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COVER: The symbol used as the standard warning of danger from laser light might also apply to the development of laser weapons: Under a cloak of extreme secrecy, great advances are being made toward producing weapons that can damage missiles or satellites with the power of light alone. Before these are deployed, however, a growing controversy over their legality and desirability must be settled. See p. 11.

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	New York, N.Y. 10036
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Editorial and Business Offices
1719 N Street, N.W.
Washington, D.C. 20036

Subscription Department
231 West Center Street
Marion, Ohio 43302

Subscription rate: 1 yr., \$10; 2 yrs., \$18; 3 yrs., \$25. (Add \$2 a year for Canada and Mexico, \$3 for all other countries.) Change of address: Four to six weeks' notice is required. Please state exactly how magazine is to be addressed. Include zip code.

Printed in U.S.A. Second class postage paid at Washington, D.C. Title registered as trademark U.S. and Canadian Patent Offices.

Published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D.C. 20036. (202-785-2255). Cable SCIENSERV. Telex 64227.

SCIENCE NEWS OF THE WEEK

Rules for gene research



Nearly two years after molecular geneticists called for the first voluntary moratorium on a new line of scientific research, the National Institutes of Health has issued formal guidelines to govern that field. These guidelines, themselves regulatory firsts for a new field, come after a long and sometimes heated debate over ways to control new genetic recombination techniques.

Recent discoveries now enable researchers to recombine DNA molecules from different organisms and thus to create totally new genetic sequences. Molecular biologists can now participate in natural selection as well as observe it, and have predicted a long list of benefits. The creation of genetic recombinants that cannot be biologically controlled has also been foreseen, however, and a moratorium was called in July 1974, until safe operating procedures could be set.

A conference met at Asilomar, Calif., in February 1975, and attendees from the United States and abroad agreed upon temporary guidelines to govern the field until the NIH (sponsors of much recombinant DNA research) could generate permanent ones. (SN: 3/22/76, p. 187). Several guidelines meetings were then held, and the process climaxed in a long and boisterous public input session at Bethesda, Md., in February. The final rules, issued last week, incorporate modifications made during the scientific advisory meetings and last-minute adjustments made by NIH Director Donald S. Fredrickson after considering the avalanche of scientific and public opinion.

An NIH spokesman traveled to Europe last week to brief officials at the World Health Organization and the European Molecular Biology Organization, and copies of the guidelines were sent to embassy science attachés. The guidelines will be binding only upon NIH grantees and contractors, but, Fredrickson says, other federal agencies such as the National Science Foundation, the Department of Defense and the Department of Agriculture are expected to adopt them for the research they sponsor. Industry representatives have been responsive, too, he says, and he hopes that the guidelines will be followed by commercial scientists.

The new rules are designed, Fredrickson said at a press conference, to ensure that recombinant DNA research can proceed without ill effects to laboratory workers, the general public or the environment. They, like the earlier Asilomar guidelines, 1) ban certain types of experiments, 2) require that each research project be justified on the basis of new knowledge or benefits unobtainable with

traditional techniques, 3) establish levels of physical and biological containment to match estimated potential hazards of each experiment and 4) set responsibility for investigators, institutions and NIH.

The new guidelines are, however, stricter than those written at the Asilomar conference. The most important change, Fredrickson says, is that organisms containing recombinant DNA sequences cannot deliberately be released into the environment. Prohibited experiments now include insertion of venom genes from snakes and insects, as well as the previously prohibited insertion of bacterial toxin or disease-producing genes. Containment levels on certain classes of experiments have also been increased, in particular: experiments to transfer genes between bacteria that do not now appear to exchange genetic material in nature; experiments that use simian virus 40 or polyoma viruses, and experiments that involve cold-blooded vertebrates or insects known to produce toxins or carry pathogens.

At least one containment level was lowered: Experiments with the DNA of embryonic cold-blooded vertebrates can proceed with fewer safety precautions than work on DNA from the adult organisms. The final guidelines expand and clarify the responsibilities of investigators and institutional biohazard committees, and set down precise duties for NIH study sections and the NIH recombinant advisory committee. These latter will now approve the purpose, hazards and containment levels for each experiment, certify safer hosts and vectors and help revise the guidelines as new data becomes available.

The NIH was heavily criticized during the February public input session for inviting public comment and participation only after scientists wrote draft versions. Last week, Fredrickson, perhaps to assuage this criticism, issued a 30-page background to explain the decision-making process and demonstrate specific changes in response to specific public comments and requests. An environmental impact statement will also be released for comment this fall. □