Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

The conference on vaccines protective against enteric diseases

That there is an increased need for new vaccines is becoming more obvious and urgent as time passes. Much of a recent issue of *Science* (21 August 1992) was devoted to a series of papers on the emergence of infectious disease in hospitals from micro-organisms that are resistant to antibiotics and drugs, and in a recent study for the US Institute of Medicine (*Emergent Infections*, National Academy Press, Washington, DC) the increasing threat from disease-causing microorganisms that we thought we had conquered is highlighted, such as those causing tuberculosis, yellow fever, Lyme disease, Rift Valley fever and malaria. Some duodenal ulcers and some cancers are microbial in origin. Where are the new regime vaccines? Why has the much-vaunted genetic engineering not yet produced them? The *Vaccines for Enteric Diseases Conference*, held at Robinson College, Cambridge in April 1992, papers from which are featured in this special issue, constitutes one of the many steps that have to be taken to bring new, genetically engineered vaccines closer to realization.

The specialized meeting that centred upon enteric diseases followed a conference that concentrated on sexually transmitted diseases and will be followed in 1994 by one on respiratory disease vaccines. Many enteric diseases may now be prevented by the use of one of the many vaccines currently undergoing rigorous test procedures. In the developed world most individuals do not suffer the debilitating effects of enteric pathogens, but in the developing world

such diseases are endemic and life threatening. Travellers and those who spend much of their lives in institutions (the military, the hospitalized chronically sick, prisoners and the homeless) are also subject to higher incidences of such diseases. Traditional approaches to vaccines have been largely unsuccessful in treating organisms that exert their effects from within the gut, but the new vaccines seek to prevent such pathogenesis by evoking protective antibodies within the sphere of action of the pathogenic micro-organisms: for example using modified live bacteria that may contain immunogens for related organisms; novel methods for delivering the new antigens based on microspheres of polylactide-glycolide which make the oral application of vaccines practical and which have led to a renaissance in our efforts to protect against the diseases caused by *Escherichia coli*, *Salmonella* spp., *Cholera* and *Shigella*. Rotavirus infection in humans and animals and transmissible gastroenteritis in pigs caused by coronavirus look as though they too will fall to the new prophylactics currently under test: amoebic dysentery may also meet its match in the new vaccines.

We have many new techniques for making prophylactic materials, and in using these techniques to generate information about the nature of the immunogens and the way they work in relation to the way the pathogens work, we should determine just how much knowledge and capability we need in order to make a new vaccine. The Jennerian approach may yet

enable us to find a new rotavirus vaccine, but the very detailed knowledge we have of the molecular biology of the virus that causes AIDS has led us no closer to an effective prophylactic for this disease: perhaps we should consider the proposition that too much knowledge can be dangerous. From work on subunit vaccines, chemisynthetic peptide antigens, antigens made in organisms which do not affect native glycosylation and other post-translational modifications to the nascent protein chains, immunogens based on whole organisms may have a role as vaccines of the future, but new techniques and information are needed to improve the ways in which we can make non-immunogenic whole organisms into effective vaccines. This can be done at the level of the organism itself and in the way it is presented to the target animal.

This symposium clearly demonstrated that the techniques used and understanding gained from making the first generation of vaccines, coupled with new techniques and the deep insights into structure and function that they have brought will give rise to the next generation of vaccines. When such vaccines appear they will provide the opportunity to outwit the nosocomial pathogens that have learned to burn up the various antibiotics that we are throwing at them in desperation, and to tackle for the first time diseases that have survived our best efforts. Surely the most cost-effective way of achieving the improvement of the well-being of our societies is to put more effort and funding into production of the new prophylactics. This symposium, and others that have been initiated by this journal, will continue to maintain the push towards achieving these benefits.

R. E. Spier