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Virology Division News

The 20th meeting of the executive committee of the international committee on virus taxonomy

Virus species, higher taxa, a Universal Virus Database, and other matters

The Executive Committee of the International Committee on Taxonomy of Viruses (ICTV), comprising four office-bearers, six Sub-committee chairmen and eight other members, normally meets once in the interval between Virology Congresses to consider taxonomic proposals coming from 39 Study Groups covering the whole of virology, and to prepare these proposals for presentation of the full ICTV which assembles every three years concurrently with the International Virology Congresses. The 20th meeting of the Executive Committee of the ICTV was held at the Centers for Disease Control, Atlanta, Georgia, U.S.A. from 22nd to 24th April 1991. This meeting differed from the normal pattern of midterm meetings in that it was convened for the specific purpose of considering in depth some of the broader aspects of viral taxonomy, and several coopted guest speakers were invited to lead the discussion. The topics discussed were "The Issue of Higher Taxa", "The Species Concept in Virology", and "The Establishment of a Universal Virus Database". These topics will be the subject of more detailed articles in subsequent editions of VIROLOGY DIVISION NEWS, and only a brief summary of the proceedings is presented here.

Perhaps the most significant outcome of the meeting was the acceptance of virus species as an entity in virus taxonomy, and the adoption of a new definition of virus species put forward by Marc Van Regenmortel.

Definitions of virus species based on biological (gene pools), ecological (niches), evolutionary (lineages), or phenetic (morphology) criteria were considered and rejected. The concept of the polythetic species, on the other hand, found general favour since it can accomodate the inherent variability of viruses and it does not depend on the existence of a unique diagnostic feature. A polythetic class is distinguished from an ordinary class in that members of the former need not have any single property in common. Each member of a polythetic class is defined by more than one property, and no single property is necessary or sufficient for membership of a polythetic class. The strength of the polythetic species concept is that it does not depend on strict definition of boundaries, and the following definition of virus species was adopted:

"A virus species is a polythetic class of viruses that constitutes a replicating lineage and occupies a particular ecological niche." The chairmen of the Sub-committees now have the responsibility of implementing this decision with the assistance of a guidance document from the Executive Committee, and of coordinating the activities of their Study Groups in this task. The chairmen of the Study Groups will be required to produce working definitions for delineation of species within existing families or virus groups, and to establish the criteria for differentiating species and strains. The polythetic species concept implies that there can be no common rules; the members of all Study Groups must decide what is relevant to their group of viruses and devise diagnostic criteria accordingly.

The issue of higher taxa proved to be more contentious, and a consensus opinion was not obtained. As a consequence this matter has been deferred for further discussion at the next Executive Committee meeting. Anyone with views to air should approach either of the designated speakers, D. J. McGeoch and J. H. Strauss. The acceptance of the order *Mononegavirales* as a taxon in virology at the last ICTV meeting in Berlin in August 1990 had created a precedent. Although it was agreed that the creation of the order *Mononegavirales* fulfilled a useful function in gathering together three families of negative stranded RNA viruses with related genome organization, the opportunity to construct higher taxa is limited. For example, the remainder of the negative stranded RNA viruses which possess segmented genomes, on present evidence appear not be closely related to one another and cannot be included in a single order. Some of the factors which at present prevent the construction of hierarchies are the occurrence of recombination between viruses, the assimilation of host genes, the possibility of convergent evolution and the homologies now recognized to exist between vertebrate and plant viruses. Nonetheless it was agreed that there are good operational reasons for establishing local hierarchies and that discussion of the issue should continue.

The greater part of the meeting was devoted to discussion of the establishment of a Universal Virus Database, and it was resolved that the ICTV should take the lead in coordinating efforts in this area and play an active role in the development of the most appropriate system.

Marian Horzinek reported the results of a survey of current activity in this field carried out on behalf of the ICTV. Dr. Micah Krichevsky (NIH) presented a wide ranging appraisal of the technical aspects of database production and operation in microbiology, and Dr. Lois Blaine (ATCC) reviewed the requirements for a Virus Database and her work in compiling descriptors for use in a Virus Database. A low cost user-friendly system for vertebrate viruses using Superbase 4 software, which is at an advanced stage of development was demonstrated by A. J. Della Porta, and A. J. Gibbs described the powerful Delta-based system now being utilized as a research tool in plant virus taxonomy. The Executive Committee concluded that the problems in compiling a virus database were organisational rather than conceptual and the Data Sub-committee under Adrian Gibbs was delegated to carry the matter forward with the aim of merging the two existing systems and developing a multipurpose universal system.

The meeting also reviewed plans for preparation of the Sixth Report of the ICTV which is targeted for publication soon after the Ninth International Congress of Virology to be held in Glasgow, Scotland in August 1993. Publication of the much delayed Fifth Report, which will contain all the revisions of virus taxonomy which have accumulated since publication of the Fourth Report in 1982, is now scheduled for mid-summer 1991. The Fifth Report will be dedicated to the memory of Richard Francki, the past president of the ICTV, who was responsible for the final assembly of the Report and was undertaking the final revision at the time of his death in November 1990.

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