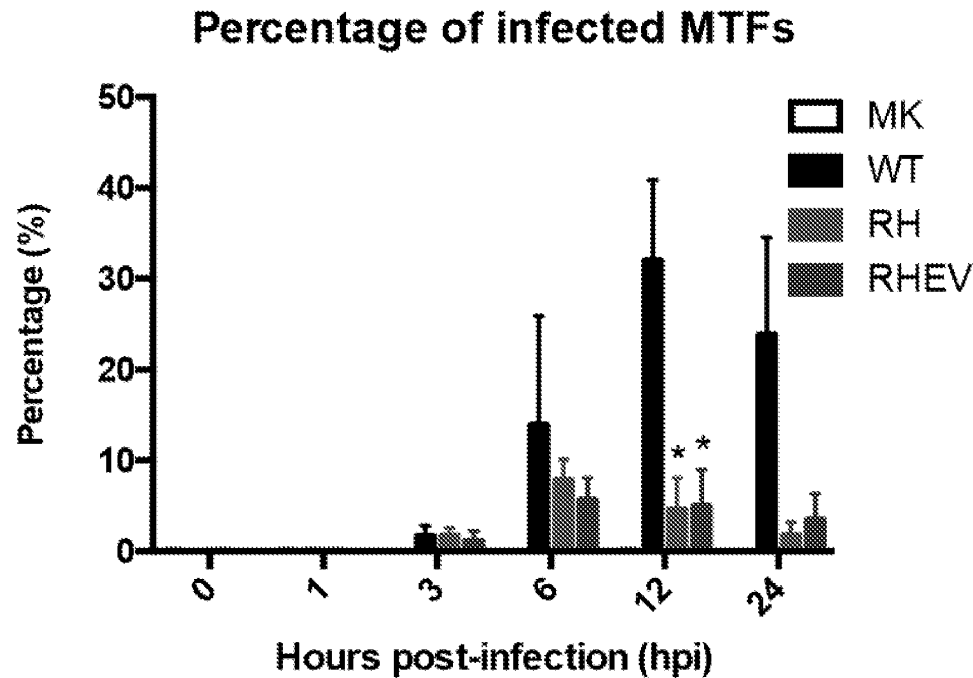


FIG. 1

(A)



(B)

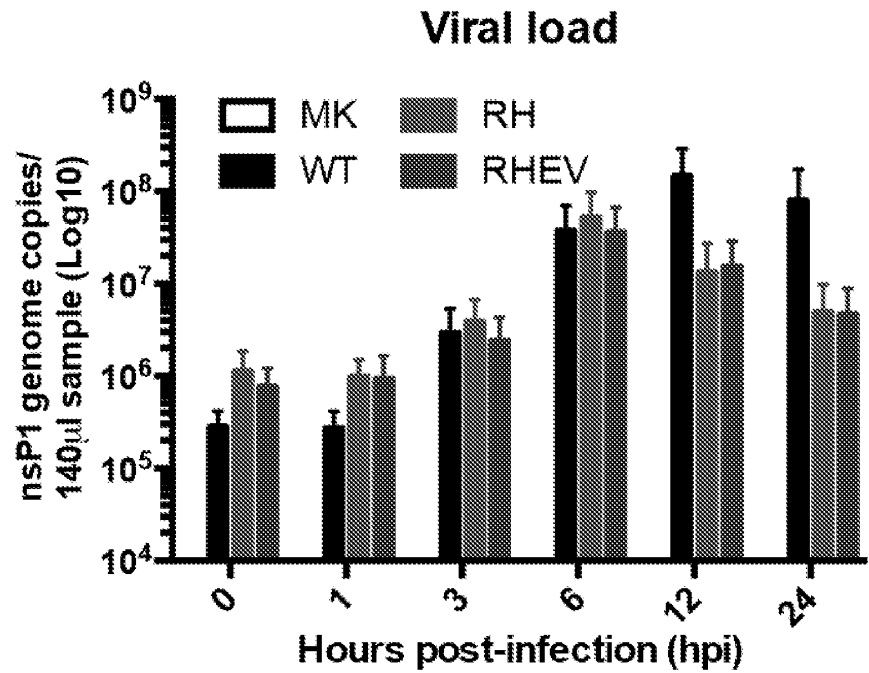
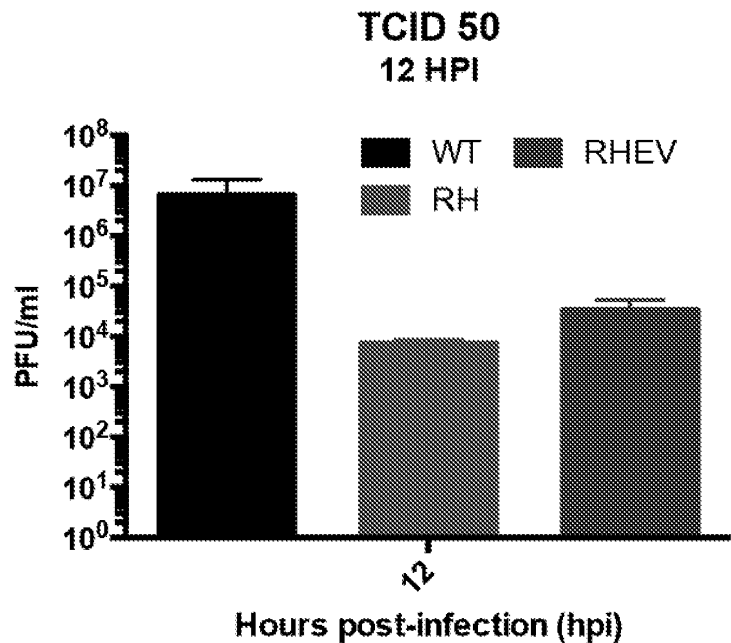


FIG. 1 (CONTINUED)

(C)



(D)

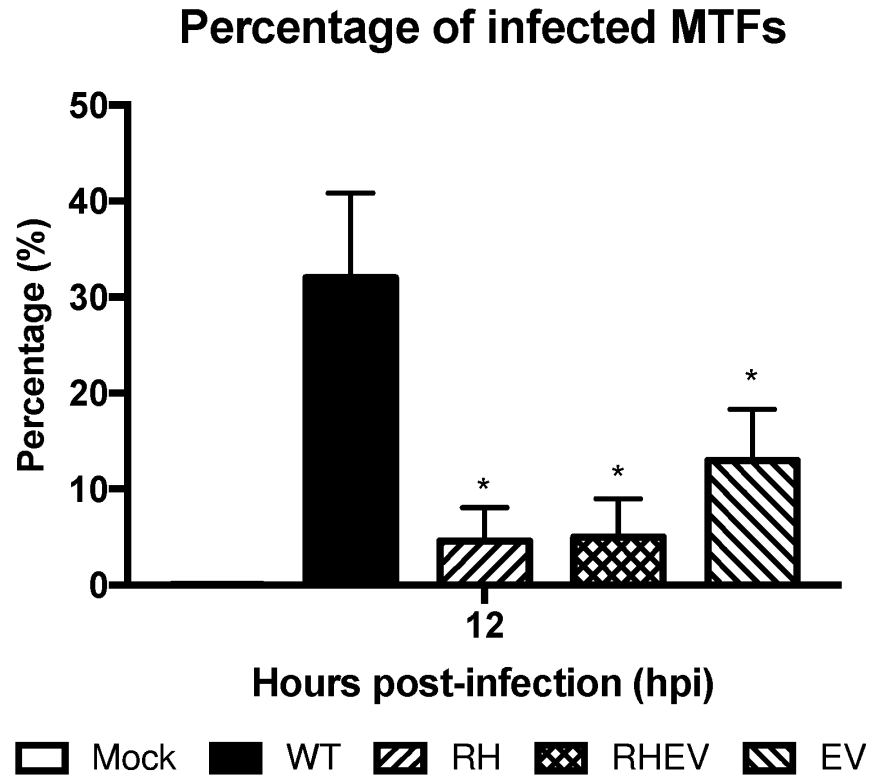


FIG. 1 (CONTINUED)

(E)

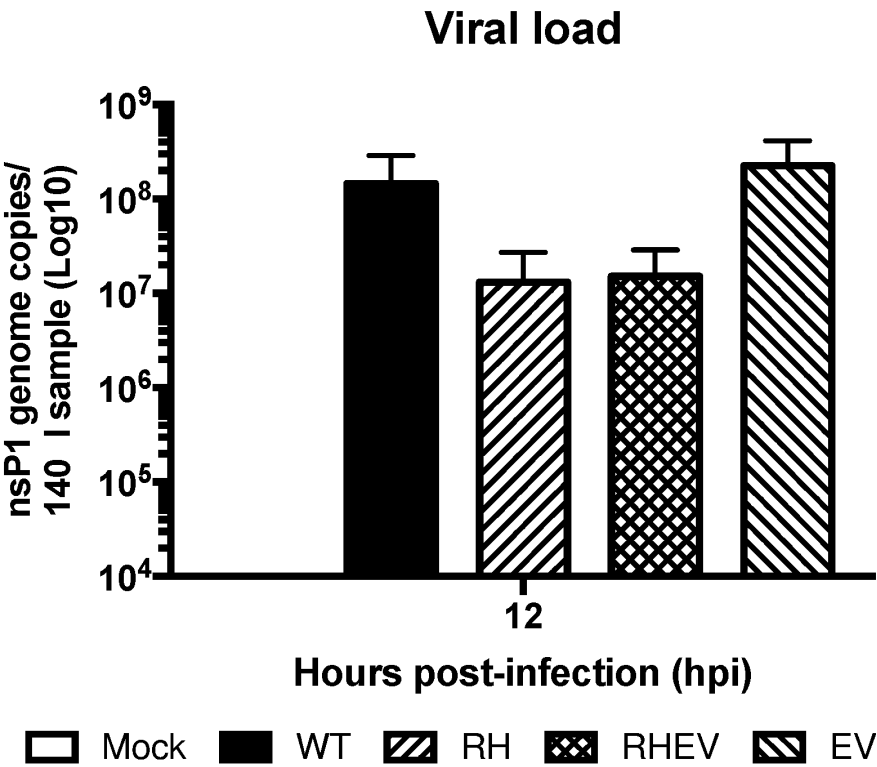
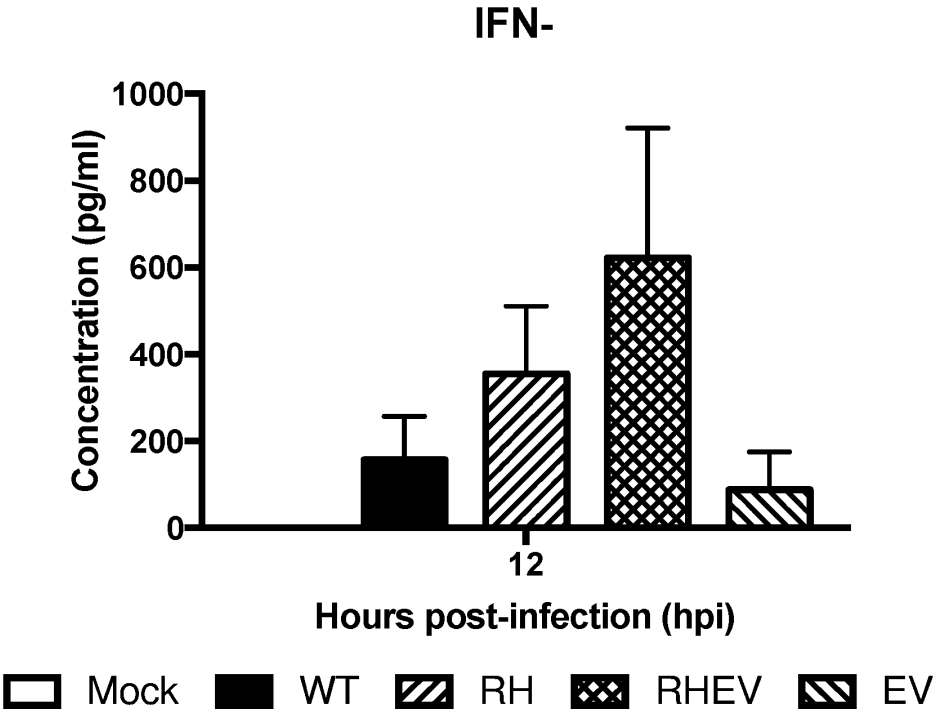


FIG. 2

(A)



(B)

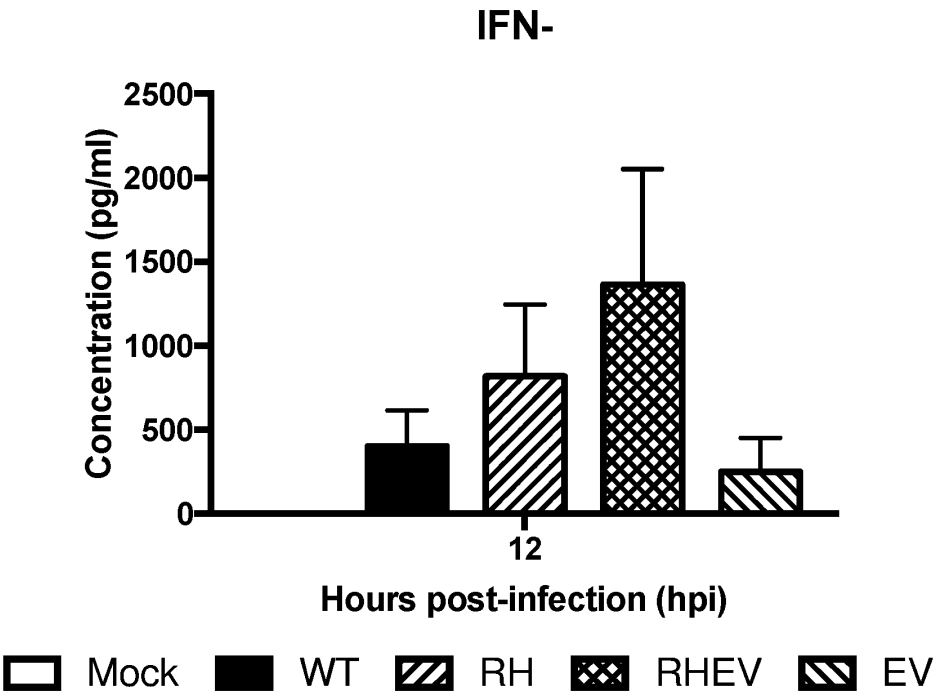
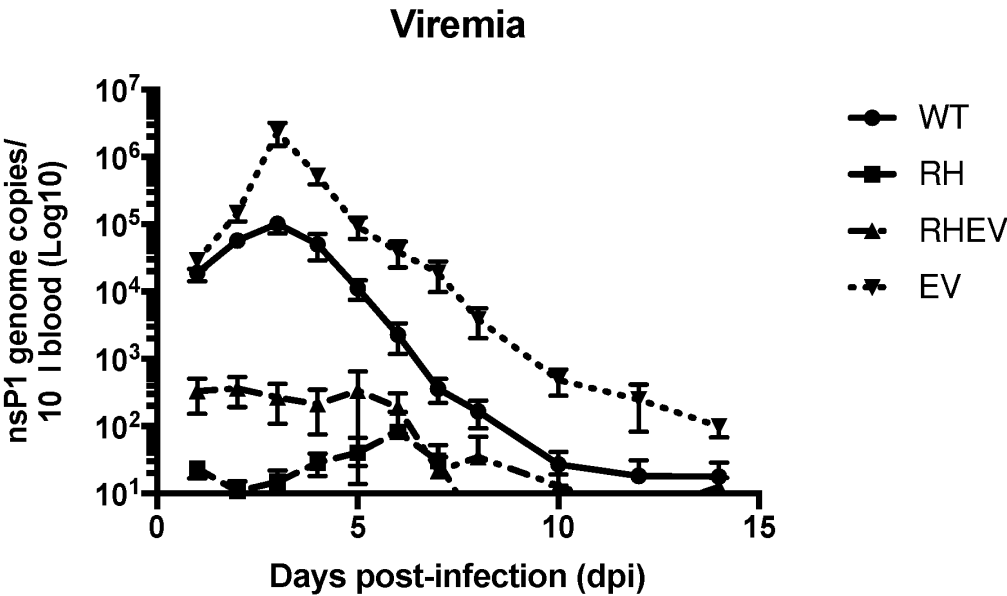


FIG. 3

(A)



(B)

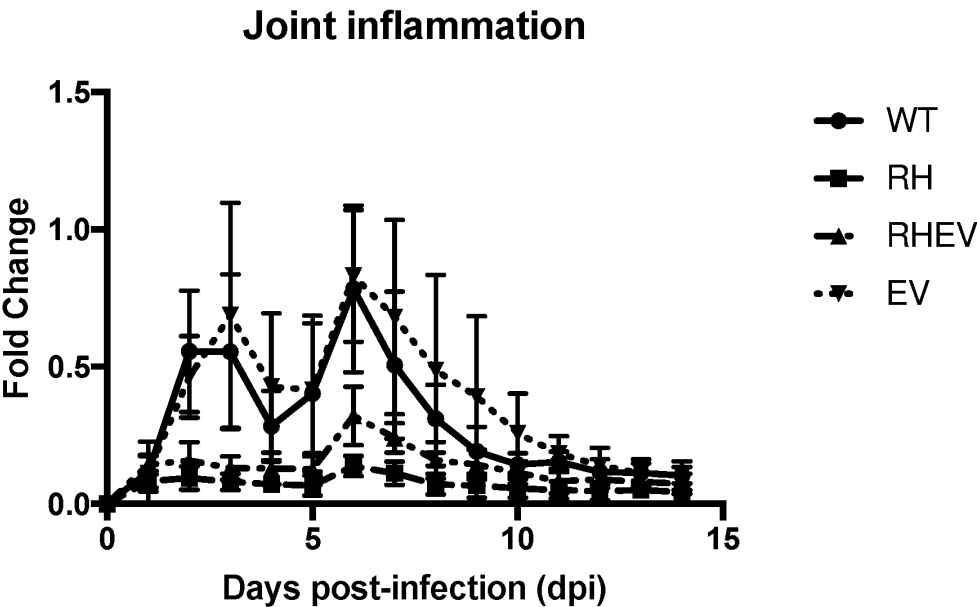
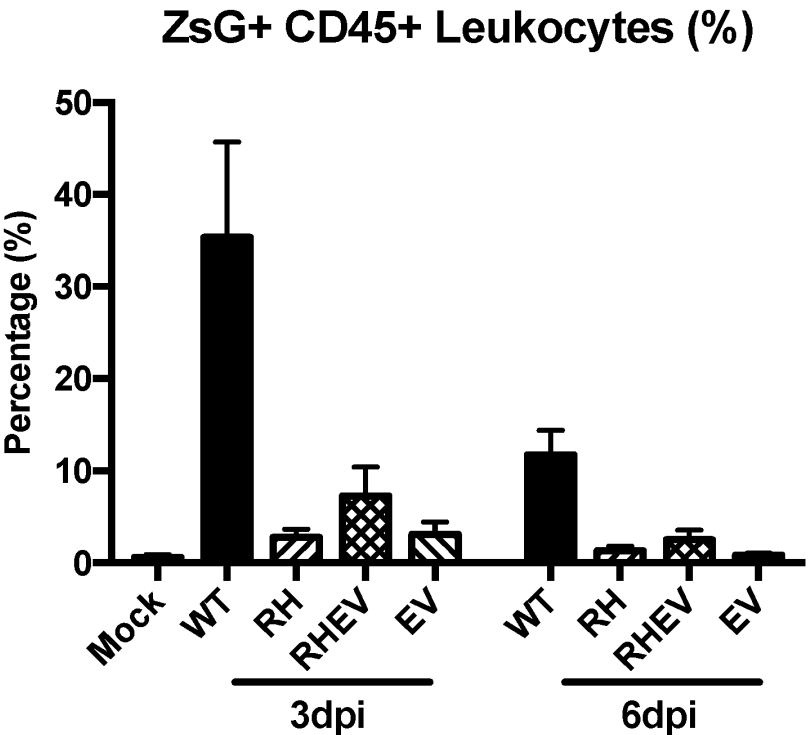


FIG. 4

(A)



(B)

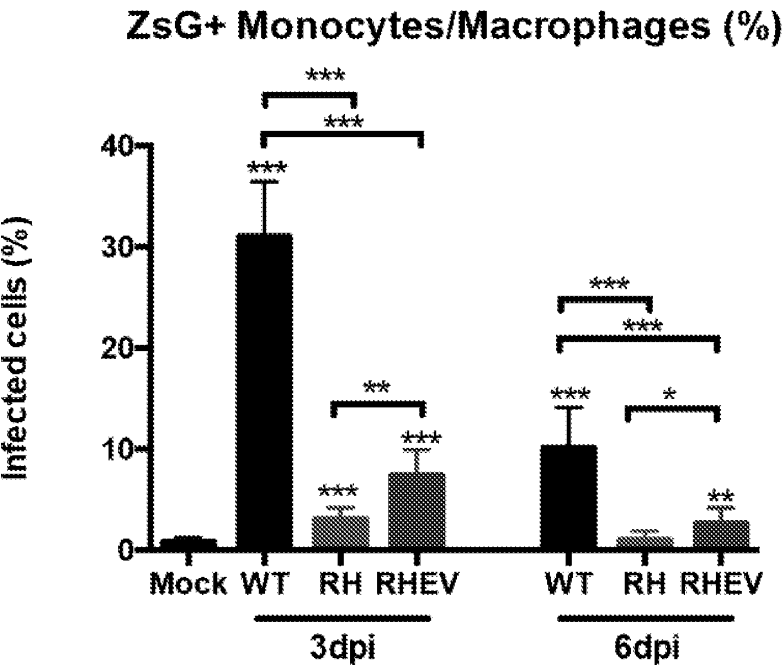


FIG. 4 (CONTINUED)

(C)

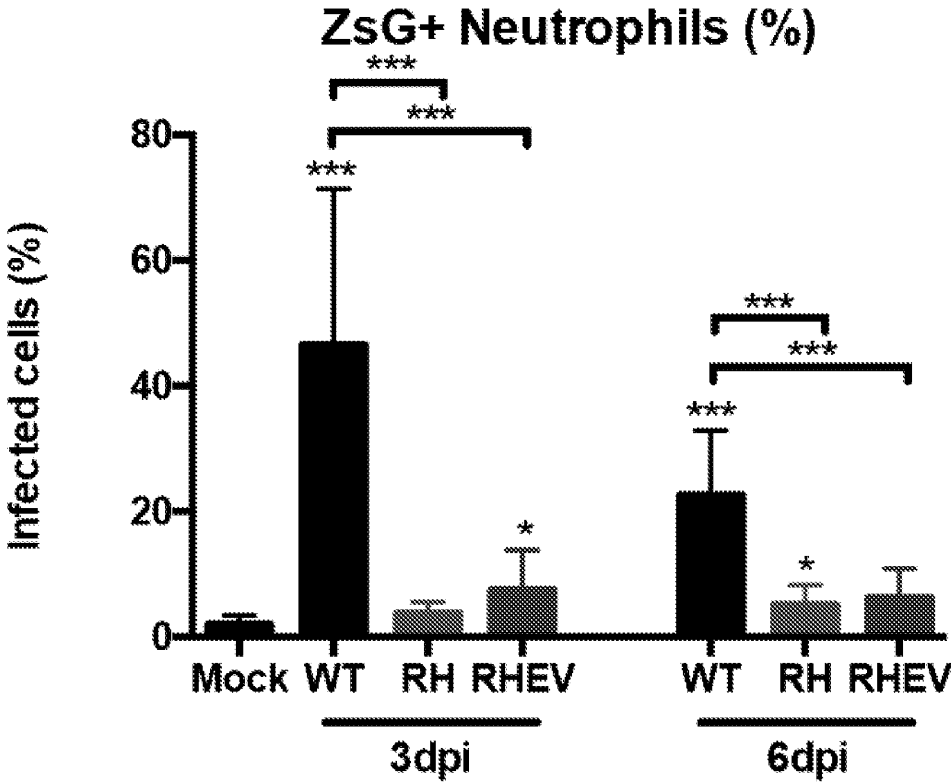


FIG. 4 (CONTINUED)

(D)

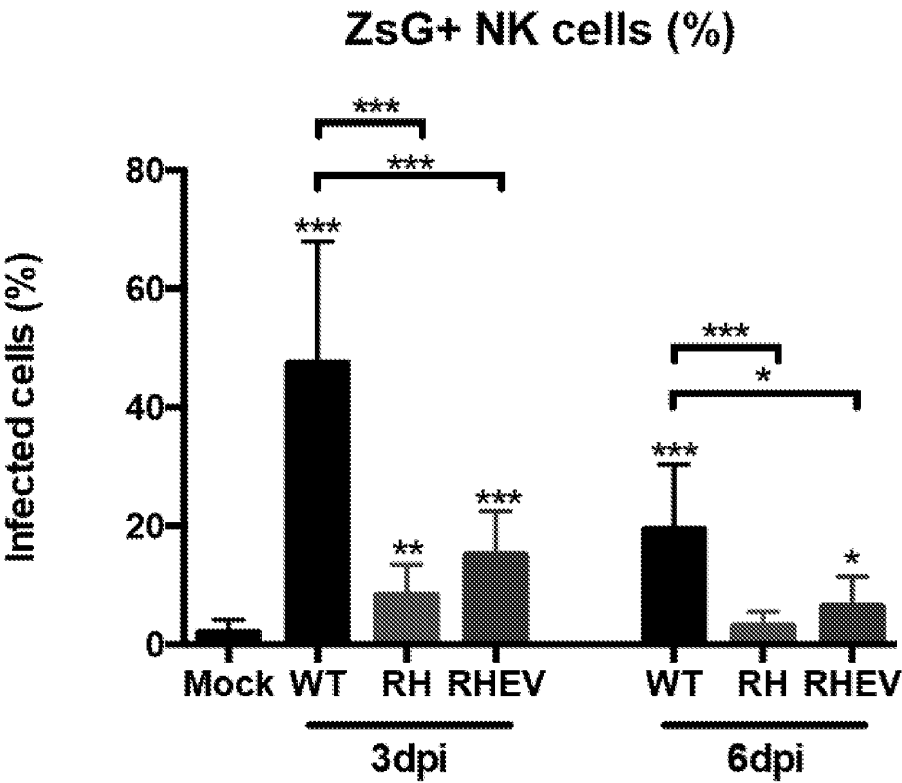


FIG. 4 (CONTINUED)

(E)

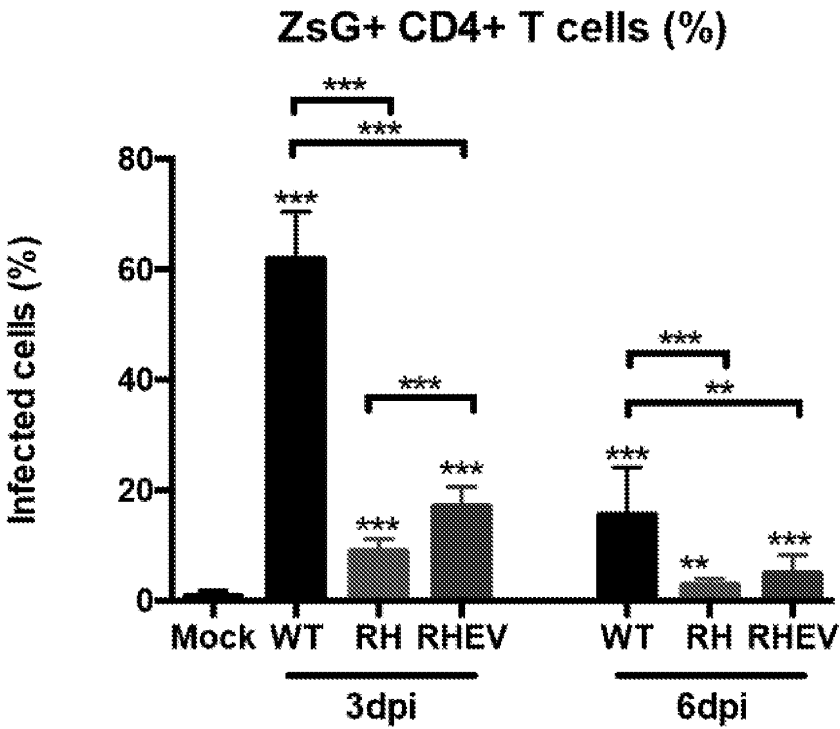
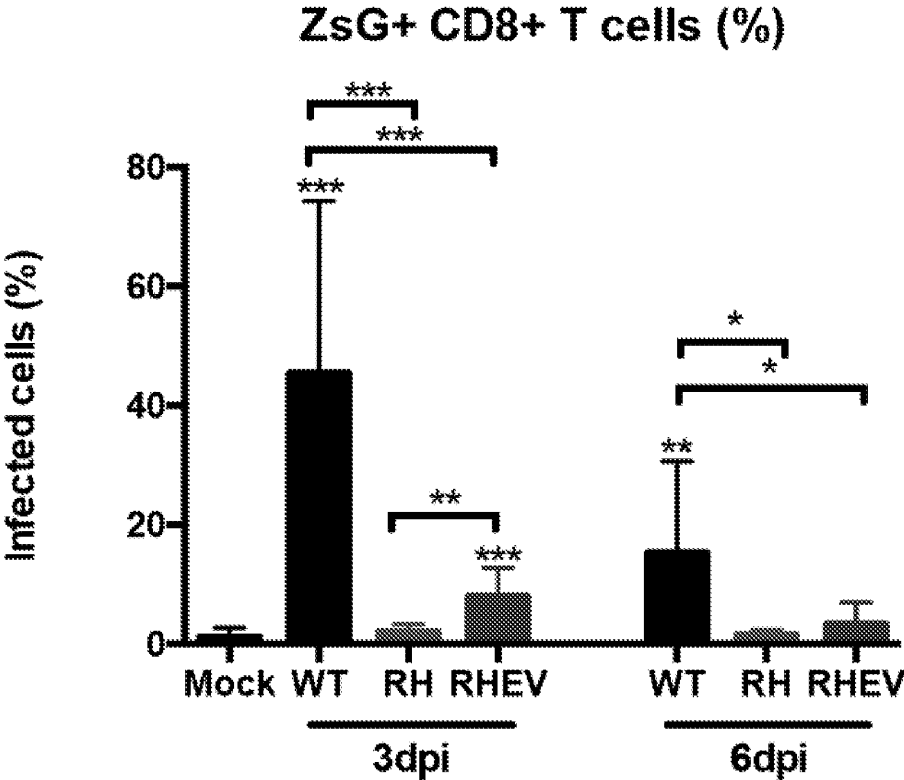


FIG. 4 (CONTINUED)

(F)



(G)

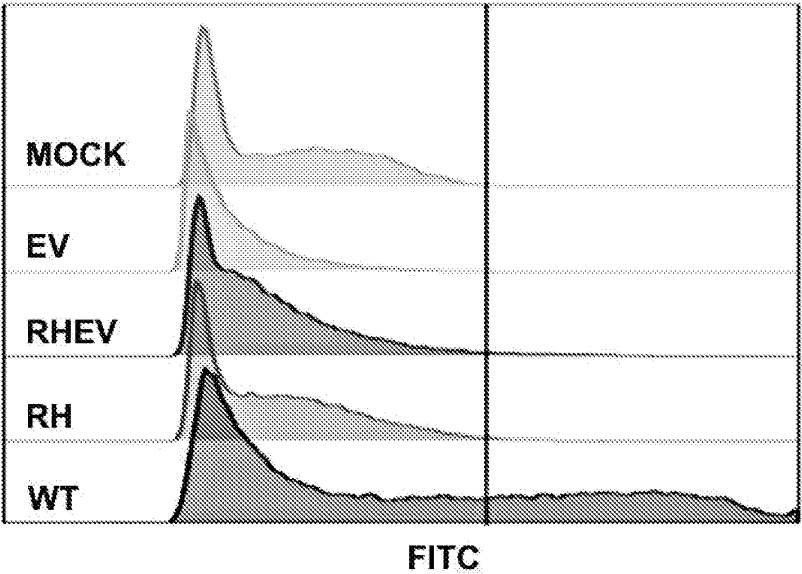
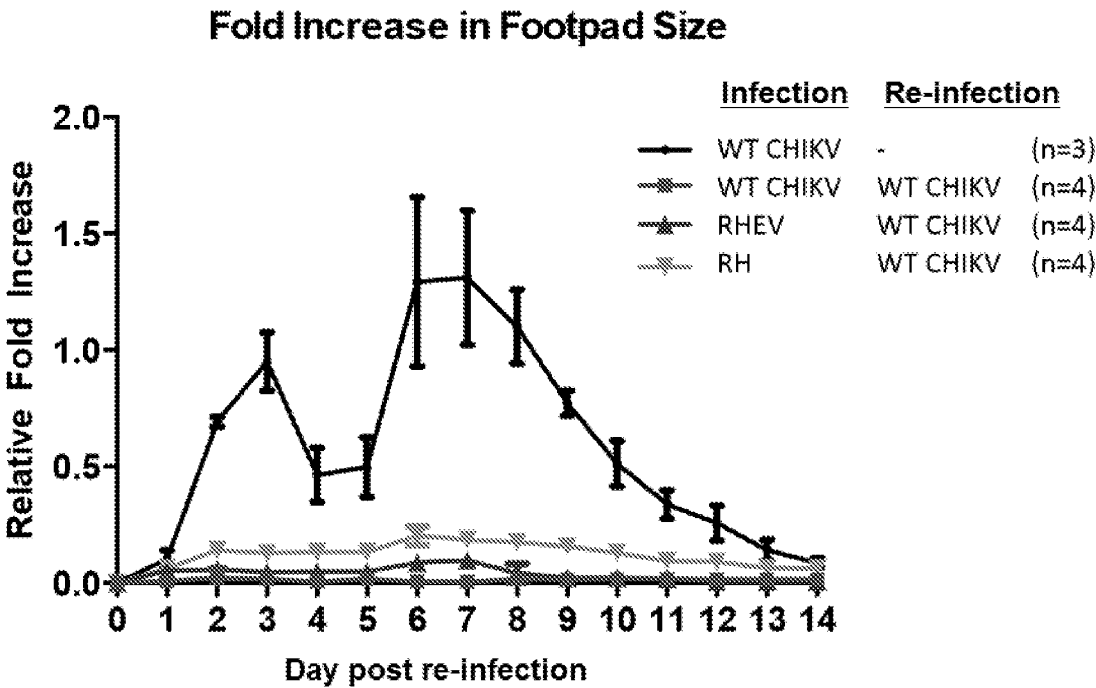


FIG. 5

(A)



(B)

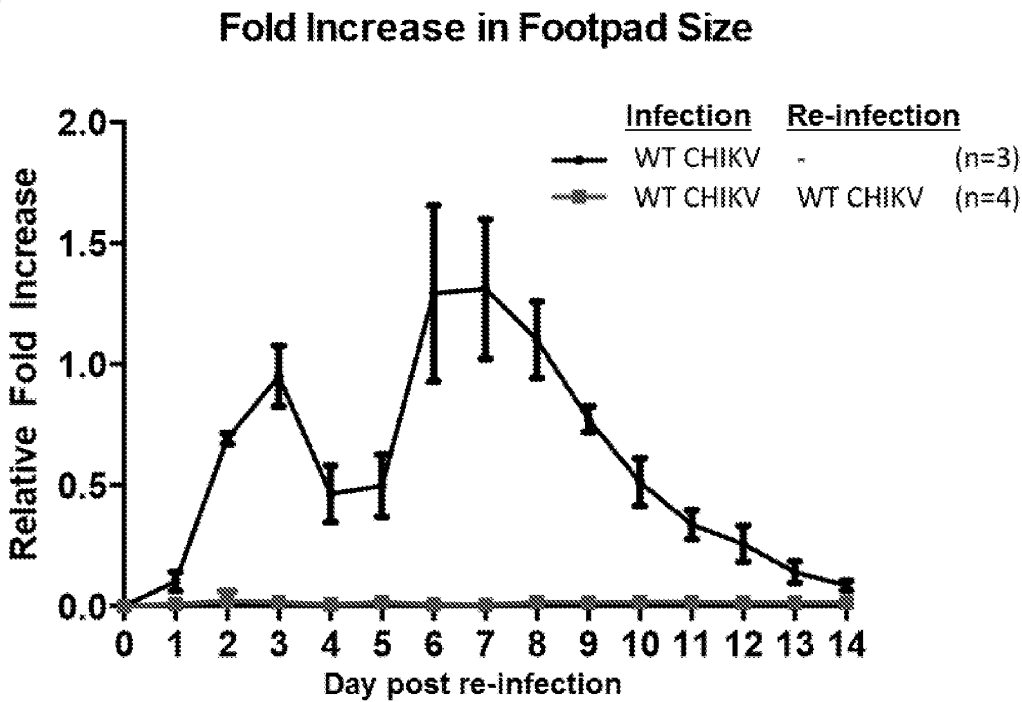
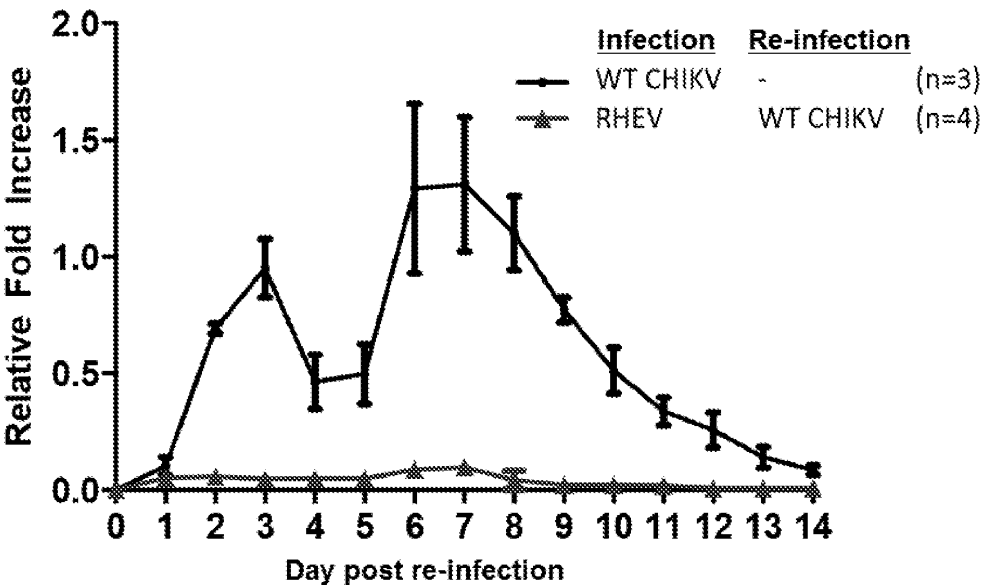


FIG. 5 (CONTINUED)

(C)

Fold Increase in Footpad Size



(D)

Fold Increase in Footpad Size

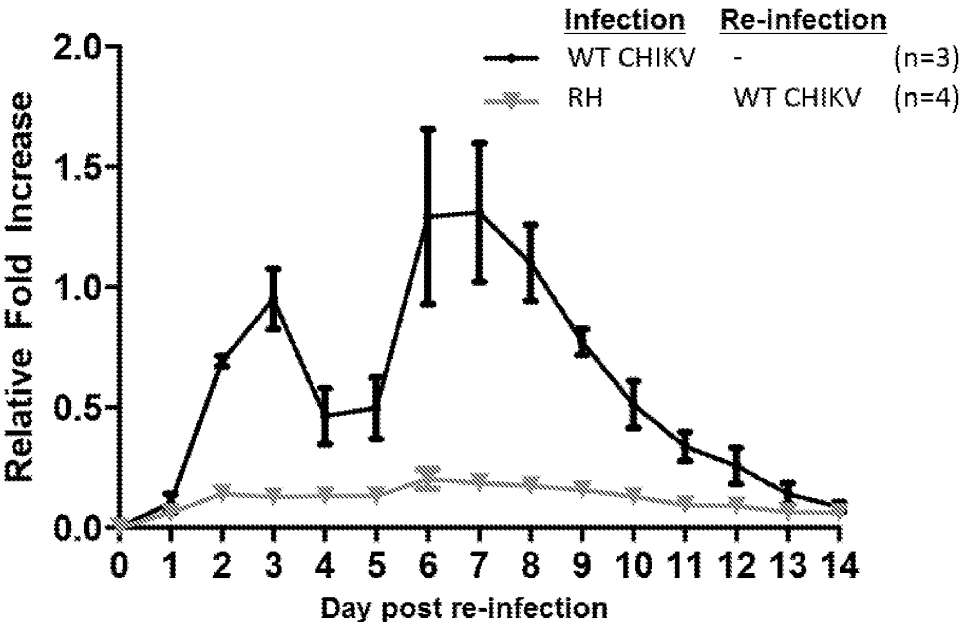
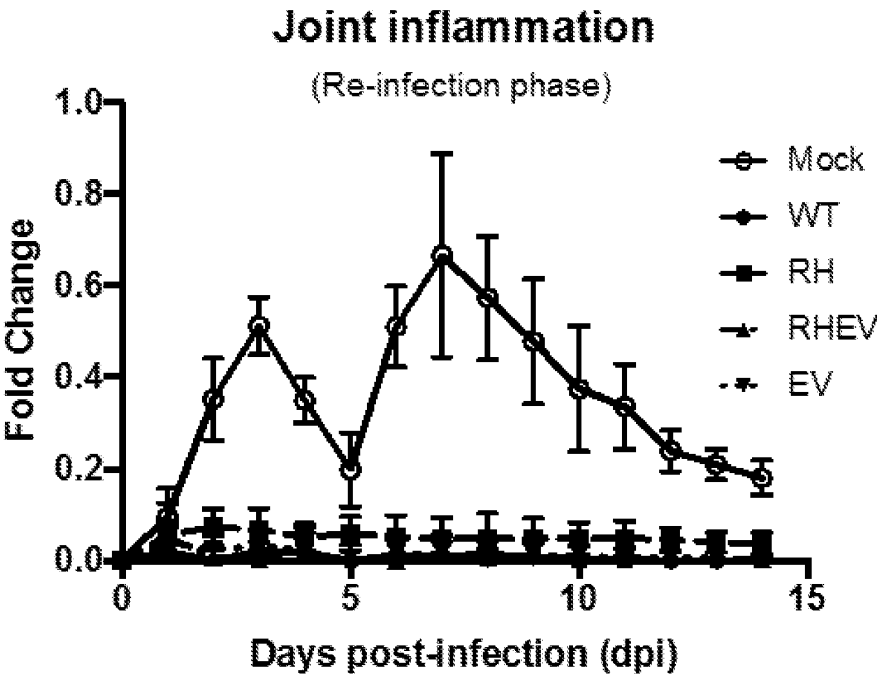


FIG. 6

(A)



(B)

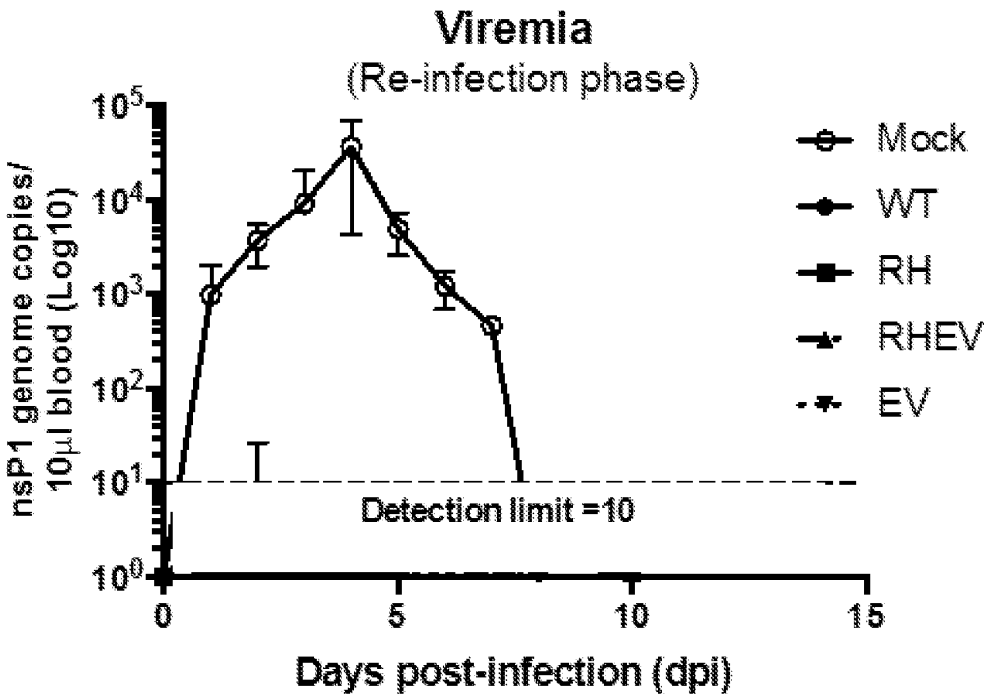


FIG. 6 (CONTINUED)

(C)

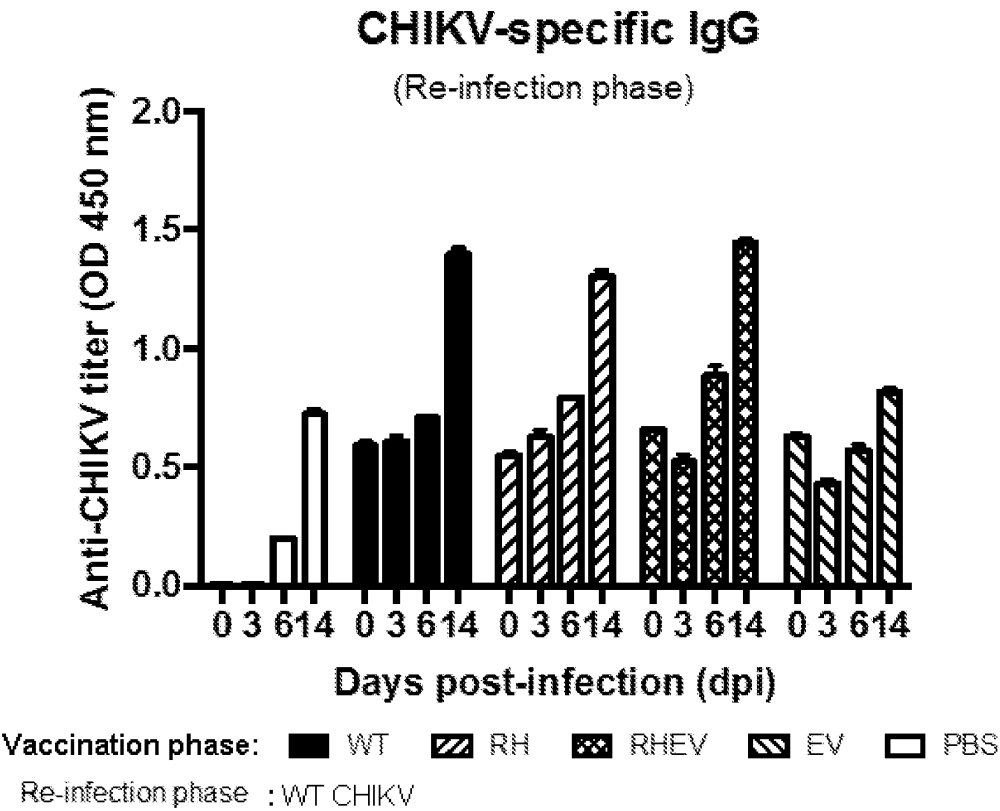


FIG. 6 (CONTINUED)

(D)

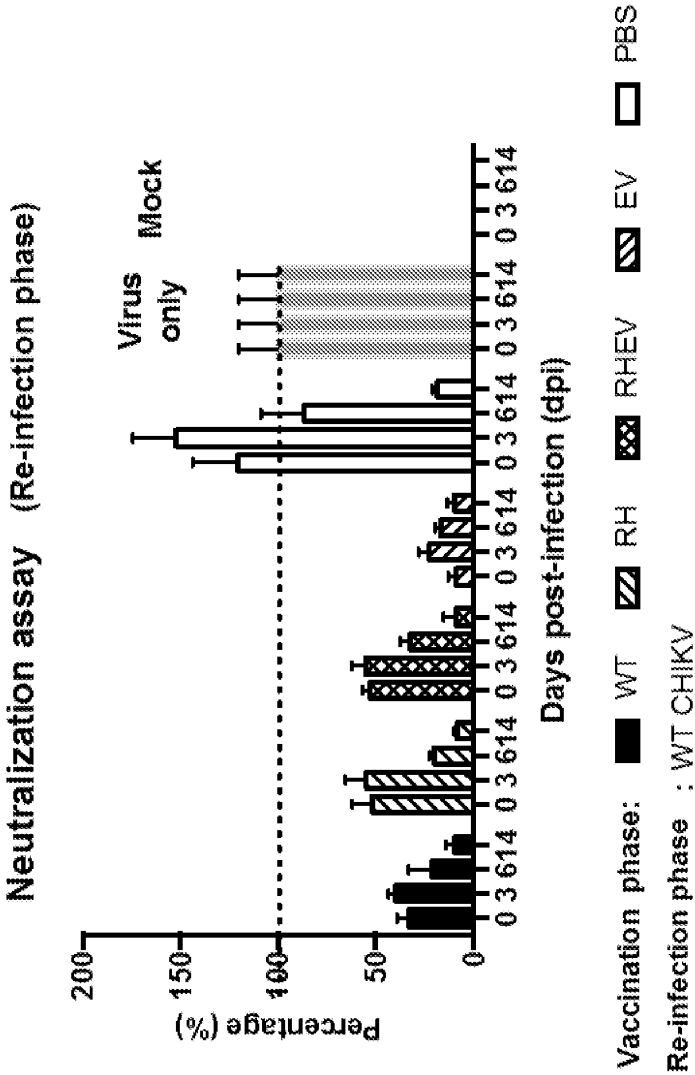


FIG. 7

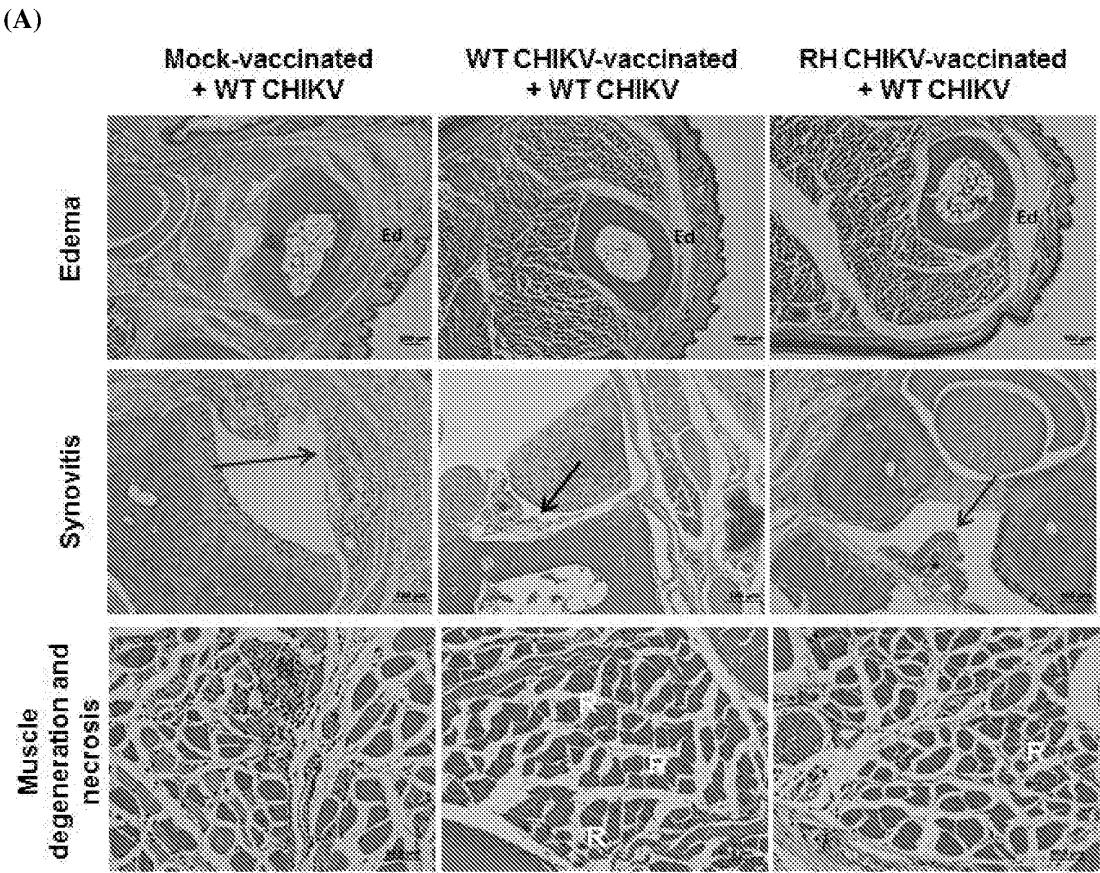
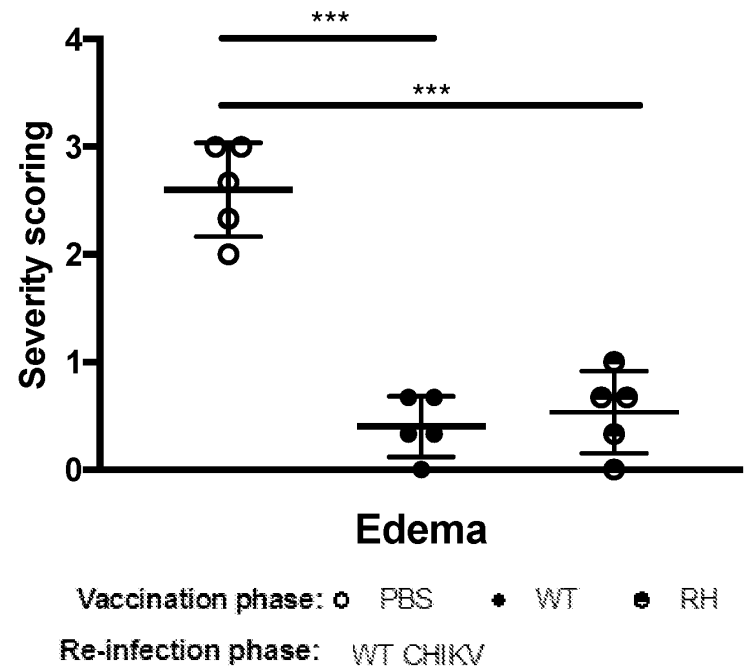


FIG. 7 (CONTINUED)

(B)
(i)



(ii)

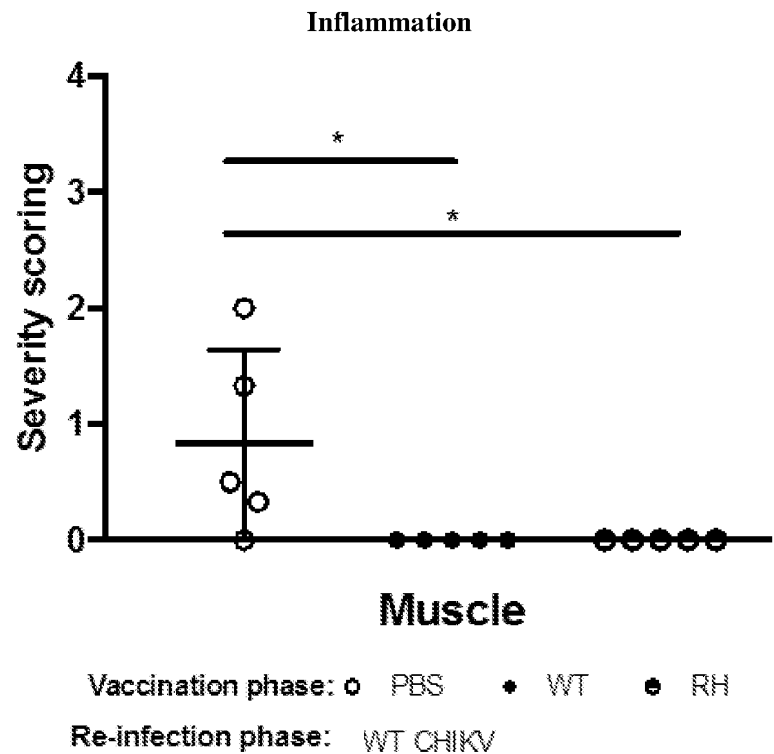
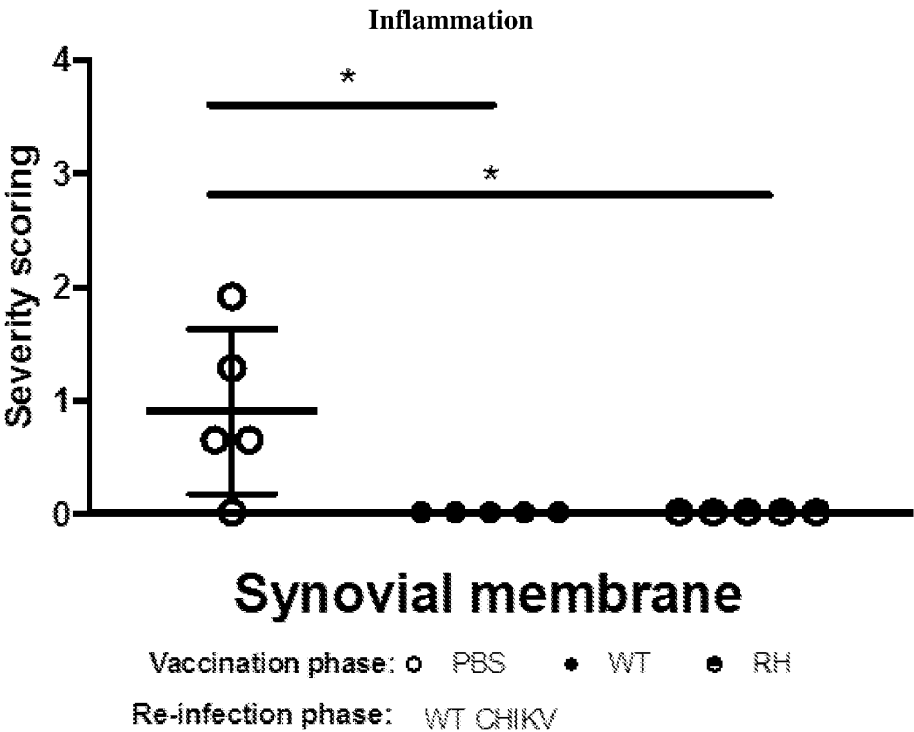


FIG. 7 (CONTINUED)

(B)
(iii)



(iv)

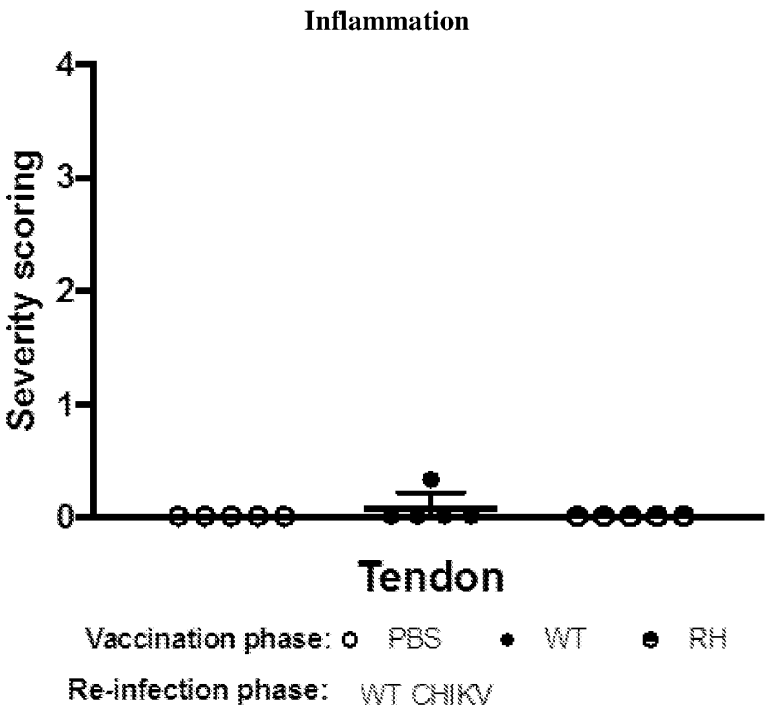
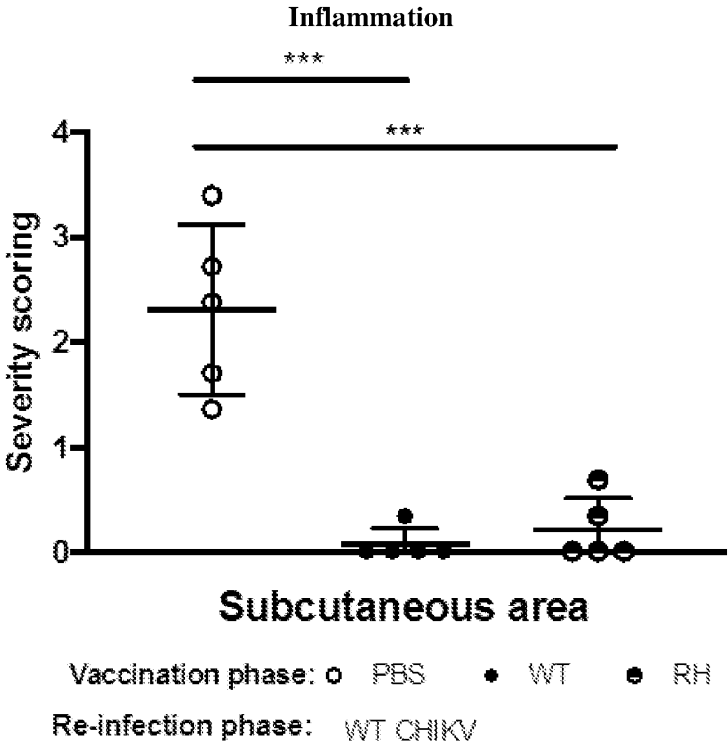


FIG. 7 (CONTINUED)

(B)
(v)



(vi)

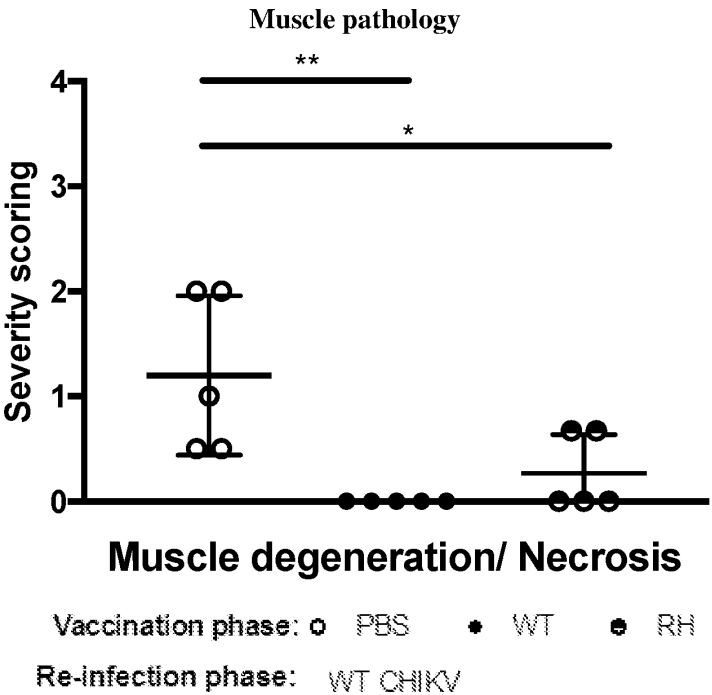
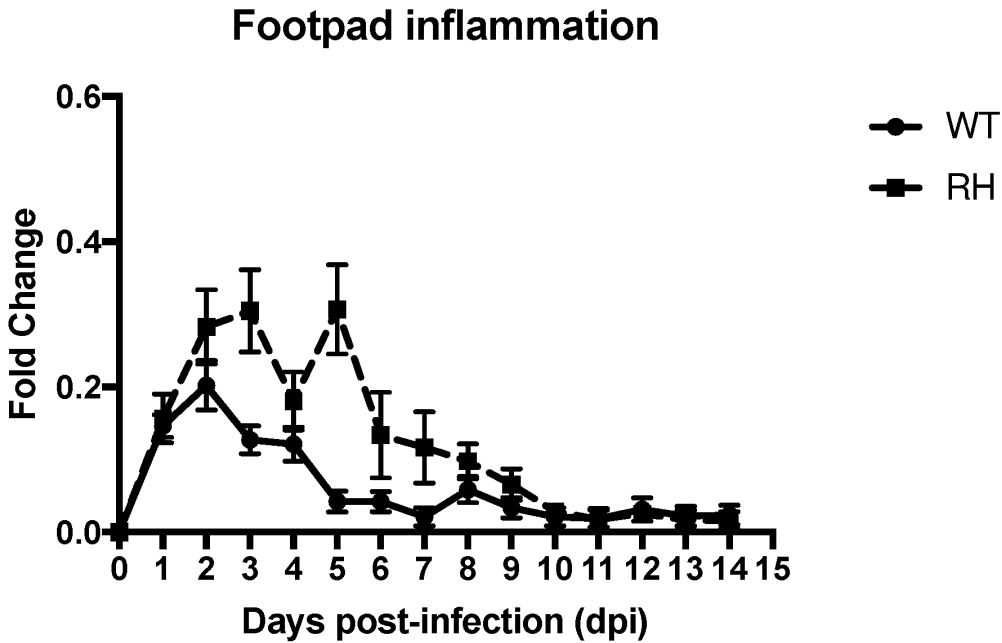


FIG. 8

(A)



(B)

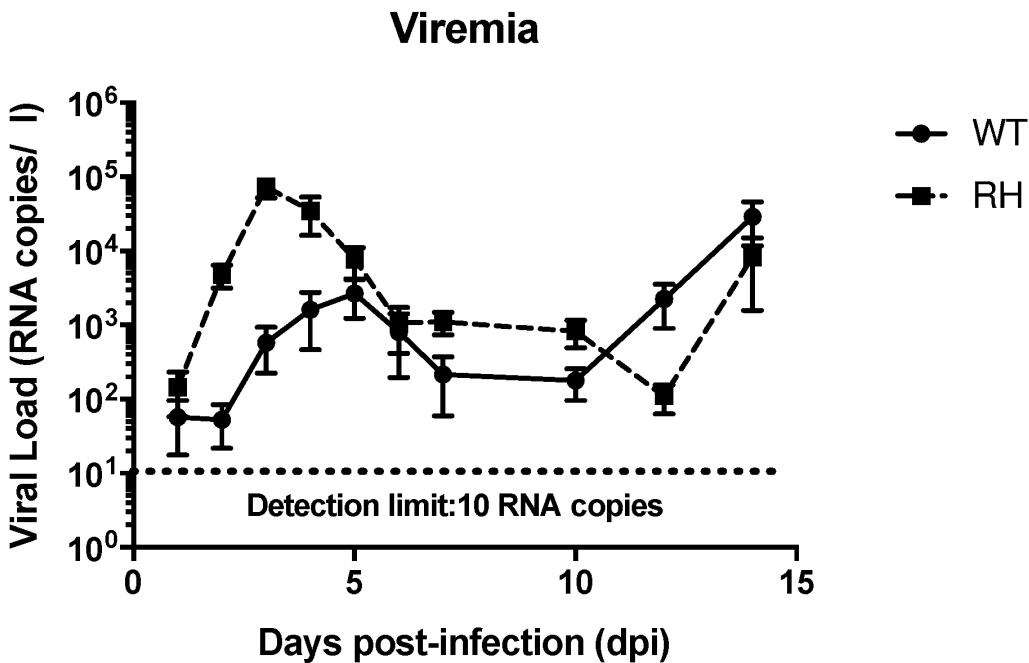
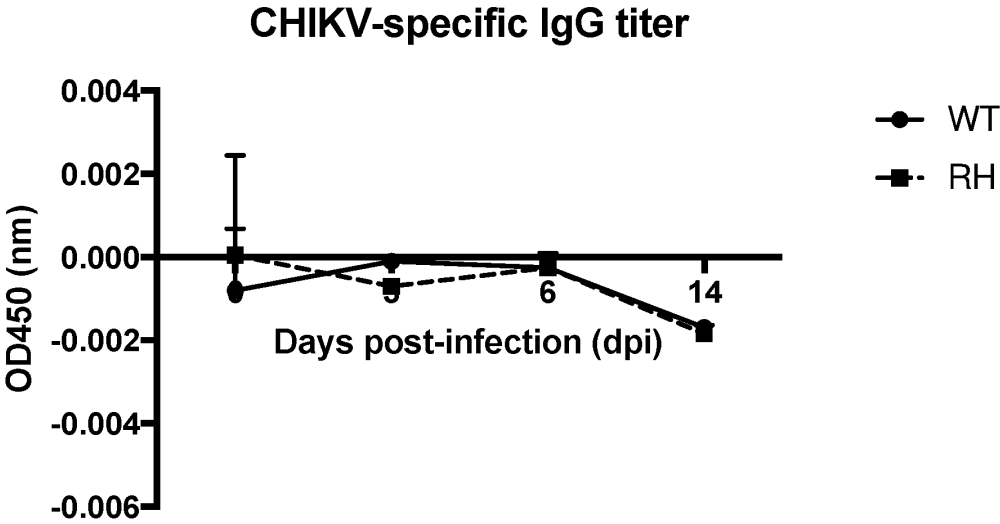


FIG. 8 (CONTINUED)

(C)



(D)

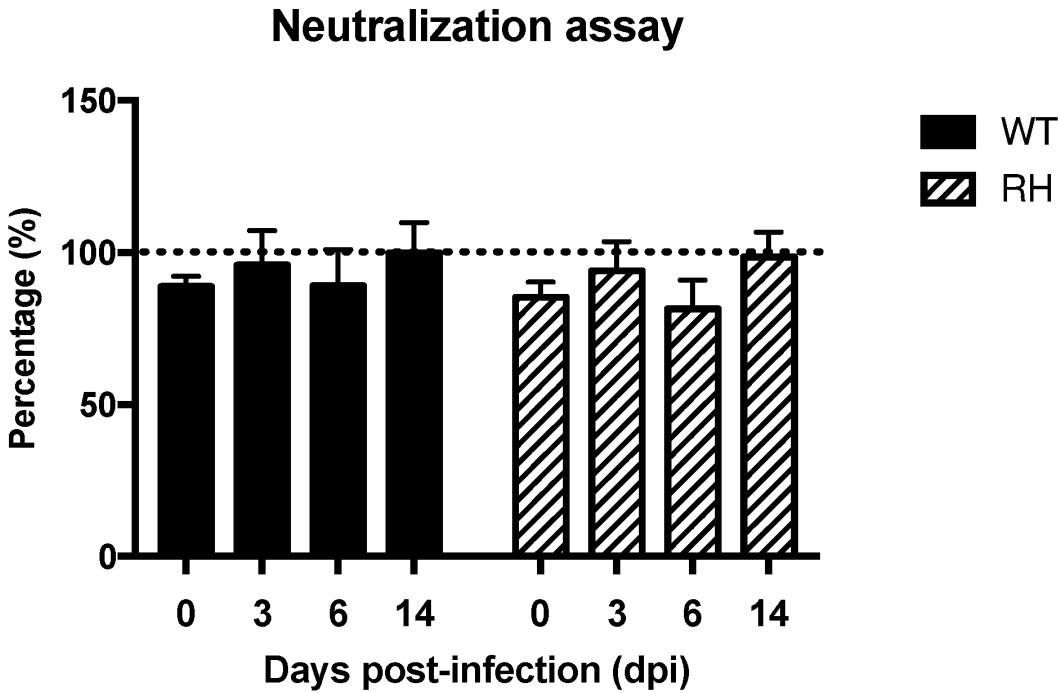
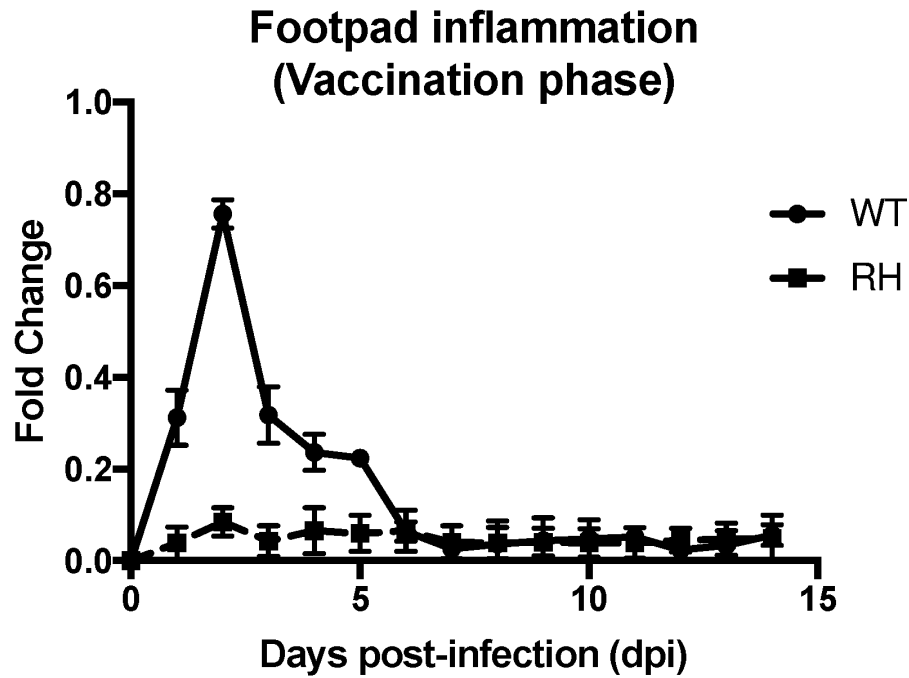


FIG. 9

(A)



(B)

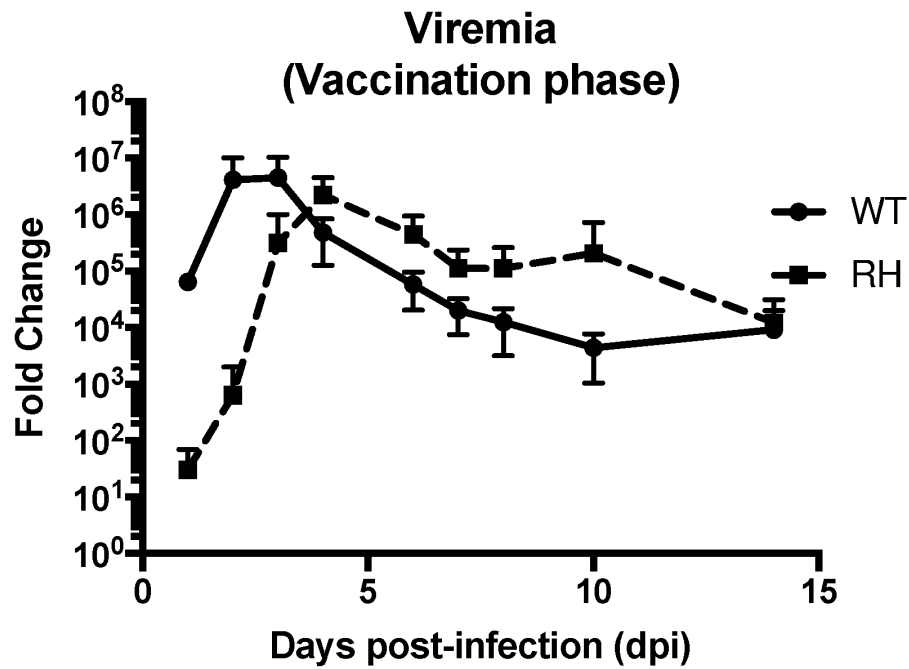
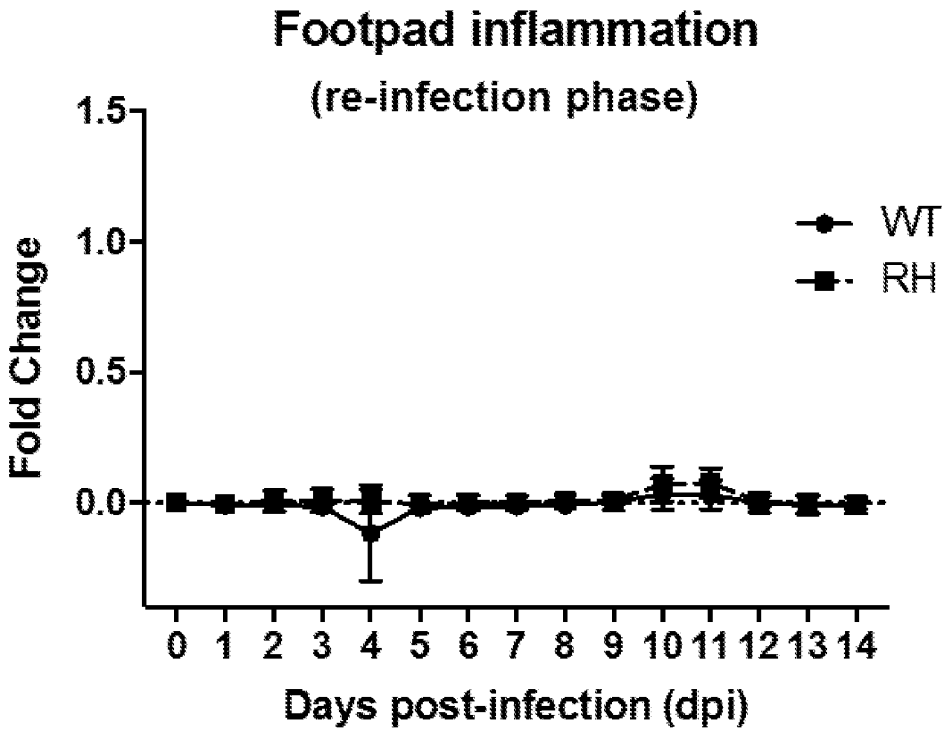


FIG. 9 (CONTINUED)

(C)



(D)

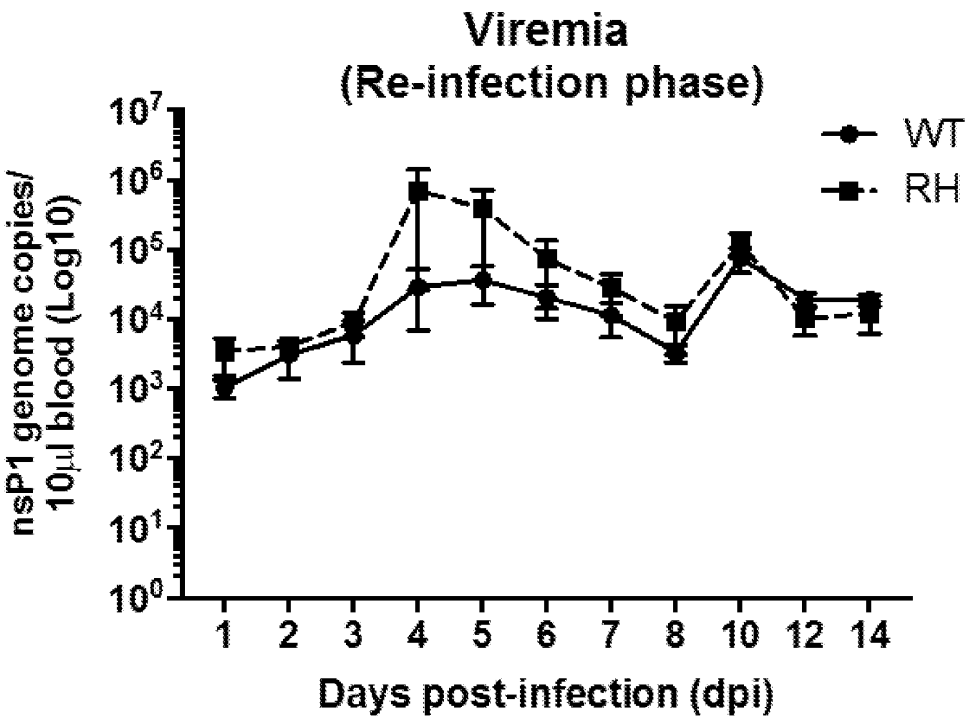


FIG. 10

(A)

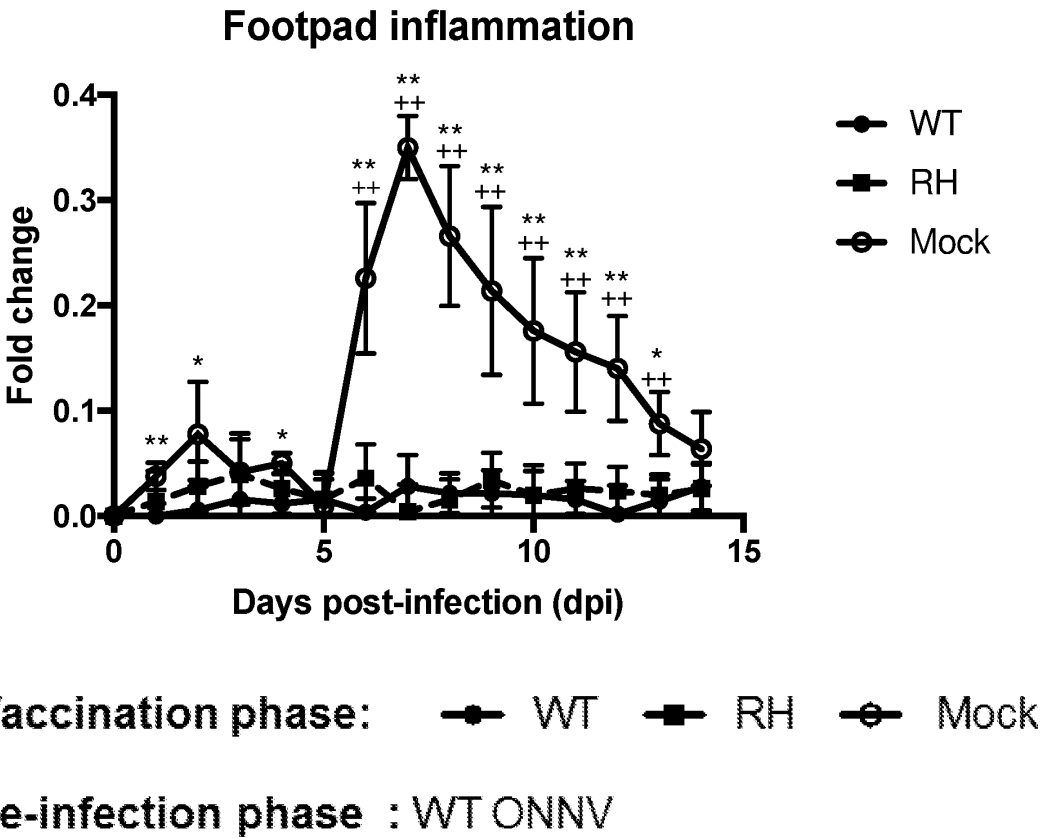
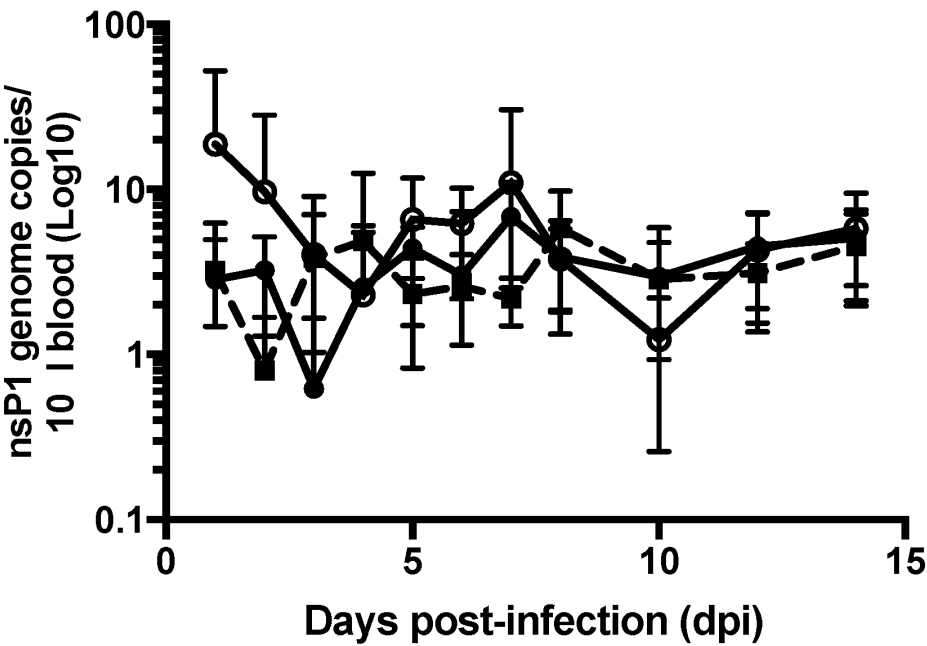


FIG. 10 (CONTINUED)

(B)

Viremia



Vaccination phase: ● WT ■ RH ○ Mock

Re-infection phase : WT ONNV

FIG. 11

[illegible]

FIG. 11 (CONTINUED)

```

VEEV  RGWVKQLQIDYKGNEMTAASQGLTRKGVYAVRYKVNENPLYAPTSEHVNVLTRTEDR
BEV  RGWVKQLQDYRGNEVMTAAASQGLTRASVYAVRTKVNENPLYAQSTSEHVNVLTRTENK
ONNV  RGWVKQLQIDYRGNEVMTAAASQGLTRKGVYAVRQKVNENPLYASTSEHVNVLTRTEGK
CHIKV  RGWVKQLQIDYRGYEVMTAAASQGLTRKGVYAVRQKVNENPLYASTSEHVNVLTRTEGK
RRV  RGWVKQLQIDYRGHEVMTAAASQGLTRKGVYAVRQKVNENPLYAPSSSEHVNVLTRTENR
SEV  RGWVKQLQIDYRGHEVMTAAASQGLTRKGVYAVRQKVNENPLYAPASEHVNVLTRTEDR
MAYV  RGWVKQLQIDYRGHEVMTAAASQGLTRKGVYAVRMKNENPLYAQSSSEHVNVLTRTEGR
***** **:*:***** . ***** ***** ;*****:*****:
IVWKTLAGDPWIKTLTAKYPGNFTATIEEWQAEHDAIMRHILERPDPTDVEQNKANVCWA
BEV  LVWKTLSLTDPPWIKTLNPPRGHYTATIAEWEAEHQGIMKAIQGYAPPVNTFMKNVNCWA
ONNV  LIWKTLSGDPWIKILQNPPKGNFKATIKEWEAEHASIMAGICNHQMAFDTFQNKANVCWA
CHIKV  LVWKTLSGDPWIKTLQNPPKGNFKATIKEWEVEHASIMAGICSHQMTFDTFQNKANVCWA
RRV  LVWKTLSGDPWIKVLTNIPKGFESATLEEWQEEHDNIMNALRERSTAVDPFQNKAKVCWA
SEV  LVWKTLAGDPWIKVLSNIPQGNFTATLEEWQEEHDKIMKVIEGPAAPVDAFQNKANVCWA
MAYV  LVWKTLSGDPWIKTLNIPKGNFTATLEDWQOEHDAIMRAITQEAAPLDVEQNKAKVCWA
:;***** ***** * ..:***: **:*: ** * * * * * * * * * * * * * * * *
KALVPVLKTAGIDMTTEQWNTV-DYFETDKAHSAEIVLNQLCVRFFGLDLDGLFSAPT
BEV  KTLTPVLETAGISLSAEDWSELLPPFAQDVAYSPEVALNICTKMYGFDLDTGLFSRPSV
ONNV  KCLVPILDTAGIKLSDRQWSQIVQAFKEDRAYSPPEVALNEICTRIYGVLDLDSGLFSKPLI
CHIKV  KSLVPILETAGIKLNDRQWSQIIQAFKEDKAYSPEVALNEICTRMYGVLDLDSGLFSKPLV
RRV  KCLVQVLETAGIRMTAEEDTV-LAFREDRAYSPPEVALNEICTKYGVLDLDSGLFSAQSV
SEV  KSLVPVLDTAGIRLTAEEWSTIITAFKEDRAYSPPEVALNEICTKYGVLDLDSGLFSAPKV
MAYV  KCLVPVLETAGIRLSAADWSSIILAFKEDRAYSPPEVALNEICTKVYGVLDLDSGLFSAPRV
* * . :*.***** :. :. : * * * * * :. :. :. :. :. :. :. :. :. :. :. :. :

```


FIG. 11 (CONTINUED)

VEEV	KASRPEQITVCSSEFPLPKYRITGVQKIQCSQPILESPKVPAYIHPRKYLVEPTPVDETPPE
BEV	KCTNTTQFTVCSSEFELPKYHIQGVQVKCERIIILDPTVPPTYKRPCIRRYPSTISCNSS
ONNV	RMNHTTSIIIVCSSEFPLPKYKIEGVQVKCSKALLEHDHNVPSRVSPRTYRPADEIIQTPQI
CHIKV	RMNHVTSIIIVCSSEFPLPKYKIEGVQVKCSKVMLEHDHNVPSRVSPREYRSSQESAQEAST
RRV	RMNNTKAIIVCSSEFPLPKYRIEGVQVKCDRVLIQFQTVPSLVSPRKYIPAAASTHADTV
SEV	RSHQVKSMVVCSSSEFPLPKYHVDGVQVKCEKVLLEDPVPSVVSPRKYAASTDHSDRSL
MAYV	RMHHTKDLVVCSSSEFQLPKYRIAGVQVRCEKVMLEDPASPASVSPVQYLTSHSETT-VSL
	: . : ***** : ***::*: : : : . *
VEEV	PSAENQSTE-----GTPEQPPLITEDETRTRTPEPIIE-EEEEDSISLLSD-G
BEV	E-DSRSLSTFSVSD--SSI-----GSLPVGDR-PIAPRTI-----
ONNV	PTEACQDAQFVQS---ITDEAVPVPSDLEAC--DATMDWPSIDIVPTRQRSDSFDSEYS
CHIKV	I-TSLTHSQFDLS----VDGEILPVPSDLAD--APALEP-ALDDGA-----
RRV	SLDSTVSTGSAWSEFPSEATYETMEVVAEVHHS--EPPVPPRRR---RA-----QVT
SEV	R-----GEDLDWTDSSTASDTMSLPSLQSCDIDSIYEPMAPI-----VV-----T--
MAYV	S-----SFSITSDSSSLSTFPDLESLEEL---GNDPQ---SM---RM-----D--
	:
VEEV	PTHQVLQVEADIHGPPSVSSSSWSIPHASDEFVDVDSLSILDTLEGASVTSGATSAETNS-Y
BEV	-----
ONNV	SRSNIQLVTADVHA-----PMY-----ANSLASSGGSVLSLSSEQAQNIGIM
CHIKV	-----
RRV	MHHQELLEVSMDMHTPIAARV---EIFVY-----DTAVVVERVAIPECTSEYA-----
SEV	-----ADVH-----PEPAGIADLAADV-----
MAYV	-----ES-----VNQ-----

FIG. 11 (CONTINUED)

```

VEEV F-----AKSMEFLARPVPAPRTVFRNPPHPAPRTRTPSLAPSR--ACSR TSLVS--TPP
BFV FRP---VPAPRAPVLRTTTPPKPPTFTVRAEV-----
ONNV ILPDS EDTSI SRVSTPIAPRRRLGR TINVTCDEREGKILPMASDR LFTAKPYTVALGV
CHIKV -----AVSDWMSTVPVAPPPRRRRGRNLT VTCDEREGNITPMASVRFRAELCPVVQET
RRV -KP---IPAPRAARVVPVAPRIQRASTYRVSP TTP-----RVLRASVC SVT TSA
SFV -HP---EPADHVDLENPIPPPPKRAAYLASR-----
MAYV -QP---IP-TAEPVWQVPVPPPPKRRRLAARMQVQ-----VEVHRPPV-----QR
      * :

VEEV GVN RVITREELEALTPSRTPS-R-----SVSR TSLVS
BFV -----HQAPPTVP-P-PPR KRAAKLAREMHPGFTFGDFGEHEVEELTASPLTFGD
ONNV STAD-ITAYPIQAPLGS-----TQPPALEQITFGDFAECEIDNLLTGALTFGD
CHIKV AETR-DTAMSLQAPPSTATEPNHPP I-SFGASSETFPTFGDFNEGEIESLSSELLTFGD
RRV GVEFPWAPEDLEVLT EPHVCKMREP V-ELPWEPE DVDIQFGDFETS-----D-KIQFGD
SFV -----AAERPVEAPRKPTPAPRT-AER- --NKLP LTFGDFDEHEVDALAS-GITFGD
MAYV TKPVPAPRTSLRPVAPRSCMPRP AV-ELPWPQETVDVEFGAPT-----EEDS-EITFGD
      . : .

VEEV NPPGVNRVITREEFEAF--VAQQRRRFDAGAYIFSSDTGQGH LQQKSVRQTVLSEVVLER
BFV FAEGEIQGMG-----VEFERLGRAGGYIFSSDTGFGHLQQRSVLQNC TAECIYEP
ONNV FEPGEVEELTDSEWSTCSDTDEELRLDRAGGYIFSSDTGQGH LQQKSVRQTTLPVNIVEE
CHIKV FLPGEVDDLTDSDWSTCSDTDEELRLDRAGGYIFSSDTGFGHLQQKSVRQSVLPVNTLEE
RRV ID-----FDQFRLGRAGAYIFSSDTGFGHLQQKSVRQH ALPCEMLYV
SFV F-----DDVLR LGRAGAYIFSSDTGSGHLQQKSVRQHNLQCAQLDA
MAYV FSAS-----EWET---ISNSSRLGRAGAYIFSSDVGFGHLQQKSVRQHDLEVPIMDR
      : * ** .*****.* *****;* *

```


FIG. 11 (CONTINUED)

```

VEEV ILEDLGVDAELLTLIEAAFEGEISSIHLPTKTKKEFGAMKSGMFLTLFVNTVINIVIASR
BFV ILEDLGVNQMLNLIIEAAFEGEIVSTHPTGTGREKEFGAMKSGMFLTLFVNTILNVVIACR
ONNV LLEDLGVDPILDLIEAAFEGEISSCHLPTGTGREKEFGAMKSGMFLTLFVNTLLNITIASR
CHIKV LLEDLGVDSLLDLIEAAFEGEISSCHLPTGTGREKEFGAMKSGMFLTLFVNTLLNITIASR
RRV LLEDLGVQELLDLIEAAFEGEITSVHLPTGTGREKEFGAMKSGMFLTLFVNTLLNIVIASR
SFV ILEDLGVQYLLDLIEAAFEGEISSCHLPTGTGREKEFGAMKSGMFLTLFINTVLNITIASR
MAYV ILEDLGVNQQLLDLIEAAFEQITSCHLPTGTGREKEFGAMKSGMFLTLFINTVLNITIASR
:***** :: *****: * * ***** *:*****:***:*. **.*
VEEV VLRERLTGSPCAAFIGDDNIVKGVKSDKLMADRCATWLNMEVKIIDAVVGEKAPYFCGGF
BFV VLEDQLAQSPCAAFIGDDNIIHGIISDKLMADRCATWNNMEVKILDSIVGIRPPYFCGGF
ONNV VLEERLTTSAACAAFIGDDNIIHGVVSDALMAARCATWNNMEVKIIDAVVSEKAPYFCGGF
CHIKV VLEDRLTKSACAAFIGDDNIIHGVVSDDELMAARCATWNNMEVKIIDAVVSLKAPYFCGGF
RRV VLREKLTNSVCAAFIGDDNIVHGVRSDDLMAERCASWNNMEVKIIDATMCEKPPYFCGGF
SFV VLEQRLTDSACAAFIGDDNIVHGVVISDKLMAERCASWNNMEVKIIDAVMGEKPPYFCGGF
MAYV VLEARLTNSACAAFIGDDNVVHGVVSDKLMADRCATWNNMEVKIIDAVMCAKPPYFCGGF
**.*: * * *****:***: * * *****:***: * * *****:
VEEV ILCDSVTGTACRVADPLKRLFKLKGKPLAADDEHDDDDRRRALHEESTRNVRVGI LSELCKA
BFV IVCDDVTGTACRVADPLKRLFKLKGKPLPLDDGQDEDRRRALHDEVKTSRVGLRHRVCEA
ONNV ILHDTVGTGTSACRVADPLKRLFKLKGKPLAAGDEQDEDRRALADEVTRWQRTGLITELEKA
CHIKV ILHDTVGTGTSACRVADPLKRLFKLKGKPLAAGDEQDEDRRALADEVIRWQRTGLIDELEKA
RRV ILYDKVTGSACRVADPLKRLFKLKGKPLPAGDTQDEDRRRALKDETDRAWARVGLKSELEIA
SFV IVFDSVTQTACRVSDPLKRLFKLKGKPLTAEDKQDEDRRRALSDEVSKEWERTGLGAELEVA
MAYV LVYDHTVTRMSCRIADPLKRLFKLKGKPLPADDCQDEDRRRALHDEVKKWERSGLGSEIEVA
:: * * * * :***: *****: * * :*****: * * * * : * * * * :

```

FIG. 11 (CONTINUED)

VEEV	VESRYETVGT	SIIV	MA	MT	LA	SS	VK	SF	SY	LR	GA	PI	TL	YG	----		
BEV	IEDRYAVH	SSEL	VLLA	TT	LS	KN	LK	SF	RN	IR	GK	PI	HL	YG	GPK----		
ONNV	VYSRYEVQ	GITAV	IT	SM	AT	FA	SS	KE	NF	KK	LR	GP	VT	LY	GGPK----		
CHIKV	VYSRYEVQ	GISV	VM	SM	AT	FA	SS	RN	FE	KL	RG	PV	IT	LY	GGPK----		
RRV	LSSRYEVN	GTGN	IV	RA	MA	TL	AK	SL	KN	FE	KK	LR	GP	IV	HL	YG	GPK----
SEV	LTSRYEVE	GCKS	IL	IA	MA	TL	AR	DI	KA	FE	KK	LR	GP	VI	HL	YG	GPRLVR
MAYV	LATRYEVE	GGYN	LL	AM	ST	FA	HS	MK	NF	SA	LR	GP	VI	HL	YG	GPK----	
	:	**	.	.	:	:	:	:	*	:	**	:	*	*	*	*	*