



## Coronavirus: Detailed taxonomy

Coronaviruses are in the realm: Riboviria; phylum: Incertae sedis; and order: Nidovirales. The [Coronaviridae](#) family gets its name, in part, because the virus surface is surrounded by a ring of projections that appear like a solar corona when viewed through an electron microscope.

Taxonomically, the main Coronaviridae subfamily – Orthocoronavirinae – is subdivided into alpha (formerly referred to as type 1 or phylogroup 1), beta (formerly referred to as type 2 or phylogroup 2), delta, and gamma coronavirus genera. Using molecular clock analysis, [investigators](#) have estimated the most common ancestor of all coronaviruses appeared in about 8,100 BC, and those of alphacoronavirus, betacoronavirus, gammacoronavirus, and deltacoronavirus appeared in approximately 2,400 BC, 3,300 BC, 2,800 BC, and 3,000 BC, respectively. These investigators posit that bats and birds are ideal hosts for the coronavirus gene source, bats for alphacoronavirus and betacoronavirus, and birds for gammacoronavirus and deltacoronavirus.

Coronaviruses are usually associated with enteric or respiratory diseases in their hosts, although hepatic, neurologic, and other organ systems may be affected with certain coronaviruses. Genomic and amino acid sequence phylogenetic trees do not offer clear lines of demarcation among coronavirus genus, lineage (subgroup), host, and organ system affected by disease, so information is provided below in rough descending order of the phylogenetic length of the reported genome.

Genus	Subgroup/ Lineage	Abbreviation	Genome	Species	Disease Name	Organ System
Alphacoronavirus		PEDV	28,033	Porcine	Porcine epidemic diarrhea virus	Enteric
Alphacoronavirus		TGEV	28,586	Porcine	Transmissible gastroenteritis virus	Enteric
Alphacoronavirus		FIPV	29,355	Feline	Feline coronavirus	FIP
Alphacoronavirus		CCoV	29,363	Canine	Canine coronavirus	Enteric
Alphacoronavirus		PRCV	27,550	Porcine	Porcine respiratory coronavirus	Respiratory
Alphacoronavirus		HCoV-229E	27,317	Human	Common cold	Respiratory
Alphacoronavirus		HCoV-NL63	27,553	Human	Common cold	Respiratory
Alphacoronavirus		Rh-BatCoV-HKU2	27,165	Bat		
Alphacoronavirus		Mi-BatCoV 1A	28,326	Bat		
Alphacoronavirus		Mi-BatCoV 1B	28,476	Bat		
Alphacoronavirus		Mi-BatCoV-HKU8	28,773	Bat		
Alphacoronavirus		Sc-BatCoV-512	28,179	Bat		

Betacoronavirus	A	HCoV-OC43	30,738	Human	Common cold	Respiratory
Betacoronavirus	A	BCoV	31,028	Bovine	Calf diarrhea, winter dysentery, BRD	Enteric and respiratory
Betacoronavirus	A	PHEV	30,480	Porcine	Chronic wasting, encephalomyelitis	Enteric and neurological
Betacoronavirus	A	AntelopeCoV	30,995	Antelope		
Betacoronavirus	A	GiCoV	30,979	Giraffe		Enteric
Betacoronavirus	A	ECoV	30,992	Equine	Equine coronavirus	Enteric
Betacoronavirus	A	MHV	31,357	Mouse	Mouse hepatitis virus	Hepatic
Betacoronavirus	A	HCoV-HKU1	29,926	Human		Respiratory
Betacoronavirus	A	RCoV	31,250	Rat		Respiratory
Betacoronavirus	B	SARS CoV	29,751	Human	Severe acute respiratory syndrome	Respiratory
Betacoronavirus	B	SARSr-CiCoV	29,728	Human	Severe acute respiratory syndrome	Respiratory
Betacoronavirus	B	SARSr-Rh-BatCoV HKU3	29,704	Bat	Chinese horseshoe bat	
Betacoronavirus	B	SARSr CoV CFB	29,734	Human	Severe acute respiratory syndrome	Respiratory
Betacoronavirus	C	Ty-BatCoV-HKU4	30,286	Bat		
Betacoronavirus	C	Pi-BatCoV-HKU5	30,488	Bat		
Betacoronavirus	D	Ro-Bat-CoV HKU9	29,114			
Gammacoronavirus		IBV	27,608	Chickens	Avian infectious bronchitis virus	Respiratory
Gammacoronavirus		TCoV	27,657	Turkey	Bluecomb, turkey coronavirus	Enteric
Gammacoronavirus		BWCoV-SW1	31,686	Whale	Beluga whale CoV	
Deltacoronavirus		BuCoV HKU11	26,476	Avian	Bulbul coronavirus	
Deltacoronavirus		ThCoV HKU12	26,396	Avian	Thrush coronavirus	
Deltacoronavirus		MunCoV HKU13	26,552	Avian	munia coronavirus	
Deltacoronavirus		PorCoV HKU15	25,421	Porcine	Porcine coronavirus	Enteric
Deltacoronavirus		WECoV HKU16	26,027		White eye coronavirus	
Deltacoronavirus		SpCoV HKU17	26,067	Avian	Sparrow coronavirus	
Deltacoronavirus		MRCoV HKU18	26,674	Avian	Magpie robin coronavirus	
Deltacoronavirus		NHCoV HKU19	26,064	Avian	Night heron coronavirus	
Deltacoronavirus		WiCoV HKU20	26,211		Wigeon coronavirus	
Deltacoronavirus		CMCoV HKU21		Avian	Common moorehen	