



FMD Genotyping Report

Lab Reference WRL batch Number: WRLFMD/2021/00019

Sender Details:

[REDACTED]

Date Received: 21/12/2021

Country of Origin*: PAKISTAN

Sequencing work has now been completed in respect of the samples you submitted and the details are as attached. Please note that all of our phylogenetic trees can be accessed via the internet at: <http://www.wrlfmd.org/>

Results Approved By:

[REDACTED]

Date:

25/3/2022

Official Stamp:

[REDACTED]

[REDACTED]

To help us improve the quality of our service, please send any suggestions or requests to the Reference Laboratory by email (reflabsfeedback@pirbright.ac.uk).

* Data supplied by the customer

FAO World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD)

Genotyping Report

FMDV serotype: Asia1
Country: Pakistan
Year: 2019
Batch: WRLFMD/2021/00019
No. of sequences: 2
Report date: 11th February 2022
Report generated by: Nick Knowles
Report checked by: Jemma Wadsworth



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www: <http://www.wrlfmd.org/>

email: reporting@pirbright.ac.uk

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Virus sample name:	PAK/76/2019
Sender reference:	FMDV As/SWT/KPK/PAK/158/2019 LFBK1
Location of origin:	Swat District, Malakand Division, Khyber Pakhtunkhwa Province
Country of origin:	Pakistan
Date of collection:	23/05/2019
Host species:	cattle
Serotype:	Asia1
Topotype:	ASIA
Lineage:	Sindh-08
Sublineage:	
Sequence length:	627
Ambiguities:	0
Material submitted for sequencing:	WRL-LFBK1
Harvest date of material:	15/01/2021
Primers:	As1-1C530F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	08/02/2022
Created:	10/02/2022
Last updated:	10/02/2022
VIBASys IDs: sample 50133, genome 50134, sequence viba_50135, sequencing info 50136	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_50139	PAK/77/2019	cattle	100.0	0	Asia1	ASIA	Sindh-08	
viba_44826	PAK/75/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42575	PAK/22/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42539	PAK/7/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42583	PAK/26/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42551	PAK/13/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_44818	PAK/70/2019	water buffalo	99.4	0	Asia1	ASIA	Sindh-08	
viba_42579	PAK/25/2019	cattle	99.4	0	Asia1	ASIA	Sindh-08	
viba_42531	PAK/3/2019	cattle	99.4	0	Asia1	ASIA	Sindh-08	
viba_42563	PAK/19/2019	water buffalo	99.4	0	Asia1	ASIA	Sindh-08	

Most Closely Related Prototype Sequences

see <http://www.wrlfmd.org/fmdv-genome/fmd-prototype-strains>

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_206	PAK/8/2008	water buffalo	92.5	0	Asia1	ASIA	Sindh-08	
viba_167	AFG/1/2001	bovine	90.2	0	Asia1	ASIA	G- I	
viba_12154	BAR/8/2009	cattle	86.1	0	Asia1	ASIA	G-VIII	
viba_737	IND/18/80	bovine	84.5	0	Asia1	ASIA	G-V	
viba_551	YNBS/CHA/58	bovine	84.3	0	Asia1	ASIA		
viba_161	IND/14/95	bovine	84.0	0	Asia1	ASIA		
viba_297	IND/63/72		83.9	0	Asia1	ASIA		
viba_775	IRN/10/2004	cattle	83.6	0	Asia1	ASIA	G-VIb	
viba_146	Shamir/ISR/89	bovine	83.5	0	Asia1	ASIA		
viba_385	IND/762/2003	bovine	82.9	0	Asia1	ASIA	G-III	

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Sublineage:	
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Last updated:	10/02/2022

VIBASys IDs: sample 50137, genome 50138, sequence viba_50139, sequencing info 50140

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_50135	PAK/76/2019	cattle	100.0	0	Asia1	ASIA	Sindh-08	
viba_44826	PAK/75/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42575	PAK/22/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42539	PAK/7/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42583	PAK/26/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_42551	PAK/13/2019	cattle	99.5	0	Asia1	ASIA	Sindh-08	
viba_44818	PAK/70/2019	water buffalo	99.4	0	Asia1	ASIA	Sindh-08	
viba_42579	PAK/25/2019	cattle	99.4	0	Asia1	ASIA	Sindh-08	
viba_42531	PAK/3/2019	cattle	99.4	0	Asia1	ASIA	Sindh-08	
viba_42563	PAK/19/2019	water buffalo	99.4	0	Asia1	ASIA	Sindh-08	

Most Closely Related Prototype Sequences

see <http://www.wrlfmd.org/fmdv-genome/fmd-prototype-strains>

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_206	PAK/8/2008	water buffalo	92.5	0	Asia1	ASIA	Sindh-08	
viba_167	AFG/1/2001	bovine	90.2	0	Asia1	ASIA	G- I	
viba_12154	BAR/8/2009	cattle	86.1	0	Asia1	ASIA	G-VIII	
viba_737	IND/18/80	bovine	84.5	0	Asia1	ASIA	G-V	
viba_551	YNBS/CHA/58	bovine	84.3	0	Asia1	ASIA		
viba_161	IND/14/95	bovine	84.0	0	Asia1	ASIA		
viba_297	IND/63/72		83.9	0	Asia1	ASIA		
viba_775	IRN/10/2004	cattle	83.6	0	Asia1	ASIA	G-VIb	
viba_146	Shamir/ISR/89	bovine	83.5	0	Asia1	ASIA		
viba_385	IND/762/2003	bovine	82.9	0	Asia1	ASIA	G-III	

Report on FMDV Asia1 in Pakistan in 2019

Batch: WRLFMD/2021/00019



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor:	vp1_Asia1
Query sequence set:	WRLFMD/2021/00019-Pakistan-Asia1 (2 sequences)
Sequence database set:	allseqs_Asia1 (704 sequences)
Prototype sequence set:	!prototypes_Asia1 (13 sequences)
Number of related sequences reported:	10
Minimal VP1 subsequence match length	600
Sequence alignment method:	muscle (default parameters)
Sequence alignment length:	627
Phylogeny reconstruction method:	fdnadist, fneighbor
Number of bootstrap samples:	1000
Random seed for bootstrapping:	1
Displaying bootstrap values above:	70.0%
Number of sequences in tree capped at:	100
Number of prototype sequences in tree:	10
VIBASys version:	reflabs-1.1.2

Sequences in the Phylogenetic Tree

All sequences in the tree are in taxonomic group FMDV/Asia1/ASIA

label	accession	host(s)	lab	country	taxonomic information
PAK/77/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/76/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/34/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/25/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/75/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/13/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/71/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/69/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/31/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/30/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/27/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/20/2019	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/19/2019	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/33/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/7/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/26/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/59/2019	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/3/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/18/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
IRN/1/2020	n/a	bovine	WRLFMD	Iran	Sindh-08
PAK/48/2019	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/49/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/4/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/21/2019	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/22/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/70/2019	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/11/2019	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/23/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/8/2016	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/48/2015	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/46/2014	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/37/2014	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/35/2014	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
VRI/CAMB/Kasur2/PUN/PAK*	MK241890	cattle	VRI-CAMB	Pakistan	Sindh-08
VRI/CAMB/Kasur1/PUN/PAK*	MK241888	cattle	VRI-CAMB	Pakistan	Sindh-08
NIAB/PUN/PAK/181/2016*	MF140441	cattle	NIAB	Pakistan	Sindh-08

continued on next page

label	accession	host(s)	lab	country	taxonomic information
PAK/54/2015	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
NIAB/PUN/PAK/190/2016*	MF140438	water buffalo	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/148/2016*	MF115988	cattle	NIAB	Pakistan	Sindh-08
PAK/39/2014	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/26/2014	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/15/2017	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/9/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/5/2017	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/13/2016	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/3/2017	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/14/2016	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
AFG/21/2016	n/a	bovine	WRLFMD	Afghanistan	Sindh-08
AFG/10/2016	n/a	bovine	WRLFMD	Afghanistan	Sindh-08
PAK/18/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/1/2017	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
AFG/6/2016	n/a	bovine	WRLFMD	Afghanistan	Sindh-08
PAK/38/2015	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/37/2015	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/33/2015	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/27/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/29/2015	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
NIAB/PUN/PAK/197/2016*	MF167435	dromedary	NIAB	Pakistan	Sindh-08
PAK/11/2017	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/29/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/1/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/6/2017	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/16/2017	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/17/2016	n/a	cattle	WRLFMD	Pakistan	Sindh-08
NIAB/PUN/PAK/160/2016*	MF140439	water buffalo	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/156/2016*	MF115991	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/154/2016*	KY659575	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/145/2016*	KY659571	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/149/2016*	KY659574	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/147/2016*	KY659573	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/195/2016*	MF140443	dromedary	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/152/2016*	MF115989	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/146/2016*	KY659572	cattle	NIAB	Pakistan	Sindh-08
NIAB/PUN/PAK/144/2016*	KY659570	cattle	NIAB	Pakistan	Sindh-08
BAR/1/2011	n/a	n/a	WRLFMD	Bahrain	Sindh-08
AFG/66/2011	n/a	cattle	WRLFMD	Afghanistan	Sindh-08
BAR/4/2011	n/a	n/a	WRLFMD	Bahrain	Sindh-08
PAK/10/2012	n/a	cattle	WRLFMD	Pakistan	Sindh-08
Pak/RYK-279/12*	KU365814	cattle	PIADC	Pakistan	Sindh-08
Pak/RYK-278/12*	KU365813	cattle	PIADC	Pakistan	Sindh-08
Pak/RYK-283/12*	KU365815	cattle	PIADC	Pakistan	Sindh-08
Pak/RYK-280/12*	KU365812	cattle	PIADC	Pakistan	Sindh-08
PAK/35/2012	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/22/2012	n/a	cattle	WRLFMD	Pakistan	Sindh-08
PAK/57/2012	n/a	water buffalo	WRLFMD	Pakistan	Sindh-08
PAK/27/2012	n/a	cattle	WRLFMD	Pakistan	Sindh-08
Pak/SGD-170/12*	KU365819	cattle	PIADC	Pakistan	Sindh-08
Pak/SGD-171/12*	KU365820	cattle	PIADC	Pakistan	Sindh-08
PAK/8/2008	KY091304	water buffalo	WRLFMD	Pakistan	Sindh-08
AFG/1/2001	DQ121109	bovine	WRLFMD	Afghanistan	G- I
YNBS/CHA/58*	AY390432	bovine	LVRI	China	
IND/63/72*	AY304994	n/a	IVRI- Bangalore	India	
IND/18/80	DQ121116	bovine	WRLFMD	India	G-V
BAR/8/2009	MG603264	cattle	WRLFMD	Bahrain	G-VIII
IND/762/2003*	DQ101240	bovine	PD-FMD	India	G-III
IRN/10/2004	DQ121119	cattle	WRLFMD	Iran	G-VIb
IND/14/95*	AF390678	bovine	PD-FMD	India	
Shamir/ISR/89*	n/a	bovine	BFAV	Israel	

*, not a WRLFMD Reference Number
n/a, not available