

## NOTES

### Arenoviruses: Proposed Name for a Newly Defined Virus Group

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The name "arenaviruses" is proposed for the newly defined taxonomic group containing lymphocytic choriomeningitis, Lassa, and the Tacaribe complex viruses.

Recent studies (5, 8) have established that the Tacaribe complex viruses and lymphocytic choriomeningitis (LCM) virus constitute a distinct taxonomic group. This report is a proposal by a group of interested investigators concerning the name, definition, and composition of this virus group.

**Nomenclature.** The name "arenaviruses" (from *Arenosus*, L. sandy) is proposed; this is pronounced with the accent on the second syllable. This name was chosen to reflect the characteristic fine granules seen in the virion in ultrathin sections.

**Definition.** The arenaviruses are lipid solvent-sensitive, ribonucleic acid (RNA)-containing viruses which share a group-specific antigen demonstrable by immunofluorescence and, in some cases, by complement-fixation tests, and which show a pathognomonic virion structure in ultrathin-section electron micrographs. Virus particles are round, oval, or irregular in shape and range in diameter from 50 to over 300 nm. Mean diameter is approximately 110 to 130 nm. The particles consist of a dense, well-defined unit-membrane envelope with closely spaced projections and an unstructured interior containing a variable number of electron-dense granules. These granules are 20 to 30 nm in diameter and closely resemble host ribosomes. The presence of these granules is the most striking unique feature of these viruses. Virus particles are formed by budding, chiefly from plasma membranes. Host-cell membrane is modified at sites of budding; it

becomes denser, more clearly bilamellar, and covered with projections (2, 5).

Negative-contrast electron micrographs of Tacaribe virus show spherical or pleomorphic particles, 85 to 99 nm in diameter, with an envelope having a pronounced and regular surface structure (1). Similar studies of other members of the group are in progress. The type of symmetry, if any, in the virion and the strandedness of the RNA are not known.

Arenoviruses are separable from other RNA-containing, lipid solvent-sensitive viruses as follows. (i) They do not have the helical symmetry characteristic of myxoviruses. (ii) They are much more pleomorphic than and contain unique intravirionic granules not possessed by rubella virus, yellow fever and some other arboviruses, and the C-type RNA tumor viruses.

Further characteristics, not presently considered as essential to the definition of the group or not established for all members, or both, are as follows. (i) There is a "soluble" complement-fixing antigen, separable from the virus by centrifugation. (ii) Large unbounded masses of 20-nm granules, either ribosomes or the internal granules of the virion, form in the cytoplasm of infected cells. (iii) There is characteristic cytopathic effect in the Vero tissue culture cell line of African green monkey kidney. It appears that some strains of LCM do not share this property. (iv) Chronic carrier states are produced in the rodent which is the natural host. (v) The mechanism of pathogenesis in mice depends on in-

tegrity of the thymus-dependent lymphoid system.

**Composition.** Presently recognized viruses of the arenavirus group are LCM, Lassa (S. M. Buckley and J. Casals, *in preparation*), and the members of the Tacaribe complex, which include Tacaribe (3), Junin (6), Machupo (4), Amapari (7), Tamiama (C. H. Calisher et al., *Amer. J. Trop. Med. Hyg.*, *in press*), Pichinde (H. Trapido and C. Sanmartin, *in preparation*), Parana (P. A. Webb, K. M. Johnson, and M. L. Kuns, *in preparation*), and Latino (P. A. Webb, C. J. Peters, and K. M. Johnson, *in preparation*). The Tacaribe complex viruses are more closely related to each other by complement-fixation tests than they are to LCM or Lassa virus. There is little or no cross-neutralization between members of the group.

Tacaribe complex viruses have been isolated principally from cricetid rodents and only in the Western Hemisphere. This fact, together with the observed immunological relationships, indicates that they most likely constitute a subgroup within the arenavirus group. No recommendation is made at this time, however, concerning nomenclature and definition of subgroups.

LCM virus is considered the prototype virus of the arenavirus group.

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