

Template for Taxonomic Proposal to the ICTV Executive Committee

Creating Species in an existing genus

Code † To designate the following as species in the genus:

belonging to the family[°] :

Equine coronavirus (ECoV)

† Assigned by ICTV officers

° leave blank if inappropriate or in the case of an unassigned genus

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Old Taxonomic Order

Order Nidovirales
Family Coronaviridae
Genus Coronavirus
Type Species Murine hepatitis virus
Species in the Genus

Group 1 coronaviruses: transmissible gastroenteritis virus; canine coronavirus; feline coronavirus; human coronavirus 229E; human coronavirus NL63; porcine epidemic diarrhoea virus; bat coronavirus.

Group 2 coronaviruses: murine hepatitis virus; bovine coronavirus; canine respiratory coronavirus; porcine haemagglutinating encephalomyelitis virus; human coronavirus OC43; SARS-coronavirus.

Group 3 coronaviruses: avian infectious bronchitis virus; turkey coronavirus.

Tentative Species in the Genus
Unassigned Species in the family

New Taxonomic Order

Order
Family
Genus
Type Species
Species in the Genus

Group 2 coronaviruses: murine hepatitis virus; bovine coronavirus; canine respiratory coronavirus; porcine haemagglutinating encephalomyelitis virus; human coronavirus OC43; SARS-coronavirus; equine coronavirus

Tentative Species in the Genus
Unassigned Species in the family

ICTV-EC comments and response of the SG

Study group has approved taxonomic proposal for equine coronavirus during the last SG meeting in Colorado Springs 2005

Species demarcation criteria in the genus

Currently all coronaviruses are within one genus, *Coronavirus*, which is divided into three Groups, 1, 2 and 3. The structural proteins of the species of one Group have <40% amino acid identity with the corresponding structural proteins of species in other Groups.

The EqCoV-NC99, isolated from a diarrheic foal, should be considered a group 2 coronavirus because of its antigenic relatedness to the BCoV and non-relatedness to group 1 or group 3 coronaviruses (Guy et al 2000) and because of its genomic sequence similarities to other group 2 coronaviruses (Table 1 and references therein).

Argumentation to justify the designation of new species in the genus

Table 1. % amino acid sequence identity between EqCoV and other group 2 coronaviruses.

Protein	% amino acid sequence identity between EqCoV and other group 2 coronaviruses ^a				
	BCoV-Mebus	HECoV-4408	HCoV-OC43	HEV-67N	MHV-A59
first 96 aa of 246-aa nsp 1 (p28) ^b	75.0	75.0	73.9	75.0	45.8
HE protein ^b	72.7	73.2	72.9	72.7	-
S protein ^b	80.1	80.7	81.5	76.8	62.8
12.7 kDa protein ^b	83.6	82.7	81.8	86.4	50.4
E protein ^b	90.6	90.6	91.8	92.9	62.8
M protein ^b	91.8	91.8	88.7	88.7	84.5
N protein ^c	91.8	91.3	90.4	89.6	71.5

^a GenBank Accession numbers: EqCoV, AY316300, AF251144; BCoV-Mebus, U00735; HECoV-4408, AY316299, L07747, L07748; HCoV-OC43, NC005147; HEV-67N, AF481863; MHV-A59, NC001846.

^b Data from Wu et al, 2003

^c Data from Guy et al, 2000

Although isolated from the equine species, extensive host susceptibility studies have not been done to determine host range. Yet, it is clear from sequence analyses (Table 1 and references therein) and enzyme studies on the hemagglutinin-esterase (Smits et al 2005) that the equine coronavirus, while more closely related to the bovine coronavirus-Mebus strain, human respiratory coronavirus-OC43 strain, human enteric coronavirus-4408 strain, and the porcine hemagglutinating encephalomyelitis virus-67N strain than the mouse hepatitis virus strains, the rat coronavirus strains or the puffinosis virus strains, it is quite distant from other group 2 coronaviruses.

List of created Species in the genus

Equine coronavirus (ECoV)

References

Guy JS, Breslin JJ, Breuhaus B, Vivrette S, Smith LG. Characterization of a coronavirus isolated from a diarrheic foal. J Clin Microbiol. 2000 Dec;38(12):4523-6.

Smits SL, Gerwig GJ, van Vliet AL, Lissenberg A, Briza P, Kamerling JP, Vlasak R, de Groot RJ. Nidovirus sialate-O-acetyltransferases: evolution and substrate specificity of coronaviral and toroviral receptor-destroying enzymes. J Biol Chem. 2005 Feb 25;280(8):6933-41. Epub 2004 Oct 26.

Wu HY, Guy JS, Yoo D, Vlasak R, Urbach E, Brian DA. Common RNA replication signals exist among group 2 coronaviruses: evidence for in vivo recombination between animal and human coronavirus molecules. Virology. 2003 Oct 10;315(1):174-83.

Annexes:

None