

On the nomenclature of viruses associated with AIDS

Traditionally, virus isolates have been named most commonly for the disease from which they were isolated - eg. influenza, poliomyelitis, visna, foot-and-mouth disease, and the like. A smaller number are named for the place of isolation - Coxsackie, Sindbis, and Sendai viruses are a few examples, and a mercifully small number are named for their discoverers - alone or in combination with other features - such as Epstein-Barr virus, Rous sarcoma virus, etc. With retroviruses, it is also usual to append the species of origin to the name - avian leukosis virus, human T-cell lymphoma virus, baboon endogenous virus, etc. Unlike most other organisms, the naming of new virus isolates has usually been a trivial prerogative of the isolator, and not subject to review by other workers in the field. This has, in general, caused little difficulty so long as the names chosen were novel and did not presuppose unproven relationships. Significant confusion has been created in the past, however, by injudicious choices of virological nomenclature. A good example is the use of the term "arboviruses" to include all viruses transmitted by insect vectors. Only much later did it become clear that several unrelated groups of viruses were included under the one rubric.

Based on the haphazard but workable prior "convention" it would seem most appropriate to label viruses etiologically associated with acquired immunodeficiency syndrome with a designation like "human immunodeficiency virus (HIV)", or something similar.

In support of this I note the following:

1) Precedence clearly belongs to LAV and HTLV-III with a slight edge to the former. Current usage strongly favors HTLV-III, although the compound HTLV-III/LAV (or vice-versa) seems to be coming into favor. While there would be no compelling scientific objection to the use of LAV, (particularly if interpreted as "lymphadenopathy-AIDS virus"), it seems highly improbable that this name would be acceptable to the majority of workers. I do believe that scientific objections to the use of HTLV-III are compelling; to wit:

a. Most significantly, it implies relationships and groupings that do not exist. HTLV-1, 2, and BLV form a clear and obvious group, based on sequences and structural relationships, as do all AIDS virus isolates studied to date. Features that differentiate the two groups are legion, including LTR organization and size, nature of tRNA primer, organization of gag-protease-pol domains, size and structure of the env gene placement and its products, virion morphology, and distribution of open reading frames to name a few.

b. It creates didactic difficulties. In lecturing to medical students, for example, it is far more difficult to get the point across that AIDS and ATLL are caused by viruses with very similar names yet which are very different, than to use very different names and later explain the similarities.

c. It is inherently confusing. Despite statements to the contrary, the "L" in HTLV is still most clearly associated with "lymphoma" or "leukemia" as it was used in virtually all the literature up until the middle of 1984, and as reemphasized in the Cold Spring Harbor agreement of September, 1983, signed by most of the prominent workers in the field. The word "lymphotropic" is only a late alteration.

d. The name emphasizes cell tropism - a feature which is well known to be one of the most variable and least reliable criteria for distinguishing retroviruses. Tropism can vary by several different mechanisms. The best understood models are small sequence differences in the LTR of T-cell leukemogenic vs. non-leukemogenic MLV, and small differences in the receptor-recognizing portion of the env gene of different subgroups of ALV. While the tropism of different viruses can be a startling biological difference, it is hardly a fundamental one. By the same token, the proclivity of HTLV and AIDS viruses to infect the same cell type is also impressive, but unlikely to reflect a fundamental similarity useful for grouping. Indeed, there is good evidence that the mechanisms conferring the tropism are fundamentally different for the two groups of viruses. Also, BLV, far more closely related to HTLV than to the AIDS viruses, is not T-lymphotropic, and it would not be at all surprising to find non-T-lymphotropic viruses which are closely related to AIDS viruses.

e. It will complicate attempts to develop a consistent and workable taxonomy. Retrovirus classification is clearly in need of revision to better reflect relationships as revealed by modern molecular methods. While this revision is still a task for the future (and probably for others), it is clear that AIDS viruses and the HTLV-BLV group will have to be considered distinct species (by any definition) and probably distinct genera. The use of HTLV to embrace this set of viruses would preclude its use as a designation for the one limited group including HTLV-1 and 2, or, alternatively, force the inclusion of BLV and other viruses as "T-lymphotropic". Again, it seems not unlikely that other isolates related to the AIDS viruses but of distinctive biological properties will be isolated.

2. The name proposed does not directly name AIDS, but does reference the disease. Many viruses are named for the disease they are most closely associated with, even though the association is less than perfect. A prominent example is poliovirus in which the vast majority of infections are inapparent or insignificant. Similarly, HTLV-1 is associated with lymphoma in only a small minority of infected individuals.

The issue of stigmatizing patients with names which reflect the name of the disease seems irrelevant here, since any euphemism is evanescent. As soon as any name becomes widely used its use will create the same atmosphere of concern. The problem lies with the distribution and gravity of the disease, not with its name or the name of the etiologic agent.

3. The name should include all human isolates obviously related to the prototypes, unless other clusters of related viruses are found with sufficient biological difference to warrant additional names. Such clusters could include viruses of clearly distinctive pathogenicity, for example. At such time, it would be also necessary to consider nomenclature for the group as a whole. There seems no good reason to do so until there is a better idea of the composition of such a group.

4. Related viruses of primates (or other animals) with similar pathogenicities can be given related (eg. simian (S), or more specifically chimpanzee (C), baboon (B), etc.). Related viruses of uncertain pathogenicity might then be called immuno-deficiency-like virus (ILV) with the appropriate prefix.

5. Preliminary results suggest a rapid variation from one isolate to another and it would thus be very useful to have a consistent, easily understood substrain designation, giving the place and date of isolation as well as a trivial strain designation (and perhaps a serial number as well). The nomenclature used for this purpose in influenza virus would be a good model. For example, the strain known as LAV might additionally be designated PA 8/83 (or whatever the appropriate date is) indicating the place (Paris), month and year of isolation. It seems highly likely that some such additional nomenclature will be of considerable value for molecular epidemiology.