

**Supplementary Table 1: The information of nasal and ocular swabs collected
from symptomatic cats**

Sample ID	Sample type	Host	City	Province	Collection date (M/D/Y)	Clinical symptom
		Approximate Age (months)				
1	Nasal swab	2	Nanjing	Jiangsu	06/02/2019	Nasal and ocular discharge
2	Nasal and ocular swab	1	Nanjing	Jiangsu	06/09/2019	Nasal and ocular discharge, sneezing, conjunctivitis
3	Nasal swab	12	Nanjing	Jiangsu	07/12/2019	Sneezing, coughing
4	Nasal and ocular swab	3	Hangzhou	Zhejiang	07/12/2019	Sneezing, nasal and ocular discharge
5	Nasal and ocular swab	4	Hangzhou	Zhejiang	08/08/2019	Nasal and ocular discharge, conjunctivitis
6	Nasal and ocular swab	2.5	Hangzhou	Zhejiang	07/17/2019	Sneezing, coughing
7	Nasal and ocular swab	12	Hangzhou	Zhejiang	07/17/2019	Nasal discharge, coughing
8	Nasal swab	24	Hangzhou	Zhejiang	09/14/2019	Sneezing, coughing
9	Nasal swab	3	Ningbo	Zhejiang	09/21/2019	Nasal discharge
10	Nasal swab	8	Ningbo	Zhejiang	09/30/2019	Sneezing, nasal and ocular discharge, conjunctivitis
11	Nasal and ocular swab	18	Ningbo	Zhejiang	10/09/2019	Sneezing, nasal discharge
12	Nasal and ocular swab	12	Beijing		07/09/2019	Nasal and ocular discharge
13	Nasal swab	1.5	Beijing		07/12/2019	Sneezing, nasal and ocular discharge
14	Nasal and ocular swab	5	Beijing		07/23/2019	Nasal and ocular discharge, conjunctivitis
15	Nasal and ocular swab	12	Beijing		05/12/2019	Nasal discharge
16	Nasal swab	1	Beijing		06/09/2019	Sneezing, nasal and ocular discharge
17	Nasal swab	3.5	Beijing		07/03/2019	Ocular discharge
18	Nasal and ocular swab	4	Chengdu	Sichuan	07/08/2019	Nasal and ocular discharge
19	Nasal and ocular swab	6	Chengdu	Sichuan	07/11/2019	Nasal and ocular discharge, conjunctivitis

20	Nasal and ocular swab	5	Chengdu	Sichuan	08/14/2019	Sneezing, nasal and ocular discharge
21	Nasal and ocular swab	2	Chengdu	Sichuan	08/29/2019	Sneezing, nasal and ocular discharge, died 7 days after therapies
22	Nasal and ocular swab	2	Chengdu	Sichuan	08/29/2019	Nasal and ocular discharge, conjunctivitis
23	Nasal swab	2.5	Chengdu	Sichuan	09/03/2019	Sneezing, nasal discharge
24	Nasal and ocular swab	3	Harbin	Heilongjiang	08/08/2019	nasal discharge
25	Nasal swab	4	Harbin	Heilongjiang	08/31/2019	nasal discharge
26	Nasal and ocular swab	6	Harbin	Heilongjiang	10/14/2019	Sneezing, nasal discharge
27	Nasal swab	1	Harbin	Heilongjiang	11/29/2019	Nasal and ocular discharge, coughing
28	Nasal and ocular swab	18	Guangzhou	Guangdong	05/09/2019	Sneezing, nasal and ocular discharge
29	Nasal and ocular swab	8	Guangzhou	Guangdong	06/07/2019	Nasal and ocular discharge, conjunctivitis
30	Nasal and ocular swab	11	Guangzhou	Guangdong	07/05/2019	Sneezing, nasal and ocular discharge, conjunctivitis
31	Nasal and ocular swab	2	Guangzhou	Guangdong	07/19/2019	Nasal and ocular discharge, coughing
32	Nasal swab	5	Guangzhou	Guangdong	08/01/2019	Sneezing, nasal and ocular discharge
33	Nasal and ocular swab	12	Guangzhou	Guangdong	11/29/2019	Sneezing, nasal discharge
34	Nasal and ocular swab	2	Guangzhou	Guangdong	11/29/2019	Nasal and ocular discharge, coughing
35	Nasal and ocular swab	4	Guangzhou	Guangdong	01/03/2020	Sneezing, nasal and ocular discharge

Supplementary Table 2: Specific primers for PCR identification of FHV, FCV, and FPV

Virus	Primer and Sequence	Target Gene	Product Size (bp)	References	Reaction system	Amplification conditions
FHV	FHV-F: AACTGCCCTCCATTCTAC TC	<i>gD</i>	1269	[17]	2× Taq PCR Mix, 12.5 μL; F/R primer, 1 μL; Template, 1 μL;	Fore-denaturalization: 94°C, 5min. Denaturalization: 94°C,

FCV	FHV-R: TTGGTCCAGACTCCAAC CTAT	<i>VP1</i>	2250	[27]	ddH ₂ O, 9.5 µL	30s. Anneal:57°C, 30s. Extension: 72°C, 1min. 35 circles, Extension: 72°C 10min.
	FCV-F: TTGAGCATGTGCTCAAC CTG				cDNA synthesis: Total RNA, 7µL; 5×gDNA Eraser Buffer, 2 µL; gDNA Eraser, 1 µL; Prime Script RT Enzyme Mix I, 1 µL; RT Primer Mix I, 1 µL; 5×PrimeScript Buffer II, 4 µL; RNase Free ddH ₂ O, 4 µL. PCR amplification: same as FHV	cDNA synthesis: 37°C, 15min; 85°C, 5s; 4°C, 20min. PCR: same as FHV
	FCV-R: ATTTTGRTTTGTGTATGA GTAAGGG					
	FPV-F: TCTTGCACCAATGAGTG ATGG					
FPV	FPV-R: TCAAGTACAAGTACAAT ATTTCTATGCTG	<i>VP2</i>	1755	[28]	Same as FHV	Same as FHV

Supplementary Table 3: FHV reference strains used in this study

Gene	Isolates	Collection Time	Country	GenBank No.
<i>gD</i>	F	2014	China	KT963465.1
	Feligen	2014	Australia	KR296657.1
	H	2014	China	KT963466.1
	K	2014	China	KT963467.1
	CALI_14	2016	USA	MH070339.1
	C7301	2007	Japan	D30767.1
	KANS_08	2016	USA	MH070325.1
	KANS_02	2016	USA	MH070348
	MILW_09	2016	USA	MH070346.1
	WASH_03	2016	USA	MH070345.1
	PHIL_10	2016	USA	MH070344.1
	FLOR_04	2016	USA	MH070341.1
	PEEBLES_1	2016	USA	MH070340.1
	3236-06	2006	Australia	KR381791.1
	G2620	1996	Netherlands	D42113.1

	C-27	2008	USA	NC_013590.2
	729-83	1983	Australia	KR381779.1
	135-68a	1968	Australia	KR381786.1
	3227-05	2005	Australia	KR381802.1
	B	2014	China	KT963464.1
	CALI_11	2016	USA	MH070326.1
	MILW_11	2016	USA	MH070347.1
	GZ001	2013	China	KJ466150.1
	SV435-08	2008	Brazil	KJ676502.1
	SV1110-13	2013	Brazil	KJ676511.1
	SV822-13	2013	Brazil	KJ676505.1
	SV823-13	2013	Brazil	KJ676508.1
	WH2020	2020	China	OQ623324.1
	GD2018	2018	China	MT500582.1
	CH-B	2016	China	MT813047.1
	HR-1	2013	China	MH027311.1
	YBYJ-16	2022	China	OQ710115.1
	pMD19-T	2022	China	OQ710116.1
	V777	1995	UK	KT819632.1
	15-4016-NSW	2016	Australia	KY057364.1
	0194	1985	UK	KT819633.1
	HVC19912	2012	Brazil	KX828242
	FLOR_05	2016	USA	MH070327.1
<i>gB</i>	Feligen	2014	Australia	KR296657.1
	CALI_14	2016	USA	MH070339.1
	KANS_02	2016	USA	MH070348
	KANS_08	2016	USA	MH070325.1
	MILW_09	2016	USA	MH070346.1
	WASH_03	2016	USA	MH070345.1
	PHIL_10	2016	USA	MH070344.1
	FLOR_04	2016	USA	MH070341.1
	PEEBLES_1	2016	USA	MH070340.1
	3236-06	2006	Australia	KR381791.1
	C-27	2008	USA	NC_013590.2
	729-83	1983	Australia	KR381779.1
	135-68a	1968	Australia	KR381786.1
	3227-05	2005	Australia	KR381802.1
	CALI_11	2016	USA	MH070326.1

<i>gE</i>	WH2020	2020	China	OQ623324.1
	GD2018	2018	China	MT500582.1
	LOU-28	2020	USA	OQ756219.1
	LOU-22	2021	USA	OQ756213.1
	MM-1	2005	USA	OL321946.1
	MM-2	2020	USA	OL410287.1
	Merial Purevax MLV	2021	USA	OL410296
	MILW_11	2016	USA	MH070347.1
	Companion	2014	Australia	KR381803.1
	0194	1985	United Kingdom	NC_030117.1
	23612	2022	Italy	OP997219.1
	ELAL-1	2019	USA	MW353125.1
	Feligen	2014	Australia	KR296657.1
	CALI_14	2016	USA	MH070339.1
	KANS_02	2016	USA	MH070348
	KANS_08	2016	USA	MH070325.1
	MILW_09	2016	USA	MH070346.1
	WASH_03	2016	USA	MH070345.1
	PHIL_10	2016	USA	MH070344.1
	FLOR_04	2016	USA	MH070341.1
	PEEBLES_1	2016	USA	MH070340.1
	3236-06	2006	Australia	KR381791.1
	C-27	2008	USA	NC_013590.2
	729-83	1983	Australia	KR381779.1
	135-68a	1968	Australia	KR381786.1
	3227-05	2005	Australia	KR381802.1
	CALI_11	2016	USA	MH070326.1
	WH2020	2020	China	OQ623324.1
	GD2018	2018	China	MT500582.1
	CH-B	2016	China	MT813047.1
	DGHV-01	2020	China	OP287016.1
	G2620	1996	Netherlands	D42113
	MM-1	2005	USA	OL321946.1
	MM-2	2020	USA	OL410287.1
	Merial Purevax MLV	2021	USA	OL410296

TK	LOU-28	2020	USA	OQ756219.1
	LOU-22	2021	USA	OQ756213.1
	Companion	2014	Australia	KR381803.1
	0194	1985	United Kingdom	NC_030117.1
	23612	2022	Italy	OP997219.1
	ELAL-1	2019	USA	MW353125.1
	Feligen	2014	Australia	KR296657.1
	CALI_14	2016	USA	MH070339.1
	KANS_02	2016	USA	MH070348
	KANS_08	2016	USA	MH070325.1
	MILW_09	2016	USA	MH070346.1
	WASH_03	2016	USA	MH070345.1
	PHIL_10	2016	USA	MH070344.1
	FLOR_04	2016	USA	MH070341.1
	PEEBLES_1	2016	USA	MH070340.1
	3236-06	2006	Australia	KR381791.1
	C-27	2008	USA	NC_013590.2
	729-83	1983	Australia	KR381779.1
	135-68a	1968	Australia	KR381786.1
	3227-05	2005	Australia	KR381802.1
	CALI_11	2016	USA	MH070326.1
	WH2020	2020	China	OQ623324.1
	GD2018	2018	China	MT500582.1
	CH-B	2016	China	MT813047.1
	HR-1	2013	China	MH027342
	Companion	2014	Australia	KR381803
	MM-1	2005	USA	OL321946.1
	MM-2	2020	USA	OL410287.1
	Merial Purevax MLV	2021	USA	OL410296
	LOU-22	2021	USA	OQ756213.1
	LOU-28	2020	USA	OQ756219.1
	MR1	1996	France	X75765.1
	0194	1985	United Kingdom	NC_030117.1
	YP11	1996	Japan	D83054.1

Supplementary Table 4: Clinical score criteria

Category	Signs	Score
Depression	Normal	0
	Mild	1
	Moderate	2
	Severe	3
Conjunctivitis	Normal	0
	Mild hyperemia	1
	Moderate to severe hyperemia	2
	Moderate to severe hyperemia, with chemosis	3
Blepharospasm	Normal	0
	<25% of eye closed	1
	25-50% of eye closed	2
	>50% of eye closed	3
Ocular discharge	Normal	0
	Minor, serous	1
	Minor to moderate, mucoid	2
	Marked mucopurulent	3
Nasal discharge	Normal	0
	Minor, serous, occasional with blood	1
	Minor to moderate, mucoid or bloody	2
	Marked mucopurulent	3
Nasal congestion	Normal	0
	Mild	1
	Moderate	2
	Severe, with open mouth breathing	3
Sneezing	Normal	0
	Mild (≤ 3 times during each observation)	1
	Moderate (> 3 times during each observation)	2
	Severe (continuously during each observation)	3
Coughing	Normal	0
	Mild (≤ 3 times during each observation)	1
	Moderate (> 3 times during each observatio)	2
	Severe (continuously during each observation)	3

Supplementary Table 5: Ocular clinical sign scoring after FHV inoculation

Group	Animal ID	Day 0	Day post FHV inoculation													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1: FHV-A1	002	000	000	000	000	000	111	222	232	333	Died					
	010	000	000	000	100	111	111	222	323	Died						
	013	000	000	000	000	000	000	111	222	332	333	323	223	113	113	112
	015	000	000	000	000	000	001	001	112	112	223	333	333	Died		
	020	000	000	000	000	100	111	211	222	232	333	333	222	111	111	110
2: FHV-C8	004	000	000	000	000	111	222	222	333	Died						
	005	000	000	000	000	000	000	001	001	111	112	113	223	123	112	111
	011	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	016	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	017	000	000	000	000	000	000	001	111	112	222	333	Died			
3: FHV-D3	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	009	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	012	000	000	000	000	000	000	111	222	222	333	333	332	111	110	000
	014	000	000	000	100	100	101	212	212	322	333	333	333	Died		
	018	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
4: Negative Control	003	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	006	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	007	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	008	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000
	019	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000

Note: Three scored data were recorded daily for each animal, respresented scores of ”

Conjunctivitis”, “Blepharospasm”, and “Ocular discharge”, respectively.

Supplementary Table 6: Upper respiratory tract clinical sign scoring after FHV inoculation

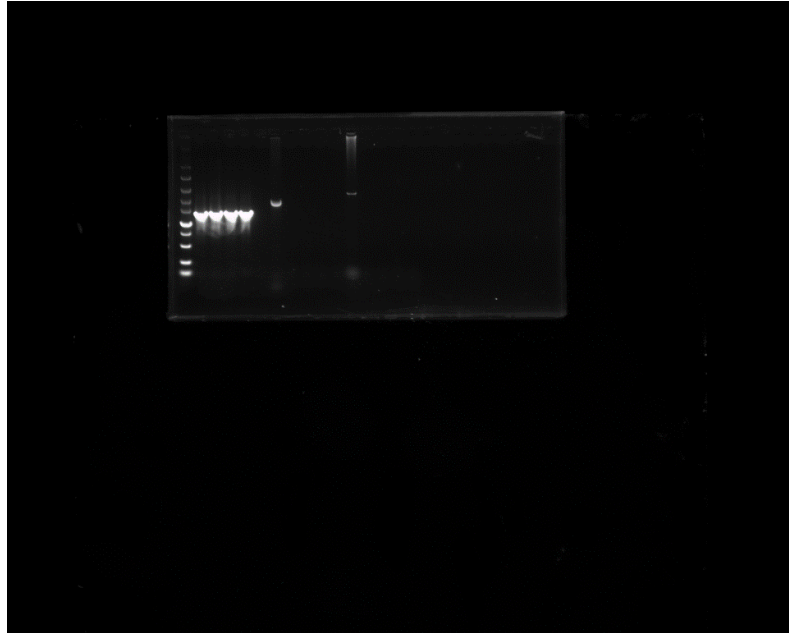
Group	Anim al ID	D0	Day post FHV inoculation													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1: FHV- A1	002	0000	0000	0000	0010	1110	1110	1111	3320	3321	Died					
	010	0000	0000	0000	1110	1110	1110	2210	3321	Died						
	013	0000	0000	0000	0000	0000	1110	1110	1120	1120	2220	2210	3310	3310	3300	3300
	015	0000	0000	0000	0000	1100	1110	2210	2210	2210	2210	2220	3320	Died		
	020	0000	0000	0000	0000	0000	1110	1110	2210	2220	3320	3310	3310	2210	2200	1100
2:	004	0000	0000	1110	1110	2210	2210	2210	3320	Died						
FHV-	005	0000	0000	0000	0000	0000	1100	1110	2210	2210	2220	3320	3310	3310	2210	1100

[illegible]

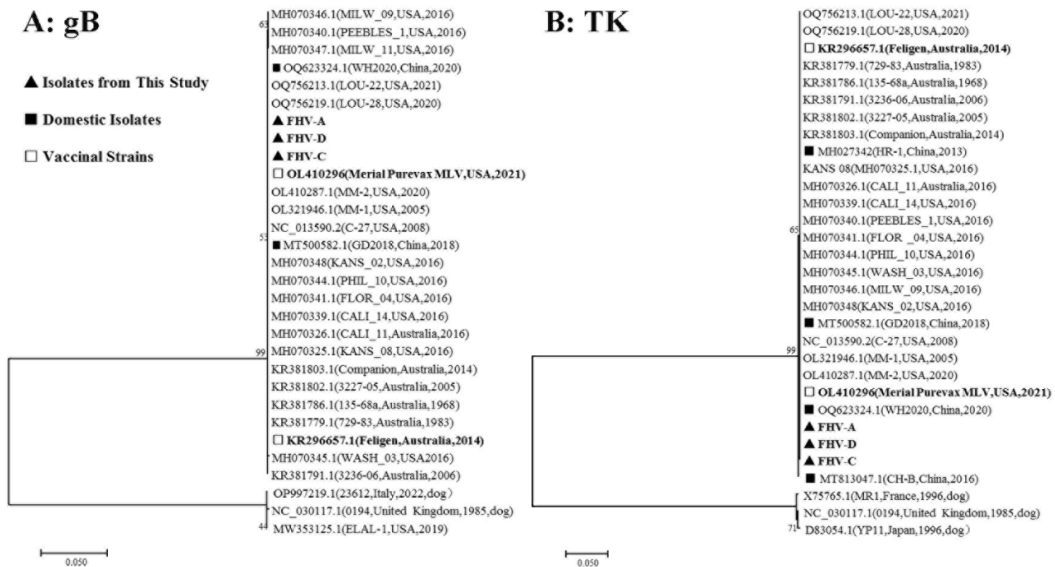
Supplementary Table 7: Virus excretion detection of nasal and ocular swabs

Control	007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note: “+”positive, “-”negative



Supplementary Figure 1: Original gel images for PCR identification of FHV isolates.



Supplementary Figure 2: Phylogenetic analysis of FHV *gB* and *TK* gene nucleotide sequences.