who need to be better educated. We want to live better and longer, but fear many problems related to an aging society. We are often split between wishful thinking and what we effectively do ourselves in terms of respecting nature and preserving the environment. I am convinced that gene technology will help us solve some of these problems.

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MRC Commitments

Arthur Kornberg, in an editorial "'I'he NIH [National Institutes of Health] did it!" (12 Dec., p. 1863), refers to the U.K. Medical Research Council (MRC) in the context of worldwide "[t]rends to centralize and collectivize bioscience research support," leaving no room for the scientist to do something utterly original and unpopular.

Contrary to Komberg's interpretation of the recent changes in the research funding schemes we introduced, the MRC is fully committed to supporting both the individual scientist and basic research. The main aim of the changes is to ensure that the individuals who receive MRC funding work in an intellectually stimulating environment with adequate infrastructure support. In our own institutes and units, most of which are embedded in universities, we have been able to maintain full support for our best scientists. It is, however, generally accepted that universities have not been able to keep up the physical environment and infrastructure (for example, laboratory facilities and technical support) that underpin MRC funding under the so-called "dual support" system in the United Kingdom. Our changes will in part contribute to correcting this problem. We also have a substantial fellowship program to provide career progression for the best researchers and a commitment to long-term funding of individuals. We have introduced special schemes for recently appointed university scientists to help them establish their careers and have provided a new scheme of short-term funding for high-risk, speculative, and innovative research projects. We believe that initiatives like this will enable young and emerging scientists to dictate the direction and pace of research in the future.

All our funding is awarded competitively with the use of scientific advisers numbering many hundred and is based on proposals from individual scientists (and this applies to researchers in our own institutes and units as well) who are personally responsible for the success or failure of their research program. At the same time, it cannot be denied that encouraging collaboration between researchers is as important as seeking out the most innovative and productive individuals.

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Kornberg describes the erosion of individual investigator independence as block grants from the NIH aimed at specific diseases have become more popular and the percentage of funds available for investigator-initiated projects (R01s) has declined.

NIH might ameliorate this problem by changing the way in which some block grants are administered. As one example, consider program project grants (PPGs). A PPG is a group of three or more research projects, each with approximately the scope of an R01, held together by mutual interest and the availability of shared core facilities funded by the grant. Instead of giving full budget authority over the entire grant to the principal investigator (PI) of the PPG, each of the subprojects might be independently

administered, with each project director receiving full control of his or her own budget.

The present system is usually justified by the argument that some individual has to take overall responsibility for evaluating progress, for determining when the direction of the PPG ought to be changed, and for deciding how to fund new opportunities. With this assumption, it is natural that the PI would have this role. But this approach has a hidden cost: it introduces a research director into a group collaboration where none is needed.

If budget authority were shared among project directors, any proposed budget changes would automatically be subject to peer review, instead of being dictated by a single individual. If a new research opportunity should arise, it would get funded only if the peer group can agree on how much each of them should contribute to the effort.

Giving each project director budget control would reestablish the independence and responsibility of individual investigators. It would also mean that PPGs would survive only as long as they remain truly synergistic, promoting collaborations above and beyond those possible by a group of scientists, each of whom has R01 support. Such an approach might be considered for other block grants as well.

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Climate Change and Human Health

The article "Apocalypse not" by Gary Taubes (News & Comment, 7 Nov., p. 1004) addresses the issue of fundamental differences of opinion among health scientists about the impact of climate on human health. While we acknowledge that there are strong differences in opinion about the potential consequences of future climate change on disease incidence and distribution, we share common concerns; we wish to emphasize that despite any differences, there are many areas where we agree.

The key questions behind the climate/health research agendas are, How will climate change alter health risks, to what extent will risks be altered, and what can be done to mitigate any potential increase in health risks? At issue is not which is more important, climate factors or improved health measures; rather, it is important to assess how health risks might change in both industrialized and more vulnerable developing countries.

The complexity of this public health issue entails far more uncertainty than many health hazards with which we are familiar. Impacts may occur indirectly through simultaneous disturbances of other sectors, including water supply, food production, or habitat. Thus far, scientists have found great difficult in communicating this extra level of uncertainty.

We agree on the need to improve understanding of the complex relationships between climatic conditions and disease transmission dynamics. We also agree that disease incidence is influenced by multiple factors (none of us will argue that climate is the only or the most important factor). Well-designed research studies must be conducted to gain a better understanding of how these multiple factors relate to each other and how all might be influenced by climate. Identifying risk factors that influence disease transmission is a key to public health planning, and as more data from climate/health research studies become available, the influence of weather will be better understood.

We recognize that extreme weather events such as those that may accompany this year's El Niño place an extra burden on sanitation and general public health systems. The early regional forecasts obtained from El Niño exemplify important new predictive capabilities that public health officials can use in their public health planning.

Interdisciplinary research and interagency cooperation can go far toward improving the health risk assessment associated with climate change. Ecology-based research and monitoring combined with advances in climate forecasting will enhance our understanding of complex environmental health hazards and may provide the public with early warning systems that allow timely public health interventions.

The signatories of this letter agree that public health is of great importance and that public health infrastructure and services must be improved worldwide. We recognize that environmental and socioeconomic conditions underpin health status; effective and sustainable public health prevention will ultimately require improvement in these underlying conditions. It is important to realize, however, that the projected climate change may have a profound influence on an aspects of human ecology, and we strongly recommend that research be supported to allow development of effective prevention strategies that will help mitigate its effect on public health.

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Paul R. Epstein
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