing agreement** has been reached under which Hoffmann-La Roche will distribute Centocor's monoclonal antibody cancer diagnostic kits. The deal covers kits for gastrointestinal and ovarian cancer.

**High-yield crop cloning** will be addressed by a collaboration between Interferon Sciences and Fudan University of Shanghai, China. The joint venture will develop artificial cloning systems to engineer improved strains of rice, other cereal crops, and beans.

**Eleven companies have purchased** special term licenses to Columbia University's patents on inserting DNA into eukaryotic cells, including biotech specialty companies BioTechnology General and Cetus Corp. Regular term licenses continue to be available.

**A new marketing subsidiary** was established by Damon Biotech. Damon Biotech GmbH, Heidelberg, F.R.G., will market Encapcel™ technology throughout Europe.