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EDITORIAL

Vaccines: A Study in Contrasts

This issue of *Science*—Frontiers in Medicine: Vaccines—presents a striking contrast between the tone of the News articles and the tone of the pieces written by vaccine researchers. Many of the Articles written by researchers have an upbeat tone, reflecting positive assessments of the chances of formulating effective new vaccines. Part of that enthusiasm stems from scientists' steady progress in demystifying the immune response to foreign antigens, and one aspect of that work is discussed in Sprent and Tough's Article on how the immune system "remembers" antigens it was exposed to long ago. Another cause for optimism comes from the arsenal of new technologies that are enabling researchers to manipulate the immune response, which are reviewed in an Article by Rabinovich, McInnes, Klein, and Hall.

In the Perspectives section, several researchers show how new knowledge and new technologies are being combined to make vaccines against major infectious diseases. Many of these diseases are caused by pathogens that present multiple targets to the immune system. Advances in recombinant DNA techniques and in peptide and polysaccharide chemistry offer ways to hit many of these targets at once, as discussed by Nussenzweig and Long for malaria vaccines, Siber for pneumococcal conjugate vaccines, and Glass, Gentsch, and Smith for rotavirus reassortant vaccines. Mekalanos and Sadoff also note the importance of recombinant DNA technology in the development of oral vaccines for cholera.

Because even very effective vaccines can fail, researchers must remain vigilant about developing and implementing alternative vaccine strategies. The measles vaccine is a remarkable success story (only 277 cases of measles were reported in the United States in 1993) but, as discussed by Katz and Gellin, the vaccine is far less effective in developing countries. Investigations of why vaccines fail can provide important leads for new vaccine strategies, as noted by Hall in her overview of respiratory syncytial virus vaccines. There are currently no vaccines licensed for use in the United States against herpesvirus, in part because of concerns about vaccine safety. But, as Plotkin notes, such vaccines are available in other countries—and the public health significance of herpesvirus infections is substantial.

All of these contributions offer reasons for hope that we will soon have the knowledge required to make new vaccines against some diseases of major public health significance. But how quickly will that knowledge result in vaccines actually reaching the clinic? That is a difficult question to answer, and the News reports in this issue suggest that it may not be as soon as one would hope. *Science*'s reporters, led by Jon Cohen, paint a bleak picture of the social mechanisms by which vaccines come to market. Cohen surveyed more than than 100 of the world's leading vaccine researchers, who told him that market disincentives and political disorganization are drastically slowing the process by which vaccines reach the world's clinics. Ann Gibbons describes how the Children's Vaccine Initiative, launched just a few years ago to much fanfare, has stumbled badly in its quest to use vaccines to protect the world's children; Rachel Nowak depicts United States vaccine policy-making in disarray.

How can this political and economic bottleneck be broken, liberating the new knowledge that is rapidly being accumulated? In a Policy Forum, Bloom offers one possible solution. Arguing that the problems are due partly to the huge size and fragmented nature of the vaccine enterprise (involving more than 20 federal agencies, state health departments, vaccine and biotech companies, medical societies, and university researchers, among others), he proposes establishing a National Vaccine Commission to take the lead in making and coordinating vaccine policy. The commission would be an independent group whose members would represent the key players in the vaccine enterprise and whose power would derive from the group's collective expertise and experience in immunization issues. As Bloom envisages it, the establishment of such a commission could be accomplished within existing legislation and funding mechanisms.

If history is a reliable indicator, this conflict between science and politics will not be resolved speedily. But with today's heightened awareness of cost containment in health care, vaccine researchers may have more reason to hope that their arguments will be heard.

Paula A. Kiberstis, John M. Benditt, and Daniel E. Koshland Jr.