

Genetic engineering: Clashing views

The controversy over the call by U.S. scientists for an international moratorium on certain kinds of genetic engineering research has spread across the Atlantic, producing some sympathy for the social concern but strong reaction against the hamstringing of fundamental research.

Medical scientists clashed at a three-day international symposium in Davos, Switzerland, organized by the Gottlieb Duttweiler Institute. Most acknowledged the "enormous dangers" but believed that controls would be "impractical and unenforceable."

"We are in the same place as nuclear physicists were in 1938," said Karl Scherrer of the Swiss Institute for Cancer Research.

Instead of exciting simple praise, results of new experimental triumphs only fueled the argument.

Nils Ringertz of the Swedish Institute for Medical Cell Research and Genetics reported success in crossing genes of different species to produce live hybrid cells. His team combined human cells with chromosomes of other animals such as rats, mice and even insects and unborn chicks, producing "man-mouse" cells and other strange combinations.

Some hybrid cells' behavior proved unpredictable, but the Swedish scientist strongly upheld their use as tools in cancer research and gene-mapping in man.

However, Paul Berg, head of the Stanford University biochemistry department, warned that scientific techniques could now genetically alter some bacteria infectious to man, so that they would resist all known medical treatment. (This had been talked about a few weeks earlier at the Pugwash Conference in Vienna.) If self-reproducing, unbeatable infectious cells escaped into the environment, they could provoke epidemics.

Berg was a pioneer in constructing inter-specie hybrid chromosomes. But early in 1974 he announced that he was stopping all such research until he could assess the public health hazards.

He headed the scientific panel, backed by the U.S. National Academy of Sciences, that called in July for an international moratorium until control methods are developed (SN: 6/27/74, p. 52). The two types of research are formation of bacteria resistant to antibiotics and the linkage of DNA molecules with tumor-causing viruses that could conceivably cause widespread cancers.

"Several groups of scientists are already using this technology to create recombinant DNA molecules from a

variety of other viral, animal and bacterial sources," Berg noted. "These experiments could result in the creation of novel types of infectious DNA elements whose biological properties cannot be predicted. The new infectious DNA elements could spread widely and quickly among humans with unpredictable effects if they escaped from the laboratory."

In Britain alone, experts estimated that 150 laboratories are competent to perform experiments that Berg and his group oppose. Pressing further for the moratorium, British scientists have set up a commission under Lord Ashby to study the state of genetic research there and the environmental hazards.

The influential British journal *NATURE* has already said it will not accept a suggestion that journals consider rejecting publication of any research on the two types of plasmid engineering. In an editorial, *NATURE* said taking a stand against such papers would lead to "impossible situations" of trying to assess all research for possible moral implications before publication. Also, the journal said, "If a scientist has chosen to ignore a widespread call, then a case could occasionally be made for drawing the community's attention to who he is and what he is doing." *NATURE* emphasized, however, that it had broad general sympathy with the aims of the NAS group.

Berg's group has called an international conference for early next year at Asilomar, Calif. (Feb. 24-28). About 150 molecular biologists are expected to attend, including Russians and Chinese. Thus far, these have resisted any moratorium. The conference will examine experiments planned or in progress in genetic engineering and "look very deeply at whether any . . . are so hazardous that they shouldn't be undertaken," Berg said.

One decision the scientists hope to take is whether to create an international control agency to monitor such research. "We have raised the issues of constructing new kinds of chromosomes that do not exist in nature," Berg says. "The problem of their containment is serious. The conference must produce the necessary guidelines and if necessary suggest legislation for the enforcement of adequate training standards and security measures."

"This is one area where controls could be introduced," said Charles Weissmann of the Zurich Institute for Molecular Biology. He earlier announced a breakthrough in transforming genes, which others consider highly important in research against hereditary defects.

The issue of state control over that institute's research has already been raised in the Zurich Cantonal Parliament, as a way of protecting citizens from inadvertent contamination.

Werner Arber of the Basel University Microbiological Center was one of those openly critical of Berg's campaign. "You should not hamper basic science," he said. "You cannot slow down research." Switzerland has no legislation concerning medical experiments on humans.

Max Birnstiel of the Zurich Institute for Molecular Biology typified the excitement. "Making use of plasmid and phage genetic engineering is taking the easy way out," he said. "This new approach is likely to revolutionize not only our knowledge of gene and chromosome organization but possibly of genetic diseases, perhaps cancer. The potential benefits are so great that this sort of research is gaining uncontrollable momentum. . . .

"The possibilities . . . include the suggestion that isolated genes for insulin might be introduced to bacteria, which could then be grown to produce insulin on a technical scale.

"I personally consider that we are just now at the very brink of an information explosion and that gene isolation will provide the key to many exciting experiments on the genomic organization and the working of the genetic units in higher organisms." □

The galactic center is an alky cooker

Deep in the recesses of interstellar space are clouds in which molecules are made, nobody is yet quite sure how. Some of these molecules are fairly complex; many of them are organic. Their existence there is a fascinating mystery of astrophysics.

There seems to be an endless variety of molecules. More than 30 are now known, and new ones keep coming along. The latest score is ethyl alcohol, C_2H_5OH , the kind of alcohol that occurs in beverages. A group led by Benjamin M. Zuckerman of the University of Maryland found it in the clouds near the galactic center, a prime location for molecular variety, using a radio-telescope located at Kitt Peak, Ariz., that belongs to the National Radio Astronomy Observatory.

The presence of organic molecules of this complexity in interstellar space—methyl alcohol and formaldehyde are among the other common ones—seems to indicate that living organisms are not necessary for their formation. They can form spontaneously in space. This information is changing some hypotheses on the origin of life. □