Deterring Bioweapons Development

THE GENETICALLY ENGINEERED MOUSEPOX virus described in Elizabeth Finkel's News Focus article should be seen as a wake-up call for those of us in biological weapons control, and particularly for U.S. diplomats and policy-makers ("Engineered mouse virus spurs bioweapons fears," 26 Jan., p. 585). Researchers were trying to engineer a viral vector that could sterilize rodents, to be used for the control of infestations. But the introduction of a second gene that earlier research indicated would enhance the antibody-producing response (and thus the effectiveness of the engineered virus to sterilize mice) made the virus lethal.

> "[A]doption [of the BTWC Protocol] would...reduce the risk of bioterrorism..."

The combination of genetic engineering with the emerging fields of genomics and proteomics holds great potential for the development of new therapeutic agents and research reagents, but many of these will also have utility as weapons, or will suggest ways that new chemicals, toxins, or microbial agents could be developed (*1*). Clearly, we do not want to inhibit the peaceful development of such agents; however, it would be folly to ignore their potential for misuse (*2*). Oversight mechanisms are critical to deter diversion of these new technologies to malign purposes.

Currently, the most promising avenue is to strengthen the 1975 Biological and Toxin Weapons Convention (BTWC). This treaty, quite properly, does not prohibit research, but it does prohibit the development, production, or stockpiling of biological or toxic agents and of devices to deliver such agents for other than peaceful purposes. However, with no provisions for verification, the treaty has proved to be a weak deterrent to nations committed to biological weapons development.

For this reason, States Parties to the BTWC have for 5 years been negotiating an addendum (termed a Protocol) to the BTWC that would (i) require annual declarations of specified types of facilities with the potential for use in a biological weapons program, (ii) mandate random visits to such facilities by teams of international inspectors, and (iii) establish a mechanism for investigation of suspicions of violation of the BTWC. Its adoption would significantly improve international security and reduce the risk of bioterrorism by inhibiting bioweapons development.

The Protocol text is in the last stages of development and only awaits the final push for its completion. Despite the commitment of former President Bill Clinton to the early completion of a strong Protocol, however, the actual negotiating stance of the United States reflects otherwise. The United States has consistently delayed progress and pressed for weakening of the Protocol's provisions, and now might completely derail the negotiations by stalling past the deadline imposed by States Parties for completion of the text before the BTWC Review Conference later this year. Failure to complete the Protocol negotiations on time would represent the loss of our best opportunity to prevent a dangerous and unstable arms race.

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References and Notes

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Moribund Funding in Agricultural Research

THE DOUBLE-DIGIT INCREASES IN FEDERAL funding for basic research at the National Science Foundation (NSF) and the National Institutes of Health (NIH) for fiscal year 2001 are a welcome development (*1*), but does recognition of basic research as the engine that drives technology and economic growth not apply to agriculture?

The standard competitive grants program for basic research at the U.S. Department of Agriculture (USDA) began as the National Research Initiative 10 years ago after National Research Council (NRC) reports decried the lack of support for competitive research in the agricultural sciences. The program has outgrown its initiative status, yet it has been stalled for 9 years at a funding level that can only be described as moribund. Whereas support for competitive basic research programs at NSF and NIH combined have grown in constant dollars by 60% since 1992 (*2*), funding for the USDA's competitive grants program has decreased 14% in constant dollars since its 1992 appropriation of $100 million.

A report from the NRC noted the high quality of National Research Initiative research, its crucial contributions to agricultural productivity and environmental quality, and the more than three dozen studies that have placed the economic rate of return on public investment in food and fiber research at 35 to 60% per year (*3*). This is a phenomenal rate of return. New markets, new products, and environmental protection require new ideas, new approaches, and levels of research funding commensurate with the importance that society places on a safe, productive, and environmentally benign food and fiber production system.

In 30 years—the approximate time it takes basic research in the public sector to reach marketplace maturity—the world population will have increased by about 3

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Letters to the Editor

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