

August 13, 1979

Mr. London Ganning
Project SERVE
2051 East 115th
Cleveland, Ohio 44106

Dear Mr. Ganning:

Thank you for your letter and the important questions it raises regarding the view of the Recombinant DNA situation reflected by John Lear's book. I welcome the opportunity you have given me to try and clarify both what happened between 1973 and 1978, and the situation as it is seen by most observers today. Needless to say I can only make some general statements if I am to avoid a full length book in response. For further information and what I consider a very straightforward description of the matter I highly recommend a book entitled "A Double Image of the Double Helix: The Recombinant DNA Debate" by Clifford Grobstein, published by W. H. Freeman and Company, San Francisco, 1979. Grobstein's book is intended for the intelligent layman, but was not written for sale in the mass market. For that reason, among others, it is a much more careful and accurate account than is Lear's. Furthermore, it deals more with issues and less with personalities.

When in 1973 and 1974, it became possible to do those experiments now termed "recombinant DNA", it was the molecular biology community itself which immediately raised, for public and governmental discussion, the issue of potential hazard. No one then, nor anyone responsible since, has stated that the experiments are hazardous, only that they might be. That is, one could think through scenarios involving such experiments that might lead to organisms hazardous either to the investigators or to the public at large. As a result of this questioning, and with participation by molecular biologists at every step, guidelines designed to assure the safe conduct of experiments (even though they were not known to be hazardous) were put in place by the National Institutes of Health. The specifications of the Guidelines were of course controversial, as is to be expected when decisions are made about unknowns. The Guidelines have enjoyed wide respect and sympathy in the community of people who are doing the experiments and therefore those whose activities are regulated.

Recombinant DNA experiments can be of many many types since both the "foreign DNA" as well as the vector for the foreign DNA and the host cells used to amplify the recombinant can be derived from a large number of different organisms. Experiments and risk assessment efforts over the past five years have yielded

a great deal of information about one particular class of experiments, namely those in which the host cells are the bacteria, Escherichia coli, strain K12. It is clear from your letter that you gained the impression that this organism is a common inhabitant of the human intestinal tract. Nothing could be further from the facts. Indeed, this organism was chosen for much recombinant DNA work precisely because it is not a common inhabitant of human intestines or the intestines of other mammals. The species Escherichia coli is made up of many subspecies or strains which differ markedly. In particular, those attributes of certain E. coli strains which permit them to thrive in human intestines are completely lacking in E. coli K12. Efforts (by classical genetic techniques, not by recombinant DNA) to convert K12 to an organism having the properties of related pathogenic organisms have been uniformly unsuccessful. Furthermore, K12 is a very fastidious being requiring very special conditions in the laboratory in order to grow well. Thus its ability to spread in an uncontrolled way is either very very poor or nonexistent. For these and additional documented reasons, most people current with the situation now consider recombinant DNA experiments with E. coli K12 (and certain commonly used vectors) to be without any potential for hazard at all. Roy Curtis, who John Lear portrays as a very responsible individual, is among those who now hold this view about experiments with E. coli K12.

The facts I have summarized for you, as well as others, indicate to me that, contrary to the picture you obtained from Lear's book, molecular biologists have proceeded with a great deal of caution in this instance. As a molecular biologist, I do not believe I harbor any innate tendency to destroy either myself or anyone else. As one of those who first publicly raised questions about recombinant DNA work, I believe that many of the questions have now been answered, and in the negative. For those matters that are still open, I believe that adherence to the rather stringent National Institutes of Health Guidelines for Recombinant DNA Research assures in a reasonable manner, that should any recombinant DNA experiment indeed turn out to be dangerous, there will be little or no chance for that danger to compromise the health of any organisms, human or nonhuman. For example, the Guidelines still prohibit whole classes of experiments from being carried out at all.

Furthermore, the experimental results of the last few years make it clear that the recombinant DNA technique will indeed assist in helping to deal with important existing problems in medicine and agriculture. There is no longer any question about the potential of this technique for good.

I thank you again for your letter. It is my hope that this response has been helpful.

Sincerely yours,

Maxine Singer, Ph.D.
Chief, Nucleic Acid Enzymology Section
Laboratory of Biochemistry