Introduction

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A one-day symposium on vaccines against influenza was held at the Royal Institution in London on 27 April 1972 and sponsored by Duphar Laboratories Ltd. Chairmen of the two sessions of the meeting were Professor Sir Charles Stuart-Harris and Dr H. G. Pereira. Several of the papers presented at the meeting are printed in this issue of the *Postgraduate Medical Journal* and form a useful record of the proceedings of the meeting, which was held at a time when a number of important developments in the field of influenza vaccines had recently appeared. The main topics discussed at the symposium were as follows: developments in quality and efficacy of conventional inactivated influenza vaccines, 'subunit' vaccines and new concepts of vaccine design and of immunity to influenza.

In the past, the relatively low degree of purity achieved in the preparation of conventional inactivated vaccines has been one of the factors which imposed severe restrictions on their acceptability and efficacy. A significant development in recent years, and one which has given such vaccines a new lease of life, has been the application of continuous-flow zonal centrifugation techniques to the production of influenza vaccines. This method has enabled the production of vaccines with a very high degree of purity, thus enabling the use of much higher doses of inactivated virus antigen, in the absence of undesirable side effects, than was previously possible. Studies on human volunteers using zonally purified vaccines are described in the papers by Dr S. Mostow and Dr W. R. Dowdle (pages 152, 159) and Dr W. Marine (page 164). These workers provided clear evidence of the relative lack of reactogenicity and high antigenicity of zonally purified vaccines containing intact, inactivated A/Hong Kong/1/68 (H3N2) virus and showed that the protective efficacy of such vaccines against natural infection depended upon the use of higher doses of vaccine than those which are conventionally used.

Dr J. Smith and Dr R. Pollard (page 169) described the long-term studies being carried out by the Public Health Laboratory Service on the use of inactivated influenza vaccines in industrial populations with particular reference to the reduction in lost working days attributable to respiratory

disease. The use of intranasal vaccines containing inactivated virus, a new approach to the administration of influenza vaccines with potential advantages for use in industrial populations, was described by Dr K. S. Liem and his colleagues (page 175). Studies on the production and properties of 'subunit' influenza vaccines were described by the late Dr L. Hoyle (page 193) and Dr F. L. Ruben (page 185). One of the main obstacles to the general use of vaccines containing highly purified influenza subunits is the relative lack of antigenicity of such preparations in the absence of adjuvants. Unfortunately no adjuvant is available at present which is generally acceptable. The potential advantages of the use of adjuvants in immunization against influenza and the relative advantages and disadvantages of the various types of adjuvant were discussed by Dr D. Hobson.

The use of recombination techniques in the production of suitable strains for inactivated or attenuated influenza vaccines has now become an accepted procedure and Dr D. McCahon (page 195) described recent advances in this field.

As far as the use of inactivated influenza vaccines is concerned there seems to be general agreement that such vaccines can now be produced which are satisfactory both in quality and efficacy. In the case of these vaccines the outstanding questions to be answered are concerned with the selection of suitable groups in the population for routine immunization and the problems of cost and administration. The main alternative approach to prophylaxis of influenza is the use of attenuated influenza vaccines. The relative roles of nasal and circulating antibody in immunity to influenza and the relative importance of antibody to haemagglutinin and to neuraminidase are of considerable importance in the assessment of the merits of inactivated and attenuated vaccines. Dr D. A. J. Tyrrell and his colleagues described their studies in this field (page 200) and provided evidence that at least in some epidemiological situations in man antibody to neuraminidase provides immunity to influenza infection although it seems likely that antibody to haemagglutinin provides the main immunological defence.