3. Meeting of the Research Group, The Animal Virus Research Institute, Pirbright, United Kingdom, 25-27 October 1972

A meeting of the Research Group of the European Commission for the Control of Foot-and-Mouth Disease was held at the Animal Virus Research Institute, Pirbright, United Kingdom, from 25 to 27 October 1972.

A preliminary joint session was held with the Executive Committee on 25 October 1972 to discuss the future rôle of the Group. After an exchange of views the Chairman of the Executive Committee requested that the Research Group prepare proposals for consideration at the next Session.

The Group's meeting continued with the following participation:-

Dr. J.G. van Bekkum (Netherlands), Chairman
Dr. J.B. Brooksby (United Kingdom), Chairman of discussions
Dr. L. Nardelli (Italy), Member
Dr. G. Kubin (Austria, Member
Dr. M. Jensen (Denmark), representing Dr. E. Michelsen, Member
Dr. M. Mussgay (Federal Republic of Germany), Observer
Dr. C. Campbell (U.S.A., Observer.

The following members of the staff of the Animal Virus Research Institute, Pirbright, participated in certain of the discussions and demonstrations:

Dr. R.F. Sellers, Deputy Director
Mr. R. Burrows
Dr. G.N. Mowat
Mr. A.J. Forman,
Miss A.E.M. Arrowsmith
Mr. I.T.R. Barnett
Mr. L.S. Buckley
Mr. W. Bruce, Mr. P.J. Radlett
Mr. A.J.M. Garland.

Dr. G.M. Boldrini, Dr. P.R. Ellis and Miss D.D. Guarino served as the Secretariat of the meeting.

The main items of the agenda were the following:

1. The future role of the Research Group;
2. Functioning of the World Reference Laboratory;
3. Subtype information;
4. Post-vaccination infection;
5. Problems of vaccination against SAT types;
6. Carriers as a source of infection;
7. Various security requirements for FMD laboratories.

Most of the sessions were held in the units of the Institute which are particularly concerned with the respective agenda item. The facilities of the W.R.L. were visited and demonstrations were given on the main techniques in use for virus isolation, identification and classification as well as on the production and storage of exotic seed FMD viruses. Work on serum assay by the Epidemiology Department was also studied. The Institute's Virus Security Officer described and demonstrated the equipment and measures currently in use and the Group was given an opportunity to visit a new large animal unit which is being built to give maximum security.

The outcome of the Group's discussions may be summarized as follows:

1. The Future Role of the Research Group

Following the meeting with the Executive Committee, the Group considered its future role and concluded that three kinds of activity were needed.

(a) Annual meetings, limited to members of the Research Group and occasional invited guests, to deal with matters referred to it by the Executive Committee and to review for the Commission the important developments which are constantly taking place in research. These meetings should as a rule take place at members' laboratories.

(b) The Commission should arrange larger scientific meetings which are also open to laboratory workers from all member countries and invited guests approximately every three years and at times which do not clash with the sessions of the O.I.E. Foot-and-Mouth Disease Commission. These should, on each occasion, deal with certain clearly defined topics by means of invited papers in order to summarize the latest position and indicate the direction of new research. They should be held where suitable conference facilities are available and allow participation by staff of the laboratory or Institute which is acting as host. The cost of attendance should be borne by individual participants.

(c) The Commission should also increase training activities which should take two forms:

(i) Training of individuals for several weeks or months under the various fellowship arrangements which now exist, and

(ii) Specialized courses of one to two weeks' duration at members' laboratories on selected new techniques, for up to 15 participants. These need not be regularly scheduled but could be held every three to five years.

The cost of the first activity would continue to devolve upon the Commission but a considerable part of that associated with (b) could be borne by the host Government and participants. This would also apply to (c)(ii). Full consultation and collaboration would, of course, be maintained with O.I.E. The meetings envisaged under (a) above should, however, be regarded as a private activity of the Commission.

2. Functioning of the World Reference Laboratory

This has evolved along the general lines prescribed at the time the Epidemiology Department of the Animal Virus Research Institute at Pirbright accepted the role. A summary of some procedures now in use is attached as Appendix 1. The laboratory:

(a) Provides routine typing service for countries which do not have their own laboratory service.

(b) Carries out the taxonomic classification of strains which appear markedly different from those previously examined, especially when they appear to be of epidemiological significance, allocates an identifying number and maintains stocks of the strains and sera for distribution to interested laboratories.

(c) Maintains stocks of cell culture adapted seed virus for important types and subtypes to facilitate immediate vaccine production, should an emergency arise. The amount and nature of these stocks is, from time to time, published by the Commission.

The Group felt that the Commission should encourage the continuation of all these activities and that wider destribution of laboratory typing results should be sponsored. The W.R.L. should continue to distribute reference sheets on individual subtypes to the countries of origin, FAO and O.I.E., but also the Secretariat of the Commission should prepare a bi-monthly Bulletin summarizing important information for distribution to the Directors of Veterinary Services and official laboratories of member countries.

3. Subtype Information

The present position with respect to A_{22} virus was reviewed in a discussion of W.R.L. Information Sheet No. 17. It was concluded that the Gre 1/72 strain from Greece had been properly classed as an A_{22} strain. At least 4 Turkish strains from widely dispersed origins, the Greek strain and probably those from Lebanon and Egypt, are closely related. They are markedly different from A_{22} strain previously isolated.

Dr. Jensen presented the results of a comparison of various vaccine production strains of type A virus (Appendix 2). His laboratory had concluded that the strain previously used in Denmark was no longer the most appropriate and the Dutch A strain has been substituted.

It was also reported that the O strain from Romania appeared to be closer, antigenetically, to O Lombardy than to the more recently isolated O_1 Switzerland strain.

4. Post-Vaccination Problems in Germany

Dr. Mussgay presented a paper summarizing the problem which had arisen in the Federal Republic of Germany during the nation-wide vaccination programme. Four outbreaks had followed the application of two batches of Frenkel type vaccine and 10 others after the use of four batches of cell culture/PEG vaccine. Only a small proportion of each herd, and mainly young animals, were affected but all within about 21 days of vaccination. It could not be conclusively proved that the outbreaks were caused by vaccines but there was no evidence of field virus causing problems in the area at the time and in two batches infectious virus could be detected by elution and concentration techniques. Other Members drew attention to similar problems that had occurred in Israel and Denmark.

These contributions led to a discussion of the question of innocuity testing. It was felt that there might be a risk of virus persistence with formalin as the inactivant. It was pointed out that the pH of the product may be important in formalin inactivation. The Group suggested that it would be useful to monitor the rate of inactivation of vaccine batches, when possible, and that cell culture techniques should be used to supplement animal tests. With respect to cattle, it was pointed out that the intradermolingual route was in many cases much more sensitive than the subcutaneous route. The inoculation of large doses of vaccine subcutaneously at the same time as the intradermolingual test may reduce the sensitivity of detection of small quantities of virus by the latter route.

5. Problems of Vaccination against SAT Types

Discussion on this topic centered on difficulties encountered in producing immunity against the SAT type viruses and, in particular, against SAT 2. In a number of instances, little or no antibody response could be detected by serum assay following vaccination. However, the animals concerned were often capable of resisting natural infection in the field. It was generally agreed that all the SAT types presented difficulties in vaccine production but that this problem could probably be overcome by strain selection and that a fair measure of protection could be assured by giving booster doses.

Part of the problem may be due to the poor condition of the cattle in the areas where SAT vaccination had to be carried out.

6. Carriers as a Source of Infection

As requested by the Executive Committee, the Group discussed the problem that had arisen in Italy in connection with the importation of cattle.

As they had not had first-hand experience of the problem nor information on certain points, it was not possible for the Group to give a definite opinion. However, the Group felt that the phenomenon experienced was more likely to be due to the presence of inapparent infection following normal exposure than to the true carrier state. Current evidence suggests that, even if vaccinated animals do become true carriers following exposure to natural infection, they are unlikely to act as a source from which field outbreaks arise.

7. Virus Security Requirements for FMD Laboratories

The Group was given an opportunity of seeing and discussing the present security system at the Animal Virus Research Institute which had been evolved over the past 48 years and had been improved as experience was gained, sometimes as a result of accidental infection.

The whole area is surrounded by a perimeter fence to exclude people, and land within approximately one kilometre is kept free of livestock. Because of periodic expansion programmes it has not been possible to interconnect all the units. Most laboratories and animal units therefore have individual security systems.

Entry to the Institute's facilities is controlled by a guard. Staff agrees to avoid all contact with susceptible stock while away from the Institute and follow a very strict routine in all their work. Access to the laboratories and animal facilities is through changing rooms where special clothing is put on and, on leaving, a strict showering procedure must be followed. Complex filtration systems deal with all air passing through the units. Effluent is disinfected and all materials leaving the laboratories are disinfected, sterilized or incinerated. Similar precautions are taken within or between units inside the isolation area to avoid transfer of infection.

The Group was particularly interested in the experimental work that has been done on virus security problems and Mr. Bruce, the security officer, very kindly agreed to prepare a review of the systems and controls which had proved satisfactory at the Institute. This summary is attached as Appendix 3 of this report.

The disease security regulations in operation at the Institute are too lengthy for inclusion here but the Institute is prepared to answer any enquiry on particular points raised by those responsible for the disease security of other Institutes.

8. Next Meeting

Subject to the approval of the Commission and the Netherlands Government, the next meeting will be held at Lelystad, toward the end of September 1973.

Two topics to be included are:

(a) A further discussion of Security Measures

(b) Recent development in potency testing of vaccines.

Dr. van Bekkum on behalf of the Group expressed to the Director, the administrators and the staff of the Animal Virus Research Institute, their deep appreciation for the extremely interesting programme which had been arranged and for the generous hospitality provided.

Appendix 1

ANIMAL VIRUS RESEARCH INSTITUTE

Notes on Examination of Field Specimens of Foot-and-Mouth Disease Virus

1. Attention is drawn to the regulations for transmission of samples - see notes from World Reference Laboratory published by O.I.E. Material arriving is opened in a laminar flow cabinet and notes made of the sample submitted, the pH of medium, etc.

2. A suspension of the material is prepared in 0.04 m PO_4 buffer, pH 7.6. The remainder of the specimen will be stored as indicated later under Storage of Samples.

3. Complement Fixation Test

The suspension is used as antigen in a microplate test against dilutions of standard guinea-pig antiserum with a fixed dose of complement. A positive result, that is, fixation of complement with one of the stock sera, confirms foot-and-mouth disease.

If the result is negative, it does not rule out the possibility of the existence of FMD since, particularly with specimens from overseas, a number of epithelial samples from infected animals will fail to fix.

If the test is negative, we proceed to:

4. Passage in Tissue Culture

Five bovine thyroid cell cultures are inoculated. If these cultures show cell degeneration, this may be due to virus infection. Proof of virus infection is obtained by using the culture material as antigen in a complement fixation test. A positive result may be obtained in 24-48 hours from inoculation of the cultures.

If no cell degeneration is found, a blind passage is done from the apparently healthy culture and if this is also negative at 48 hours the result of this test is given as negative.