

Taxonomic Proposal 2002.V034.04.

1. **Proposal:** To change the species name *Marburg virus* to the species name *Lake Victoria marburgvirus*.
2. **The background.** The background of this proposal is as follows. The *Filoviridae* Study Group had multiply proposed in the past to separate the family into two genera because of significant differences in Marburg and Ebola virus particle size, genome sequence differences, differences in structure and processing of glycoprotein gene and pathogenicity. This proposal was accepted conditionally in 1998 by the ICTV Executive Committee but with temporary names for the genera, because the suggested names were the same as the species names. The temporary names for the genera were "*Marburg-like virus*" and "*Ebola-like virus*". A proposal was submitted to the EC for the spring 2001 meeting that recommended replacing the temporary genera names with the names *Marburgvirus* and *Ebolavirus*.

The EC made the following comments for the proposal in May 2001. The EC noted that it is important to avoid having the same name for the species and genus. While the proposed names *Marburgvirus* and *Ebolavirus* for the genera could be acceptable, they will not be acceptable if the species names are Ebola virus and Marburg virus. The EC suggested that the SG needs to work harder to be more creative about names for the genera. The SG was reminded to be aware of the outside concern expressed for the recent species names. For example, Fred Murphy, one of the people who published on the discovery of Ebola virus has been critical of the fact that the Ebola virus has been raised to species status. He has asked how can the virus be named "Ebola virus, subtype Zaire" and the species name be Zaire Ebola virus? The EC suggests that this SC needs to poll the community further and think about type species simultaneously with the needed new genera names.

The *Filoviridae* Study Group renewed discussion on alternative names by several rounds of consultation within the SG and by discussion with scientists involved in the field. The current names of genera of animal viruses were reviewed and categorized, and several alternative names were drafted by analogy, discussed and voted. The SG decided that the proposed names for species should be used to designate the genera. The species names of these viruses have been used for a long time by virologists active in this field, leading to the conclusion that the former species names should be preserved for genera names and should retain this recognition. Therefore it was decided that it would be more prudent to change the species names taking into account that there will be more than one species in the proposed genera in the near future. This decision was reached by unanimous vote. This proposal is the first one in the following chain of proposals for this family.

3. **Purpose:** To change the species name for the species containing all the strains of Marburg virus with the purpose to use the former species name for proposed genus name.
4. **Taxonomic situation:** The already pre-approved "Marburg-like virus" genus will comprise the single species named Lake Victoria Marburgvirus (variant - Kakamega Forest Marburgvirus) into which all the discovered genus members will be classified.
5. **Derivation of proposed names:** The proposed name(s) Lake Victoria Marburgvirus (variant - Kakamega Forest Marburgvirus) have the origin from the historical place of proposed geographical origin of all known isolates and strains of Marburg-like virus genus.

6. **References:**

1. Virus Taxonomy—Classification and Nomenclature of Viruses: Seventh Report of the International Committee on Taxonomy of Viruses. Academic Press; 2000.
2. Bukreyev A.A., Volchkov V. E., Blinov V.M., Dryga S.A., Netesov S.V. (1995) The complete nucleotide sequence of the Popp (1967) strain of Marburg virus: a comparison with the Musoke (1980) strain. *Arch Virol* 140:1589-1600.
3. Feldmann H., Mühlberger E., Randolph A., Will C., Kiley M.P., Sanchez A., Klenk H.-D. (1992) Marburg virus, a filovirus: messenger RNAs, gene order, and regulatory elements of the replication cycle. *Virus Res* 24: 1-19
4. Feldmann H., Klenk H.-D. (1996). Filoviruses: Marburg and Ebola. *In: Advances in Virus Research; Maramorosch, K., Murphy, F. A., and Shatkin, A. J., eds.; Academic Press; San Diego, New York, London, Sydney, Tokyo, Toronto, Vol. 47: 1-52.*
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6. Kiley M.P., Bowen E.T.W., Eddy G.A., Isaäcson M., Johnson K.M., McCormick J.B., Murphy F.A., Pattyn S.R., Peters D., Prozesky O.W., Regnery R.L., Simpson D.I.H., Slenczka W., Sureau P., van der Groen G., Webb P.A., Wulff H. (1982). Filoviridae: a taxonomic home for Marburg and Ebola viruses? *Intervirology* **18**, 24-32.
7. Martini G. A., Siebert R. (eds) (1971) *Marburg Virus Disease*. New York: Springer Verlag.
8. Pattyn S.R. (ed.) (1978) *Ebola Virus Hemorrhagic Fever*. Amsterdam: Elsevier/North-Holland Biomedical Press.
9. Sanchez A., Khan A.S., Zaki S.R., Nabel G.J., Ksiazek T.G., Peters C.J. (2001) Filoviridae: Marburg and Ebola viruses. *In: Fields' Virology* (P.M.Howley, D.M.Knipe., eds.), Lippincott Williams & Wilkins. A Wolters Kluwer Company, Philadelphia, 4th edn.: pp. 1279-1303.
10. Sanchez A., Kiley M.P., Holloway B.P., Auperin D.D. (1993) Sequence analysis of the Ebola virus genome: organization, genetic elements, and comparison with the genome of Marburg virus. *Virus Res* 29: 215-240.
11. Sanchez A., Trappier S.G., Mahy B.W.J., Peters C.J., Nichol S.T. (1996) The virion glycoproteins of Ebola viruses are encoded in two reading frames and are expressed through transcriptional editing. *Proc Natl Acad Sci USA* 93: 3602-3607.
12. Sanchez A., Trappier S.G., Stroher U., Nichol S.T., Bowen M. and Feldmann, H. (1998). Variations in the glycoprotein and VP35 genes of Marburg virus strains. *Virology*, 240, 138-146.
13. Volchkov V.E., Becker S., Volchkova V.A., Ternovoi V.A., Kotov A.N., Netesov S.V., Klenk H.-D. (1995) GP mRNA of Ebola virus is edited by the Ebola virus polymerase and by T7 and vaccinia virus polymerases. *Virology* 214: 421-430.
14. Volchkov V.E., Volchkova V.A., Muhlberger E., Kolesnikova L.V., Weik M., Dolnik O., Klenk H.-D. (2001) Recovery of Infectious Ebola Virus from Complementary DNA: Editing of the GP Gene and Viral Cytotoxicity. *Science*, 291: 1965-1969.

Taxonomic Proposal 2002.V035-038.04.

1. **Proposal:** To change the former temporary species names (existing among specialists) of the family *Filoviridae*:

2002.V035.04. Change the former species name *Zaire Ebola virus* to *Zaire ebolavirus*

2002.V036.04. Change the former species name *Cote d'Ivoire Ebola virus* to *Ivory Coast ebolavirus*

2002.V037.04. Change the former species name *Reston Ebola virus* to *Reston ebolavirus*

2002.V038.04. Change the former species name *Sudan Ebola virus* to *Sudan ebolavirus*

2. **Purpose:** To give constant, more appropriate names for species of the family *Filoviridae*. The four proposed names indicate the membership of these species to the corresponding genus and are in accordance with Rules 3.9-3.25 of The International Code of Virus Classification and Nomenclature (see <http://www.ncbi.nlm.nih.gov/ICTV/rules.html>). These proposed names are easy to pronounce and do not contain person names.
3. **Taxonomic situation:** The four already existing species of the family *Filoviridae* will be constantly named by Zaire Ebolavirus, Ivory Coast (variant – Tai Forest) Ebolavirus, Reston Ebolavirus and Sudan Ebolavirus (or variant names), into which all the discovered members are already classified.
4. **Derivation of proposed names:** The names Zaire Ebolavirus, Ivory Coast (variant - Tai Forest) Ebolavirus, Reston Ebolavirus and Sudan Ebolavirus (or variant names) for the existing and proposed new species are derived from the names of the first places of isolation. These names are easy to remember, do not cause confusion, are euphonious in English, German and Russian, and cannot be substantially confused phonetically with other terms currently in use in viral taxonomy. Two variants of names are given because of the practically equal distribution of votes between choices.
5. **References:**
 1. Feldmann H., Klenk H.-D. (1996). Filoviruses: Marburg and Ebola. *In: Advances in Virus Research*; Maramorosch, K., Murphy, F. A., and Shatkin, A. J., eds.; Academic Press; San Diego, New York, London, Sydney, Tokyo, Toronto, Vol. 47: 1-52.
 2. Pattyn S.R. (ed.) (1978) Ebola Virus Hemorrhagic Fever. Amsterdam: Elsevier/North-Holland Biomedical Press.
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 4. Sanchez A., Kiley M.P., Holloway B.P., Auperin D. D. (1993) Sequence analysis of the Ebola virus genome: organization, genetic elements, and comparison with the genome of Marburg virus. *Virus Res* 29: 215-240.
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 6. Volchkov V.E., Becker S., Volchkova V.A., Ternovoi V.A., Kotov A.N., Netesov S.V., Klenk H.-D. (1995) GP mRNA of Ebola virus is edited by the Ebola virus polymerase and by T7 and vaccinia virus polymerases. *Virology* 214: 421-430.
 7. Volchkov V.E., Volchkova V.A., Muhlberger E., Kolesnikova L.V., Weik M., Dolnik O., Klenk H.-D. (2001) Recovery of Infectious Ebola Virus from Complementary DNA: Editing of the GP Gene and Viral Cytotoxicity. *Science*, 291: 1965-1969.
 8. Virus Taxonomy - Classification and Nomenclature of Viruses: Seventh Report of the International Committee on Taxonomy of Viruses. Academic Press; 2000.

Taxonomic Proposal 2002.V039.04.

1. **Proposal:** To replace the temporary genus names “Marburg-like viruses” and “Ebola-like viruses”, with the names *Marburgvirus* and *Ebolavirus* respectively.
2. **Purpose:** To develop and improve the current taxonomy of the family because of the differences in morphology, biological and antigenic properties, geographic location of places of isolation, genome sequences, GP properties of the different members. All the current data indicate that *Filoviridae* members fall into two distinct and phylogenetically divergent groups, a Marburg virus group and an Ebola virus group, which is not reflected by the taxonomy. The proposed changes would not only separate Marburg and Ebola virus isolates, but would also provide a skeleton structure for the placement of future novel *Filoviridae* isolates.

The existing terminology reflected the situation with the *Filoviridae* family level of study which existed almost twenty years ago. During the last twelve years two new representatives of the *Filoviridae* family, Reston and Cote d'Ivoire strains, were discovered. The sequences of the genomes of Marburg and Ebola viruses and partial sequences of other representatives of the family were determined. Finally, the properties of GP proteins of these viruses were studied. Most of these studies were made independently in three different laboratories - in U.S.A., Germany and Russia - and practically identical results were obtained. As a result of all these studies, significant differences between representatives of the family were found. Therefore the development and improvement of the existing classification of the family *Filoviridae* became necessary.

The *Filoviridae* Study Group submitted a proposal to establish 2 genera within the family in 1998, and this proposal was conditionally accepted by the ICTV EC but permanent names for the two genera were needed. In the meantime, the genera had temporary names of "*Marburg-like virus*" and "*Ebola-like virus*". A proposal was submitted to the EC for the spring 2001 meeting that recommended replacing the temporary genera names with the names *Marburgvirus* and *Ebolavirus*. The EC made the following comments for the proposal in May 2001. The EC noted that it is important to avoid having the same name for the species and genus. While the proposed names *Marburgvirus* and *Ebolavirus* for the genera could be acceptable, they will not be acceptable if the species names are Ebola virus and Marburg virus. The EC suggested that the SG needs to work harder to be more creative about names for the genera. The SG was reminded to be aware of the outside concern expressed for the recent species names. For example, Fred Murphy, one of the people who published on the discovery of Ebola virus has been critical of the fact that the Ebola virus has been raised to species status. He has asked how can the virus be named “Ebola virus, subtype Zaire” and the species name be Zaire Ebola virus? The EC suggests that this SC needs to poll the community further and think about type species simultaneously with the needed new genera names.

The permanent names *Ebolavirus* and *Marburgvirus* for the proposed new genera are derived from the names of the first isolates of these viruses, which were derived from the geographic places - Marburg city in Germany and Ebola river in the border of Zaire (now – Democratic Republic of Congo) and Sudan. These names have a strong history and will not cause confusions, are euphonious in English, German and Russian, are short and can not be substantially confused phonetically with other terms currently in use in viral taxonomy.

3. **Taxonomic situation:** The temporary genus names “Marburg-like viruses” and “Ebola-like viruses” within the family *Filoviridae* would be replaced with the names *Marburgvirus* and *Ebolavirus* respectively.
4. **References:**
 1. Bukreyev A.A., Volchkov V.E., Blinov V.M., Dryga S.A., Netesov S.V. (1995) The complete nucleotide sequence of the Popp (1967) strain of Marburg virus: a comparison with the Musoke (1980) strain. *Arch Virol* 140:1589-1600.
 2. Feldmann H., Mühlberger E., Randolph A., Will C., Kiley M.P., Sanchez A., Klenk H.-D. (1992) Marburg virus, a filovirus: messenger RNAs, gene order, and regulatory elements of the replication cycle. *Virus Res* 24: 1-19.
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11. Virus Taxonomy - Classification and Nomenclature of Viruses: Seventh Report of the International Committee on Taxonomy of Viruses. Academic Press; 2000.