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REPORT OF INFORMAL CONSULTATION ON MONKEYPOX, WHITEPOX AND RELATED POXVIRUSES

Geneva, 9-10 November 1978

1. Objective

The main objective of this meeting was to discuss the important findings of Dr Marennikova's group that viruses having some characteristics of whitepox virus could arise as variants of monkeypox viruses and to advise on action to confirm or refute these findings. The group also appraised developments since their last meeting in February 1976.

2. Participants - see Annex 1

3. Human Monkeypox Cases

Since February 1976, continuing active surveillance in Zaire has detected an additional 15 cases of human monkeypox, bringing the total to 35 at the present time. All the additional 15 cases were in Zaire; 6 in Equateur Region, 4 each in Bandundu and Kasai Orientale and one in Kivu. The absence of positive reports from other nearby countries was thought more likely to be due to their less active surveillance than to cessation of such occurrences outside of Zaire. Of the 35 cases to date, 6 deaths were attributable to the infection, all in children aged between 7 months and 7 years. There have been fifty-six unvaccinated close household contacts and only two instances where person-to-person transmission is suggested by the time interval between onsets, implying a transmission index of less than 4%. Thus the current epidemiological picture continues to indicate that human monkeypox does not seem to be a major public health problem.

4. Monkeypox Virus

Further laboratory studies have confirmed the significant differences between monkeypox viruses and variola viruses. Such studies have included the analysis of virion and intracellular viral polypeptides and restriction endonuclease characterization of the genomes, as well as biological and serological characters. Minor variations have been found between different viral isolates. One particular isolate of monkeypox - that from case number 17 - has been shown to replicate in PEK cells (unusual for monkeypox). After several passages in PEK cells, cell homogenates exhibited the "va antigen" (vaccinia/variola) as well as the "mo antigen" (monkeypox), but not the "vc antigen" (vaccinia). This experiment should be repeated with a pock-purified preparation.

5. White Pock Variants of Monkeypox Virus

Following the recent studies of Dr Marennikova's group, several investigators have looked for and at such variants.

Two from the Copenhagen strain have been shown to have the "mo" antigen, but not "va" or "vc"; both of these failed to pass in PEK cells.

One from the Copenhagen strain has been shown to have the intracellular viral polypeptide pattern, thymidine kinase characters and ceiling temperature of the parent strain.

One from the Espana strain gave restriction fragment patterns identical to those of the parent strain when tested with 5 different endonucleases.

In contrast to these findings, Dr Marennikova has described 5 stable, cloned, white pock isolates, 3 from the Congo 8 strain and 2 from the Copenhagen strain, which had some phenotypic properties different from monkeypox and characteristic of whitepox. The properties tested were: virulence for chick embryo, suckling mice and rabbit skin; ability to grow in PEK cells, temperature sensitivity of viral growth, HA activity and antigenic specificity.

She has also described the isolation of monkeypox virus from hamsters infected with strain Congo 8. All twenty isolates up to the second week were wild type virus, but 4 out of 15 isolates which had been obtained between the 2nd and the 6th week after inoculation produced white pocks. The white pock isolates had the same low pathogenicity for mice, chick embryo and rabbit as whitepox virus and were able to replicate in PEK cells.

There are thus two sets of observations of white variants of monkeypox virus which are contradictory. The general question of white pock variants of orthopoxviruses was discussed. Experience with white pock variants of rabbitpox and cowpox viruses has shown that a spectrum of mutants with different phenotypes may be obtained from a parental wild type clone. It is clearly important to resolve as quickly as possible the situation of white pock variants of monkeypox virus.

6. Recommendations

A. Investigation of white pock variants of monkeypox virus

1. Dr Marennikova's white pock clones should be further characterized by polypeptide and DNA analysis.

2. Attempts should be made to repeat Dr Marennikova's observations in other centres using the same monkeypox stocks as Dr Marennikova used and other stocks of the same monkeypox strains. Any white pock clones isolated in these experiments should be characterized by polypeptide and DNA analysis.

3. The potential of PEK cells as a selective system for variola-like viruses should be investigated.

B. Other

1. WHO should provide support for the production of a series of maps of orthopoxviral DNAs.

2. Research should be undertaken on the production of high titre monoclonal antibody specific to certain poxviruses, which could be useful for diagnostic purposes.

3. WHO should maintain liaison with and support a group of workers with experience in the laboratory study of poxviruses and arrange for them periodically to review the current situation in the poxvirus field.

4. Research on orthopoxviruses should be conducted at a level of security appropriate to the particular work.

5. Whatever the results of the laboratory studies, the public health importance of whitepox viruses can be determined only by long-term surveillance, particularly in Zaire, and it is strongly recommended that such surveillance should be maintained.

6. The group supports the proposed field study in Zaire, which is designed to define further the natural history of monkeypox.

ANNEX 1

Informal Consultation on Monkeypox, Whitepox and Related Poxviruses

PARTICIPANTS

Professor K. R. Dumbell	Department of Virology, Wright-Fleming Institute of Microbiology, St Mary's Hospital Medical School, London, England
Professor F. Fenner	Centre for Resource and Environmental Studies, The Australian National University, Canberra, Australia
Dr L. Harper	Department of Medical Microbiology, The Medical School, Birmingham, England
Dr A. C. Hekker	Rijks Instituut voor de Volksgezondheid, Bilthoven, Netherlands
Dr T. Kitamura	Division of Poxviruses, National Institute of Health, Tokyo, Japan
Professor S. S. Marennikova	Research Institute of Virus Preparations, Moscow, USSR
Dr J. H. Nakano	Viral Exanthems Branch, Center for Disease Control, Atlanta, USA
Dr J. Sambrook	Cold Spring Harbor Laboratory, New York 11724, USA

Smallpox Eradication Unit, WHO

Dr I. Arita	Chief
Dr J. G. Breman	Medical Officer
Dr A. Gromyko	Medical Officer

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