

Virologica Sinica

Supplementary Data

Discovery and characterization of novel paramyxoviruses from bat samples in China

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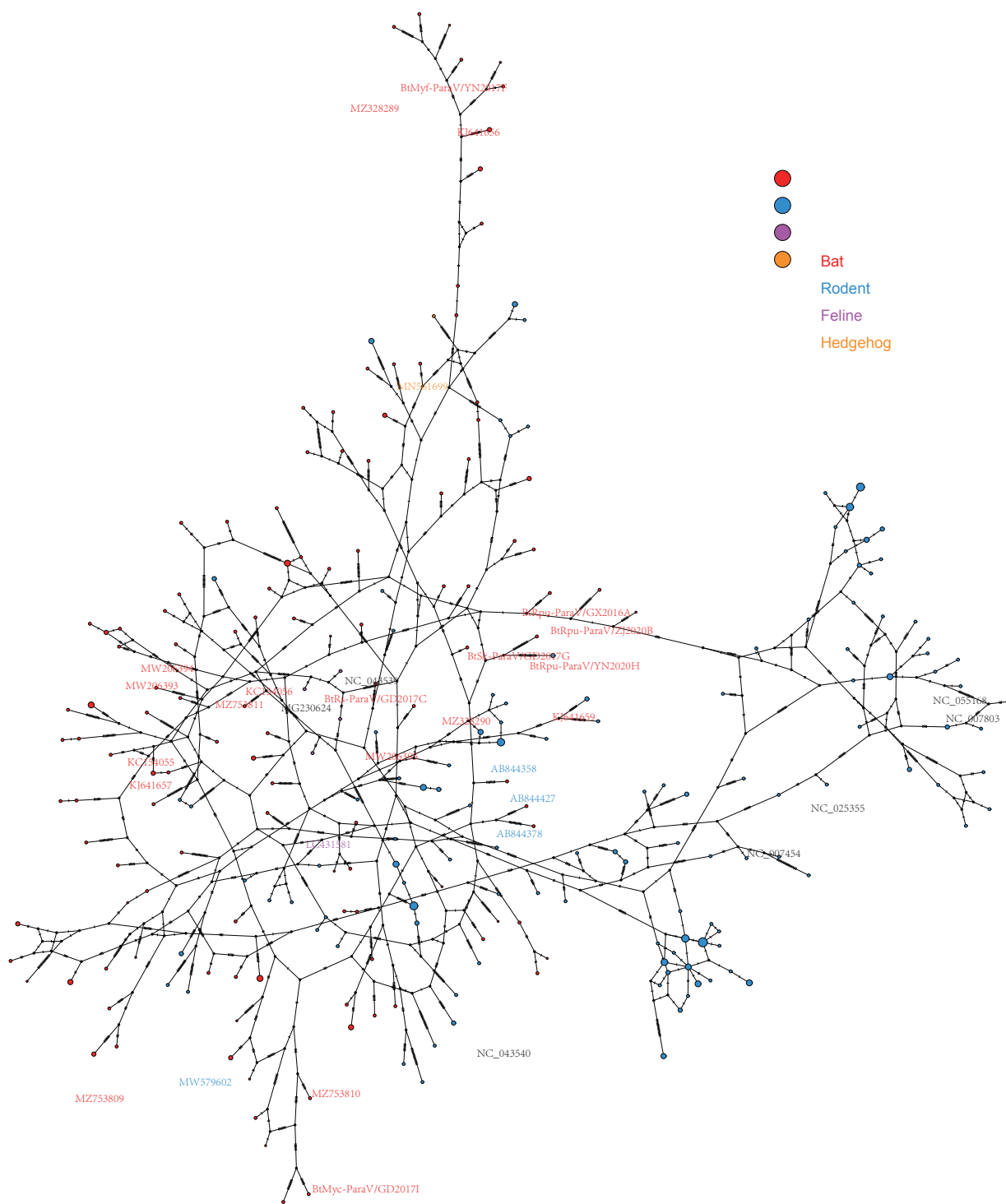
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Figure S1 Network of haplotypes. Colored circles correspond to different hosts, and circle size is proportional to the number of sequences in the dataset. Small black circles represent ancestral or unsampled intermediate sequences. Branch length is proportional to the number of mutational steps between haplotypes. Only representatives of the L3 and the L4, with the seven species of *Jeilongvirus* in black are marked out.

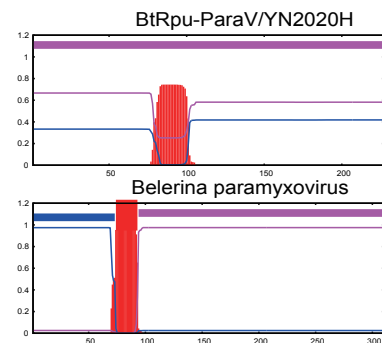
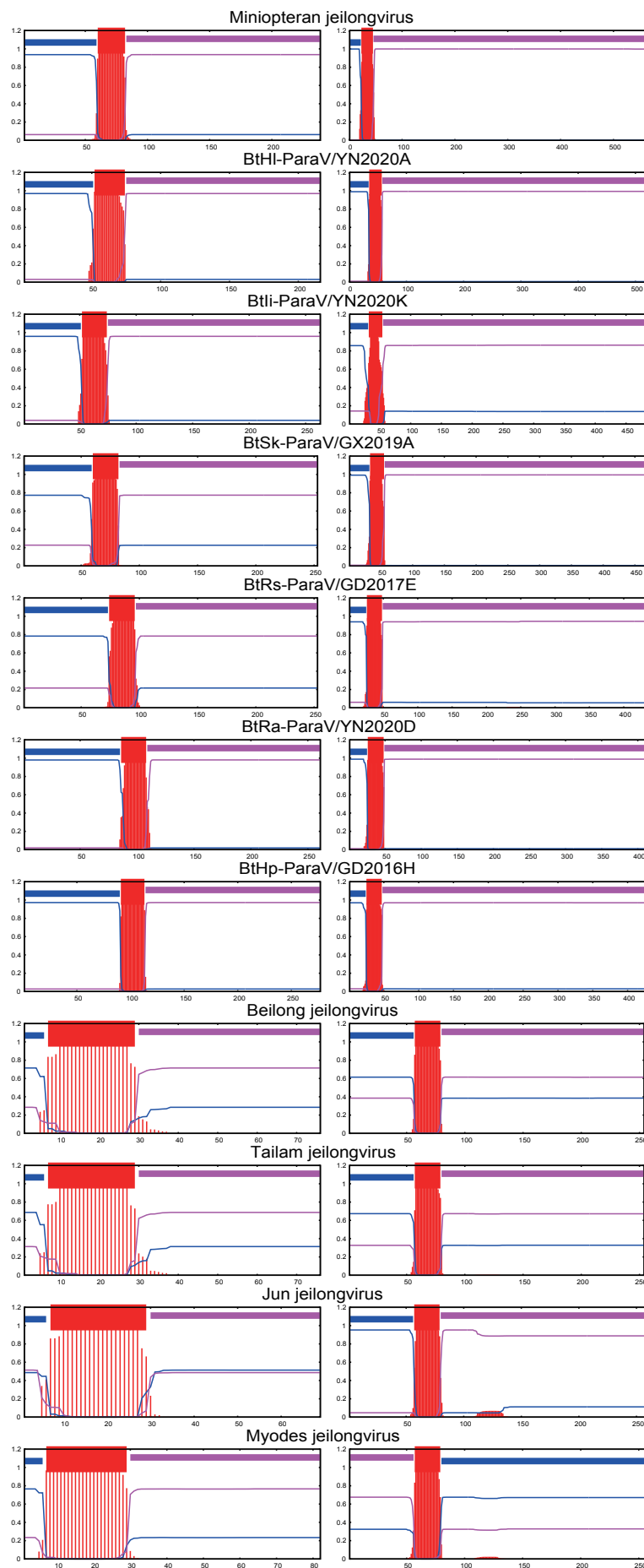
Figure S2 TMHMM posterior probabilities for *Jeilongvirus*. The x axial represents the amino acid length of the ORF, the y axial represents the posterior probability.



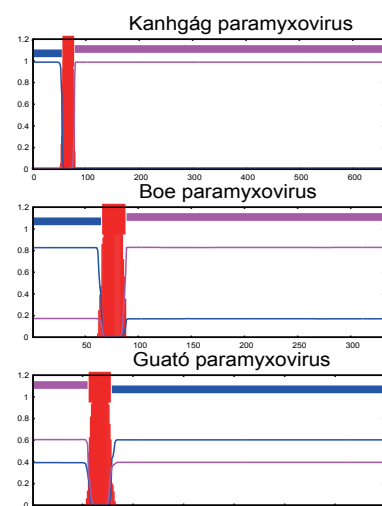
SH

TM

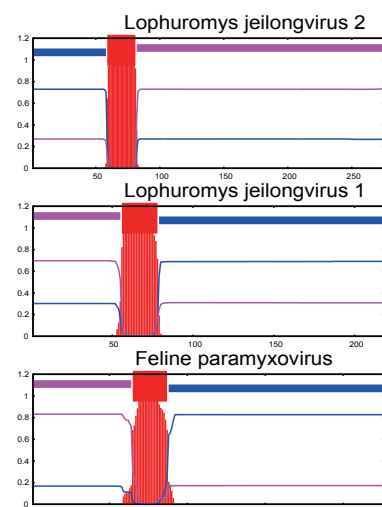
X



L3



L4



L1

L2

L2

transmembrane

inside

outside



Table S1. 40 sequences obtained before in China

Species	Year	Location	Virus	Fragment	Length (bp)	Genus	Accession
<i>Rousettus leschenaultii</i>	2006	Guangdong	Tuhoko virus 1	Complete Genome	15888	Pararubulavirus	NC_025410
<i>Rousettus leschenaultii</i>	2006	Guangdong	Tuhoko virus 2	Complete Genome	15432	Pararubulavirus	NC_025348
<i>Rousettus leschenaultii</i>	2006	Guangdong	Tuhoko virus 3	Complete Genome	15234	Pararubulavirus	NC_025350
<i>Rhinolophus ferrumequinum</i>	2010	Yunnan	Bat paramyxovirus isolate BtRf-ParaV-1/YN2010	Partial L	1468	Jeilongvirus	KJ641661
<i>Rhinolophus ferrumequinum</i>	2010	Yunnan	Bat paramyxovirus isolate BtRf-ParaV-2/YN2010	Partial L	547	Jeilongvirus	KJ641662
<i>Miniopterus schreibersii</i>	2010	Hainan	Miniopterus schreibersii paramyxovirus isolate Bat Ms-ParaV/Hainan2010	Partial M	334	Jeilongvirus	KC154059
<i>Miniopterus schreibersii</i>	2011	Shaanxi	Miniopterus schreibersii paramyxovirus isolate Bat Ms-ParaV-1/Shaanxi2011	Partial L	5286	Jeilongvirus	KC154055
<i>Miniopterus schreibersii</i>	2011	Shaanxi	Miniopterus schreibersii paramyxovirus isolate Bat Ms-ParaV-2/Shaanxi2011	Partial G, L	6273	Jeilongvirus	KC154056
<i>Miniopterus schreibersii</i>	2011	Anhui	Miniopterus schreibersii paramyxovirus isolate Bat Ms-ParaV/Anhui2011	Partial Genome	16017	Jeilongvirus	KC154054
<i>Rhinolophus ferrumequinum</i>	2011	Shaanxi	Rhinolophus ferrumequinum paramyxovirus isolate Bat Rf-ParaV/Shaanxi2011	Partial M	727	Jeilongvirus	KC154057
<i>Rhinolophus ferrumequinum</i>	2011	Shaanxi	Rhinolophus ferrumequinum paramyxovirus isolate Bat Rf-ParaV/Shaanxi2011	Partial L	529	Jeilongvirus	KC154058
<i>Hipposideros armiger</i>	2012	Guangdong	Bat paramyxovirus isolate BtHa-ParaV/GD2012	Partial Genome	14685	Orthorubulavirus	KJ641654
<i>Hipposideros pomona</i>	2012	Guangdong	Bat paramyxovirus isolate BtHp-ParaV/GD2012	Partial L	4413	Jeilongvirus	KJ641655
<i>Myotis daubentonii</i>	2012	Liaoning	Bat paramyxovirus isolate BtMd-ParaV/LN2012	Partial L	5361	Jeilongvirus	KJ641656
<i>Eonycteris spelaea</i>	2012	Yunnan	Henipavirus YN12069/CHN/2012	Partial L	612	Henipavirus	KC599257
<i>Hipposideros cineraceus</i>	2012	Yunnan	Paramyxovirus YN12003/CHN/2012	Partial L	617	Jeilongvirus	KC599255
<i>Hipposideros armiger</i>	2012	Yunnan	Paramyxovirus YN12103/CHN/2012	Partial L	565	Jeilongvirus	KC599258
<i>Taphozous melanopogon</i>	2012	Yunnan	Paramyxovirus YN12162/CHN/2012	Partial L	639	Jeilongvirus	KC599260
<i>Taphozous melanopogon</i>	2012	Yunnan	Paramyxovirus YN12167D/CHN/2012	Partial L	631	Jeilongvirus	KC599261
<i>Taphozous melanopogon</i>	2012	Yunnan	Paramyxovirus YN12167X/CHN/2012	Partial L	551	Jeilongvirus	KC599262
<i>Taphozous melanopogon</i>	2012	Yunnan	Paramyxovirus YN12193D/CHN/2012	Partial L	549	Jeilongvirus	KC599263
<i>Taphozous melanopogon</i>	2012	Yunnan	Paramyxovirus YN12193X/CHN/2012	Partial L	533	Jeilongvirus	KC599264
<i>Rousettus leschenaultii</i>	2012	Yunnan	Rubulavirus YN12137/CHN/2012	Partial L	562	Pararubulavirus	KC599259
<i>Myotis blythii</i>	2013	Gansu	Bat paramyxovirus isolate BtMbly-ParaV/GS2013	Partial L	572	Jeilongvirus	KJ641653
<i>Murina leucogaster</i>	2013	Qinghai	Bat paramyxovirus isolate BtMI-ParaV/QH2013	Partial Genome	14796	Jeilongvirus	KJ641657
<i>Rhinolophus ferrumequinum</i>	2013	Shanxi	Bat paramyxovirus isolate BtRf-ParaV/SX2013	Partial L	2670	Orthorubulavirus	KJ641658
<i>Rhinolophus hipposideros</i>	2013	Tibet	Bat paramyxovirus isolate BtRh-ParaV/Tibet2013	Partial L	4045	Jeilongvirus	KJ641660

<i>Vespertilio sinensis</i>	2013	Sichuan	Bat paramyxovirus isolate BtVs-ParaV/SC2013	Partial L	1549	Jeilongvirus	KJ641659
<i>Murina leucogaster</i>	2013	Jilin	Bat paramyxovirus isolate JTA	Partial N, P	3257	Orthorubulavirus	KX064232
<i>Murina leucogaster</i>	2013	Jilin	Bat paramyxovirus isolate JTA	Partial L	2064	Orthorubulavirus	KX343068
unclassified Chiroptera	2014	Guangxi	Avian orthoavulavirus 1 strain Ba/CH/LGX/1141/2014	Complete Genome	15198	Orthoavulavirus	MK327606
unclassified Chiroptera	2014	Guangxi	Avian orthoavulavirus 1 strain Ba/CH/LGX/1142/2014	Complete Genome	15198	Orthoavulavirus	MK327607
unclassified Chiroptera	2014	Guangxi	Avian orthoavulavirus 1 strain Ba/CH/LGX/421/2014	Complete Genome	15198	Orthoavulavirus	MK327604
unclassified Chiroptera	2014	Guangxi	Avian orthoavulavirus 1 strain Ba/CH/LGX/426/2014	Complete Genome	15198	Orthoavulavirus	MK327605
<i>Rhinolophus pusillus</i>	2015	Macao	Bat paramyxovirus isolate LJ465	Partial L	531	Jeilongvirus	KY783905
<i>Miniopterus schreibersii</i>	2016	Macao	Bat paramyxovirus isolate 160228	Partial L	531	Jeilongvirus	KY783904
<i>Miniopterus schreibersii</i>	2016	Hubei	Jingmen <i>Miniopterus schreibersii</i> paramyxovirus 1	Complete Genome	17673	Jeilongvirus	MZ328288
<i>Miniopterus schreibersii</i>	2016	Hubei	Jingmen <i>Miniopterus schreibersii</i> paramyxovirus 2	Partial Genome	14389	Jeilongvirus	MZ328289
<i>Rhinolophus pearsonii</i>	2016	Hubei	Wufeng <i>Rhinolophus pearsonii</i> paramyxovirus 1	Complete Genome	16128	Jeilongvirus	MZ328290
<i>Hipposideros armiger</i>	2021	Hainan	Bat paramyxovirus HaParaV	Complete Genome	18095	Jeilongvirus	OL630969

Table S2. 94 sequences obtained in this study

Species	Year	Location	Strain Name	Upload ID	Fragment	Length (bp)
<i>Rhinolophus sinicus</i>	2016	Guangdong	GD2016A	BtRs-ParaV/GD2016A	Partial L	564
<i>Rhinolophus sinicus</i>	2016	Guangdong	GD2016B	BtRs-ParaV/GD2016B	Partial L	1147
<i>Rhinolophus sinicus</i>	2016	Guangdong	GD2016C	BtRs-ParaV/GD2016C	Partial L	1296
<i>Rhinolophus sinicus</i>	2016	Guangdong	GD2016D	BtRs-ParaV/GD2016D	Partial L	1447
<i>Rhinolophus sinicus</i>	2016	Guangdong	GD2016E	BtRs-ParaV/GD2016E	Partial L	6462
<i>Miniopterus pusillus</i>	2016	Guangdong	GD2016F	BtMp-ParaV/GD2016F	Partial L	574
<i>Hipposideros pomona</i>	2016	Guangdong	GD2016G	BtHp-ParaV/GD2016G	Partial Genome	16908
<i>Hipposideros pomona</i>	2016	Guangdong	GD2016H	BtHp-ParaV/GD2016H	Complete CDS	17145
<i>Miniopterus schreibersii</i>	2016	Guangdong	GD2016I	BtMs-ParaV/GD2016I	Complete CDS	17574
<i>Hipposideros pratti</i>	2016	Guangdong	GD2016J	BtHpr-ParaV/GD2016J	Partial L	561
<i>Rhinolophus pusillus</i>	2016	Guangxi	GX2016A	BtRpu-ParaV/GX2016A	Partial L	1303
<i>Rhinolophus sinicus</i>	2016	Guangxi	GX2016B	BtRs-ParaV/GX2016B	Partial Genome	16799
<i>Hipposideros pomona</i>	2016	Guangxi	GX2016C	BtHp-ParaV/GX2016C	Partial P, M	1575
<i>Hipposideros pomona</i>	2016	Guangxi	GX2016D	BtHp-ParaV/GX2016D	Partial G, L	5118
<i>Hipposideros pomona</i>	2016	Guangxi	GX2016E	BtHp-ParaV/GX2016E	Partial L	1995
<i>Myotis siligorensis</i>	2016	Guangxi	GX2016F	BtMys-ParaV/GX2016F	Partial L	510
<i>Rhinolophus sinicus</i>	2016	Yunnan	YN2016A	BtRs-ParaV/YN2016A	Partial L	1010
<i>Rhinolophus affinis</i>	2016	Yunnan	YN2016B	BtRa-ParaV/YN2016B	Partial G, L	6841
<i>Myotis ricketti</i>	2016	Yunnan	YN2016C	BtMyr-ParaV/YN2016C	Partial L	617
<i>Ia io</i>	2016	Yunnan	YN2016D	BtIi-ParaV/YN2016D	Complete CDS	18137
<i>Rhinolophus sinicus</i>	2017	Guangdong	GD2017A	BtRs-ParaV/GD2017A	Partial G, L	1095
<i>Rhinolophus sinicus</i>	2017	Guangdong	GD2017B	BtRs-ParaV/GD2017B	Partial L	781
<i>Rhinolophus sinicus</i>	2017	Guangdong	GD2017C	BtRs-ParaV/GD2017C	Partial L	1311
<i>Rhinolophus sinicus</i>	2017	Guangdong	GD2017D	BtRs-ParaV/GD2017D	Partial G, L	2642
<i>Rhinolophus sinicus</i>	2017	Guangdong	GD2017E	BtRs-ParaV/GD2017E	Complete CDS	16719
<i>Rhinolophus affinis</i>	2017	Guangdong	GD2017F	BtRa-ParaV/GD2017F	Partial L	553
<i>Scotophilus kuhlii</i>	2017	Guangdong	GD2017G	BtSk-ParaV/GD2017G	Partial G, L	7077
<i>Myotis chinensis</i>	2017	Guangdong	GD2017H	BtMyc-ParaV/GD2017H	Partial N, P, M, F, SH	5489
<i>Myotis chinensis</i>	2017	Guangdong	GD2017I	BtMyc-ParaV/GD2017I	Partial L	5868
<i>Rhinolophus affinis</i>	2017	Guangxi	GX2017A	BtRa-ParaV/GX2017A	Partial L	589
<i>Rhinolophus macrotis</i>	2017	Guangxi	GX2017B	BtRm-ParaV/GX2017B	Partial F, SH	1724
<i>Rhinolophus macrotis</i>	2017	Guangxi	GX2017C	BtRm-ParaV/GX2017C	Partial G	802
<i>Scotophilus kuhlii</i>	2017	Guangxi	GX2017D	BtSk-ParaV/GX2017D	Partial TM, G	3145
<i>Scotophilus kuhlii</i>	2017	Guangxi	GX2017E	BtSk-ParaV/GX2017E	Partial L	3059
<i>Hipposideros larvatus</i>	2017	Guangxi	GX2017F	BtHl-ParaV/GX2017F	Partial N, P, M, F	5904
<i>Hipposideros larvatus</i>	2017	Guangxi	GX2017G	BtHl-ParaV/GX2017G	Partial TM, G, L	10602
<i>Hipposideros larvatus</i>	2017	Guangxi	GX2017H	BtHl-ParaV/GX2017H	Partial N, P, M, F	5697
<i>Hipposideros larvatus</i>	2017	Guangxi	GX2017I	BtHl-ParaV/GX2017I	Partial G, L	8613
<i>Hipposideros larvatus</i>	2017	Guangxi	GX2017J	BtHl-ParaV/GX2017J	Partial L	975
<i>Hipposideros larvatus</i>	2017	Guangxi	GX2017K	BtHl-ParaV/GX2017K	Complete CDS	17922
<i>Myotis ricketti</i>	2017	Guangxi	GX2017L	BtMyr-ParaV/GX2017L	Partial L	279
<i>Myotis siligorensis</i>	2017	Guangxi	GX2017M	BtMys-ParaV/GX2017M	Partial Genome	10944
<i>Myotis siligorensis</i>	2017	Guangxi	GX2017N	BtMys-ParaV/GX2017N	Partial L	4347
<i>Eonycteris spelaea</i>	2017	Yunnan	YN2017A	BtEsp-ParaV/YN2017A	Partial P	336
<i>Aselliscus stoliczkanus</i>	2017	Yunnan	YN2017B	BtAs-ParaV/YN2017B	Partial L	1626
<i>Aselliscus stoliczkanus</i>	2017	Yunnan	YN2017C	BtAs-ParaV/YN2017C	Partial G, L	8645
<i>Megaderma lyra</i>	2017	Yunnan	YN2017D	BtMl-ParaV/YN2017D	Partial L	477
<i>Myotis fimbriatus</i>	2017	Yunnan	YN2017E	BtMyf-ParaV/YN2017E	Partial P, M	1518
<i>Myotis fimbriatus</i>	2017	Yunnan	YN2017F	BtMyf-ParaV/YN2017F	Partial L	999
<i>Myotis fimbriatus</i>	2017	Yunnan	YN2017G	BtMyf-017G	Partial L	1020
<i>Rhinolophus sinicus</i>	2018	Guangdong	GD2018A	BtRs-ParaV/GD2018A	Partial Genome	16789
<i>Rhinolophus affinis</i>	2018	Guangdong	GD2018B	BtRa-ParaV/GD2018B	Partial L	562
<i>Scotophilus kuhlii</i>	2018	Guangdong	GD2018C	BtSk-ParaV/GD2018C	Partial M, F	1987
<i>Scotophilus kuhlii</i>	2018	Guangdong	GD2018D	BtSk-ParaV/GD2018D	Partial L	588
<i>Scotophilus kuhlii</i>	2018	Guangdong	GD2018E	BtSk-ParaV/GD2018E	Partial G, L	8354
<i>Hipposideros larvatus</i>	2018	Guangdong	GD2018F	BtHl-ParaV/GD2018F	Partial G, L	8703
<i>Rhinolophus sinicus</i>	2019	Guangdong	GD2019A	BtRs-ParaV/GD2019A	Partial N, P, M, F	5443
<i>Rhinolophus sinicus</i>	2019	Guangdong	GD2019B	BtRs-ParaV/GD2019B	Partial L	2740
<i>Rhinolophus sinicus</i>	2019	Guangdong	GD2019C	BtRs-ParaV/GD2019C	Partial L	1455
<i>Rhinolophus affinis</i>	2019	Guangdong	GD2019D	BtRa-ParaV/GD2019D	Complete CDS	16726

<i>Rhinolophus pearsonii</i>	2019	Guangdong	GD2019E	BtRpe-ParaV/GD2019E	Partial L	548
<i>Hipposideros larvatus</i>	2019	Guangdong	GD2019F	BtHI-ParaV/GD2019F	Partial L	2441
<i>Scotophilus kuhlii</i>	2019	Guangxi	GX2019A	BtSk-ParaV/GX2019A	Complete CDS	18452
<i>Scotophilus kuhlii</i>	2019	Hainan	HI2019A	BtSk-ParaV/HI2019A	Partial L	569
<i>Scotophilus kuhlii</i>	2019	Hainan	HI2019B	BtSk-ParaV/HI2019B	Partial L	2070
<i>Scotophilus kuhlii</i>	2019	Hainan	HI2019C	BtSk-ParaV/HI2019C	Partial N, P	1566
<i>Scotophilus kuhlii</i>	2019	Hainan	HI2019D	BtSk-ParaV/HI2019D	Partial G, L	1846
<i>Scotophilus kuhlii</i>	2019	Hainan	HI2019E	BtSk-ParaV/HI2019E	Partial L	3201
<i>Rhinolophus affinis</i>	2019	Hainan	HI2019F	BtRa-ParaV/HI2019F	Partial L	561
<i>Rhinolophus affinis</i>	2019	Hainan	HI2019G	BtRa-ParaV/HI2019G	Partial L	562
<i>Hipposideros larvatus</i>	2019	Hainan	HI2019H	BtHI-ParaV/HI2019H	Complete CDS	17922
<i>Hipposideros pomona</i>	2019	Hainan	HI2019I	BtHp-ParaV/HI2019I	Partial L	567
<i>Miniopterus schreibersii</i>	2019	Hainan	HI2019J	BtMs-ParaV/HI2019J	Complete CDS	17569
<i>Rhinolophus affinis</i>	2020	Hubei	HB2020A	BtRa-ParaV/HB2020A	Partial Genome	13746
<i>Rhinolophus affinis</i>	2020	Hubei	HB2020B	BtRa-ParaV/HB2020B	Partial N, P, M, F	4761
<i>Rhinolophus affinis</i>	2020	Hubei	HB2020C	BtRa-ParaV/HB2020C	Partial TM, G, L	9873
<i>Myotis adversus</i>	2020	Jiangxi	JX2020A	BtMya-ParaV/JX2020A	Partial L	722
<i>Eptesicus serotinus</i>	2020	Jiangxi	JX2020B	BtEse-ParaV/JX2020B	Partial N, P, M	4467
<i>Eptesicus serotinus</i>	2020	Jiangxi	JX2020C	BtEse-ParaV/JX2020C	Partial F, SH, TM, G, L	12904
<i>Hipposideros larvatus</i>	2020	Yunnan	YN2020A	BtHI-ParaV/YN2020A	Complete Genome	18150
<i>Rhinolophus affinis</i>	2020	Yunnan	YN2020B	BtRa-ParaV/YN2020B	Partial N, P, M, F, SH, TM	7348
<i>Rhinolophus affinis</i>	2020	Yunnan	YN2020C	BtRa-ParaV/YN2020C	Partial G, L	3177
<i>Rhinolophus affinis</i>	2020	Yunnan	YN2020D	BtRa-ParaV/YN2020D	Complete CDS	16647
<i>Rhinolophus sinicus</i>	2020	Yunnan	YN2020E	BtRs-ParaV/YN2020E	Partial Genome	16356
<i>Hipposideros pomona</i>	2020	Yunnan	YN2020F	BtHp-ParaV/YN2020F	Partial M, F	1849
<i>Hipposideros pomona</i>	2020	Yunnan	YN2020G	BtHp-ParaV/YN2020G	Partial G, L	6996
<i>Rhinolophus pusillus</i>	2020	Yunnan	YN2020H	BtRpu-ParaV/YN2020H	Complete Genome	16038
<i>Miniopterus schreibersii</i>	2020	Yunnan	YN2020I	BtMs-ParaV/YN2020I	Partial L	992
<i>Rhinolophus pearsonii</i>	2020	Yunnan	YN2020J	BtRpe-ParaV/YN2020J	Partial L	573
<i>Ia io</i>	2020	Yunnan	YN2020K	BtIi-ParaV/YN2020K	Complete CDS	18147
<i>Aselliscus stoliczkanus</i>	2020	Yunnan	YN2020L	BtAs-ParaV/YN2020L	Partial L	586
<i>Rhinolophus pusillus</i>	2020	Zhejiang	ZJ2020A	BtRpu-ParaV/ZJ2020A	Partial N	1254
<i>Rhinolophus pusillus</i>	2020	Zhejiang	ZJ2020B	BtRpu-ParaV/ZJ2020B	Partial P, M, F, SH, TM, G, L	13135
<i>Rhinolophus ferrumequinum</i>	2020	Zhejiang	ZJ2020C	BtRf-ParaV/ZJ2020C	Partial L	3404

Table S3. Host switches

From	To	Bayesian Factors	Posterior Probability
<i>Murina</i>	<i>Desmodus</i>	1080.78	0.99
<i>Aselliscus</i>	<i>Desmodus</i>	56.49	0.80
<i>Rattus</i>	<i>Scotophilus</i>	27.33	0.66
<i>Vespertilio</i>	<i>Desmodus</i>	21.58	0.60
<i>Desmodus</i>	<i>Neotoma</i>	19.64	0.58
<i>Mus</i>	<i>Murina</i>	18.74	0.57
<i>Taphozous</i>	<i>Murina</i>	16.76	0.54
<i>Ia</i>	<i>Maxomys</i>	10.83	0.43
<i>Scotophilus</i>	<i>Felis</i>	10.70	0.43
<i>Mus</i>	<i>Myodes</i>	10.12	0.42
<i>Apodemus</i>	<i>Macrotus</i>	9.97	0.41
<i>Eptesicus</i>	<i>Ia</i>	9.45	0.40
<i>Carollia</i>	<i>Chaetodipus</i>	8.82	0.38
<i>Scotophilus</i>	<i>Erinaceus</i>	8.47	0.37
<i>Miniopterus</i>	<i>Chaetodipus</i>	8.11	0.36
<i>Scotophilus</i>	<i>Carollia</i>	7.20	0.34
<i>Erinaceus</i>	<i>Chaetodipus</i>	6.56	0.32
<i>Felis</i>	<i>Chaetodipus</i>	6.50	0.31
<i>Chaetodipus</i>	<i>Macrotus</i>	6.45	0.31
<i>Taphozous</i>	<i>Myodes</i>	6.41	0.31
<i>Mastomys</i>	<i>Miniopterus</i>	5.75	0.29
<i>Myotis</i>	<i>Murina</i>	5.69	0.29
<i>Antrozous</i>	<i>Tadarida</i>	5.69	0.29
<i>Aselliscus</i>	<i>Vespertilio</i>	5.56	0.28
<i>Taphozous</i>	<i>Bandicota</i>	5.51	0.28
<i>Murina</i>	<i>Myodes</i>	5.42	0.28
<i>Lophuromys</i>	<i>Desmodus</i>	5.31	0.27
<i>Mus</i>	<i>Taphozous</i>	5.03	0.26
<i>Scotophilus</i>	<i>Macrotus</i>	4.98	0.26
<i>Myotis</i>	<i>Bandicota</i>	4.89	0.26
<i>Mastomys</i>	<i>Chaetodipus</i>	4.75	0.25
<i>Eptesicus</i>	<i>Maxomys</i>	4.72	0.25
<i>Hipposideros</i>	<i>Pteronotus</i>	4.71	0.25
<i>Pteronotus</i>	<i>Tadarida</i>	4.56	0.24
<i>Rhinolophus</i>	<i>Bandicota</i>	4.56	0.24
<i>Rattus</i>	<i>Rhinolophus</i>	4.45	0.24
<i>Myotis</i>	<i>Sciurus</i>	4.43	0.24
<i>Myotis</i>	<i>Chaetodipus</i>	4.43	0.24
<i>Felis</i>	<i>Erinaceus</i>	4.38	0.24
<i>Apodemus</i>	<i>Tadarida</i>	4.36	0.24
<i>Mus</i>	<i>Hipposideros</i>	4.31	0.23
<i>Sikkim</i>	<i>Chaetodipus</i>	4.28	0.23
<i>Hipposideros</i>	<i>Taphozous</i>	4.03	0.22
<i>Myodes</i>	<i>Desmodus</i>	4.01	0.22
<i>Taphozous</i>	<i>Tadarida</i>	3.72	0.21
<i>Ia</i>	<i>Macrotus</i>	3.51	0.20
<i>Ia</i>	<i>Sciurus</i>	3.49	0.20
<i>Taphozous</i>	<i>Maxomys</i>	3.49	0.20
<i>Mus</i>	<i>Miniopterus</i>	3.45	0.20
<i>Murina</i>	<i>Bandicota</i>	3.43	0.20
<i>Felis</i>	<i>Carollia</i>	3.39	0.19
<i>Bandicota</i>	<i>Antrozous</i>	3.36	0.19
<i>Vespertilio</i>	<i>Lophuromys</i>	3.32	0.19
<i>Scotophilus</i>	<i>Murina</i>	3.26	0.19
<i>Murina</i>	<i>Tadarida</i>	3.19	0.18
<i>Scotophilus</i>	<i>Chaetodipus</i>	3.19	0.18
<i>Mastomys</i>	<i>Scotophilus</i>	3.19	0.18
<i>Sikkim</i>	<i>Pteronotus</i>	3.13	0.18
<i>Lophuromys</i>	<i>Macrotus</i>	3.10	0.18
<i>Hipposideros</i>	<i>Sikkim</i>	3.09	0.18
<i>Mus</i>	<i>Vespertilio</i>	3.09	0.18
<i>Hipposideros</i>	<i>Myotis</i>	3.04	0.18
<i>Myodes</i>	<i>Lophuromys</i>	3.04	0.18
<i>Neotoma</i>	<i>Tadarida</i>	3.03	0.18
<i>Vespertilio</i>	<i>Bandicota</i>	3.01	0.18

Table S4. Region switches

From	To	Bayesian Factors	Posterior Probability
HB, China	Tanzania	177444.02	1.00
ZJ, China	Tanzania	177444.02	1.00
AH, China	United Kingdom	12659.58	1.00
United Kingdom	Brazil	138.03	0.90
GD, China	Belgium	81.36	0.83
SN, China	LN, China	81.09	0.83
Thailand	Tanzania	80.93	0.83
AH, China	Tanzania	80.56	0.83
Mozambique	Brazil	57.42	0.78
HB, China	AH, China	57.18	0.78
YN, China	HI, China	57.09	0.78
JX, China	QH, China	57.03	0.78
HK, China	Comoros	57.03	0.78
United Kingdom	USA	56.79	0.78
ZJ, China	Thailand	56.64	0.78
South Korea	Thailand	32.55	0.67
Zambia	Germany	32.54	0.67
GD, China	HB, China	27.31	0.63
SN, China	United Kingdom	25.72	0.61
YN, China	Germany	25.67	0.61
United Kingdom	XZ, China	25.67	0.61
SC, China	USA	25.67	0.61
YN, China	Tanzania	25.66	0.61
LN, China	USA	25.66	0.61
GX, China	Slovenia	25.65	0.61
HK, China	LN, China	25.65	0.61
QH, China	Japan	25.65	0.61
SC, China	Kenya	25.65	0.61
Madagascar	South Korea	25.65	0.61
Zimbabwe	Mozambique	25.64	0.61
Germany	Comoros	25.63	0.61
GD, China	French Guiana	25.62	0.61
South Korea	Tanzania	25.61	0.61
JX, China	ZJ, China	25.60	0.61
GD, China	United Kingdom	25.60	0.61
Comoros	Madagascar	25.60	0.61
Australia	Comoros	25.60	0.61
YN, China	Japan	25.60	0.61
GD, China	Cambodia	25.60	0.61
XZ, China	Slovenia	25.60	0.61
Tanzania	USA	25.60	0.61
Zambia	United Kingdom	25.58	0.61
HK, China	QH, China	25.58	0.61
GD, China	Mozambique	25.57	0.61
GX, China	HB, China	25.57	0.61
HI, China	South Korea	25.56	0.61
JX, China	South Korea	25.56	0.61
GD, China	Tanzania	25.56	0.61
HI, China	USA	25.55	0.61
NX, China	Slovenia	25.55	0.61
ZJ, China	SN, China	25.53	0.61
GD, China	Brazil	25.49	0.61
Zambia	Thailand	20.95	0.56
JX, China	GX, China	8.02	0.33
XZ, China	NX, China	7.78	0.33
HB, China	South Korea	5.06	0.24
JX, China	HI, China	4.61	0.22
HB, China	ZJ, China	4.61	0.22
Zambia	AH, China	4.59	0.22
JX, China	HB, China	3.51	0.18
Germany	Madagascar	3.26	0.17
HB, China	USA	3.25	0.17
Slovenia	French Guiana	3.25	0.17
Zambia	HI, China	3.25	0.17
HI, China	Thailand	3.24	0.17
SC, China	Japan	3.24	0.17
Belgium	Brazil	3.24	0.17
Australia	SN, China	3.24	0.17
Germany	Mozambique	3.24	0.17
GD, China	HI, China	3.24	0.17
GX, China	XZ, China	3.24	0.17
QH, China	SC, China	3.24	0.17
Australia	South Korea	3.24	0.17

HB, China	NX, China	3.23	0.17
NX, China	French Guiana	3.23	0.17
Zimbabwe	Thailand	3.23	0.17
Thailand	Brazil	3.23	0.17
GX, China	HI, China	3.23	0.17
Australia	HB, China	3.23	0.17
HB, China	SC, China	3.23	0.17
AH, China	SN, China	3.23	0.17
SC, China	Comoros	3.23	0.17
Slovenia	Cambodia	3.23	0.17
Comoros	HI, China	3.23	0.17
NX, China	Kenya	3.23	0.17
Zambia	Madagascar	3.23	0.17
YN, China	GX, China	3.23	0.17
JX, China	LN, China	3.23	0.17
Japan	Thailand	3.23	0.17
GD, China	USA	3.23	0.17
Germany	Zimbabwe	3.23	0.17
South Korea	Slovenia	3.22	0.17
HI, China	HB, China	3.22	0.17
Zambia	Slovenia	3.22	0.17
JX, China	Mozambique	3.22	0.17
SN, China	Comoros	3.22	0.17
LN, China	NX, China	3.22	0.17
Australia	GD, China	3.22	0.17
HB, China	Kenya	3.22	0.17
ZJ, China	Mozambique	3.22	0.17
LN, China	Comoros	3.22	0.17
LN, China	Thailand	3.22	0.17
QH, China	XZ, China	3.22	0.17
Japan	South Korea	3.22	0.17
Cambodia	Brazil	3.22	0.17
JX, China	Tanzania	3.22	0.17
HK, China	Tanzania	3.22	0.17
United Kingdom	Germany	3.22	0.17
Australia	Belgium	3.21	0.17
HB, China	Thailand	3.21	0.17
NX, China	Belgium	3.21	0.17
HK, China	Slovenia	3.20	0.17
ZJ, China	Madagascar	3.20	0.17
XZ, China	Madagascar	3.20	0.17
HB, China	United Kingdom	3.19	0.16
French Guiana	Tanzania	3.19	0.16
HB, China	Mozambique	3.16	0.16
GD, China	GX, China	3.09	0.16
JX, China	Slovenia	3.03	0.16
United Kingdom	Belgium	3.01	0.16

Notes: HB, Hubei; ZJ, Zhejiang; AH, Anhui; GD, Guangdong; SN, Shaanxi; JX, Jiangxi; YN, Yunnan; JX, Jiangxi; HK, Hong Kong; SC, Sichuan; LN, Liaoning; GX, Guangxi; QH, Qinghai; XZ, Tibet; NX, Ningxia; HI, Hainan.

Table S5. Amino acid positions of glycosylation sites

	F N-linked	F O-GalNAc	G N-linked	G O-GalNAc
BtHl-ParaV/YN2020A	58 61 85 429 436 486	432 438 442 444	19 50 159 338 439 606	137 587 588
BtIi-ParaV/YN2020K	62 430 480 520	-	48 55 156 415	175 450
BtSk-ParaV/GX2019A	58 61	-	50 53 158 398 417	177 454
BtRs-ParaV/GD2017E	58 64 87 431 487 529	98	52 55 158 173	132 137 138 175 176 179 181 183 185
BtRa-ParaV/YN2020D	59 68 88 432 487	325	23 54 57 160 283	145 169 181 183 187 356
BtHp-ParaV/GD2016H	15 59 88 432 487	-	26 51 157 172 445	142 145 148
BtRpu-ParaV/YN2020H	64 287 432 487	331	53 134 447 618	6 13 15 16 358 457 600 601 602 604 613