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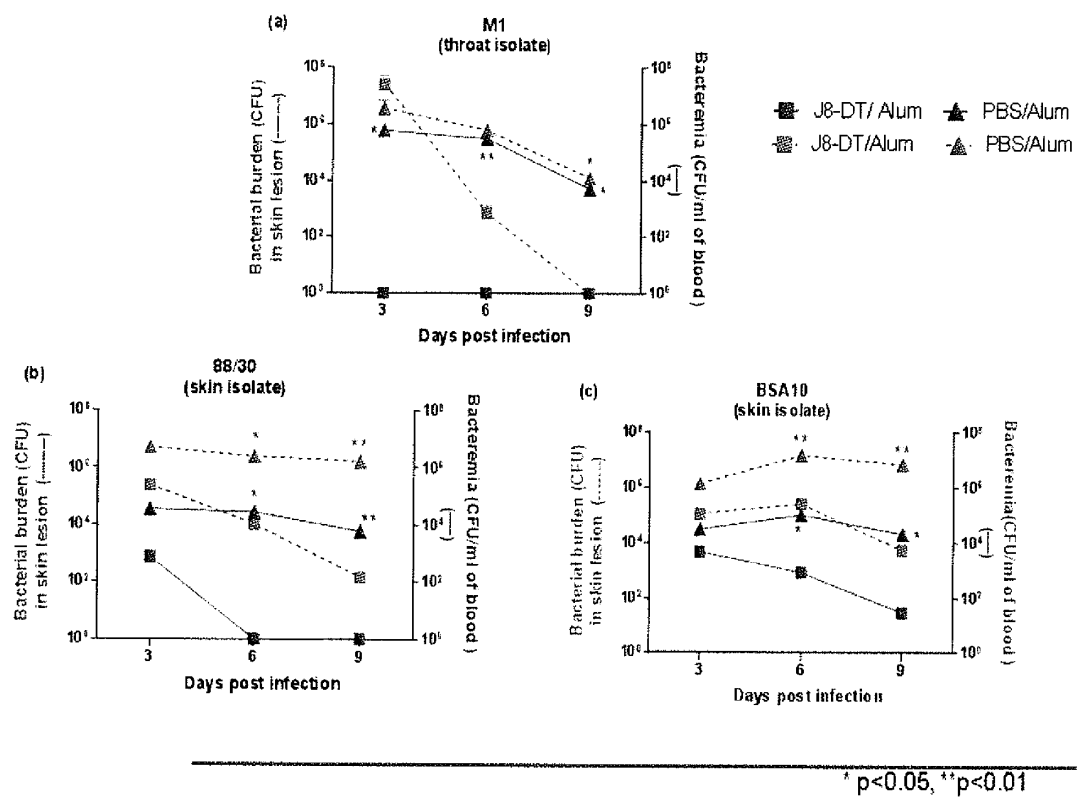


Figure 1

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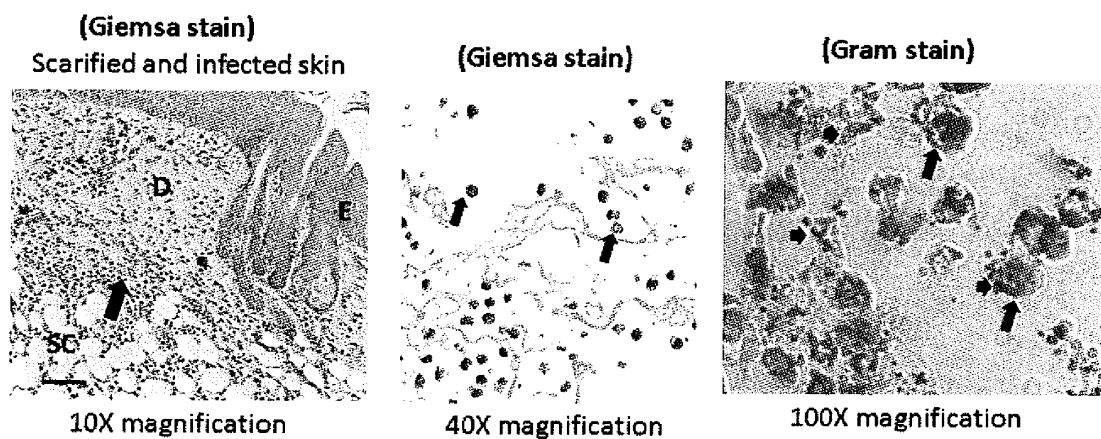


Figure 2

GAS clinical isolate 90/31*

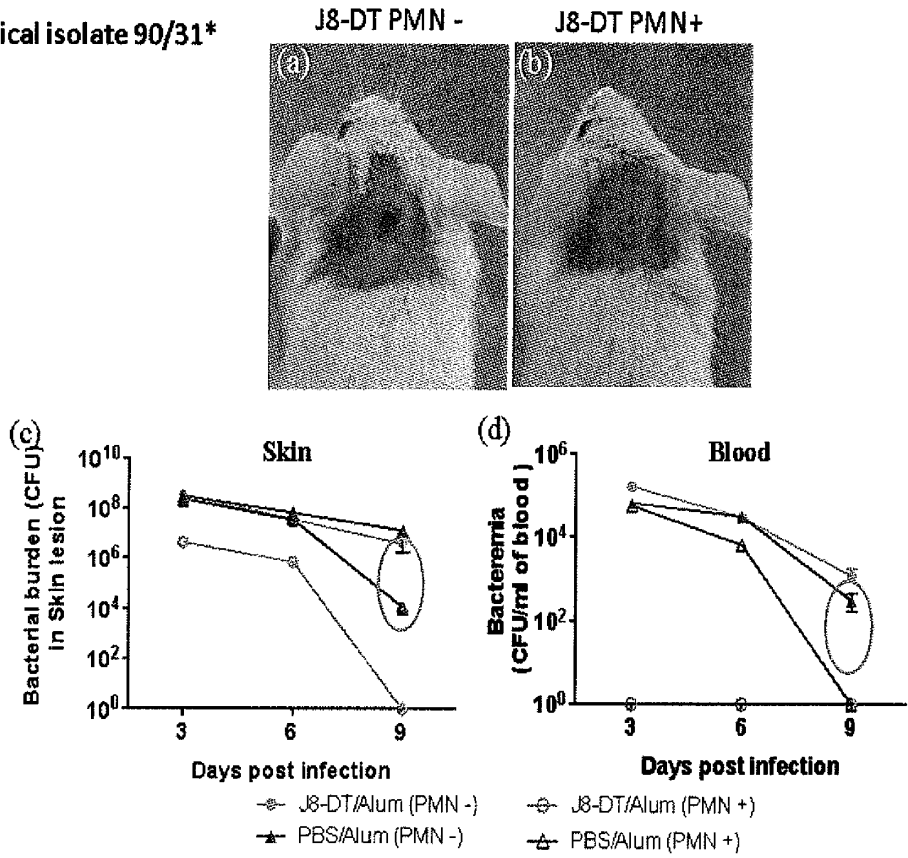


Figure 3

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M1T1 → 5448AP → CovR/S mutation → High expression of a number of virulence factors (HA ↑ / Sag ↑ / ska ↑ / speB ↑ / Sda ↑ / mac ↑ / SpyCEP ↑)

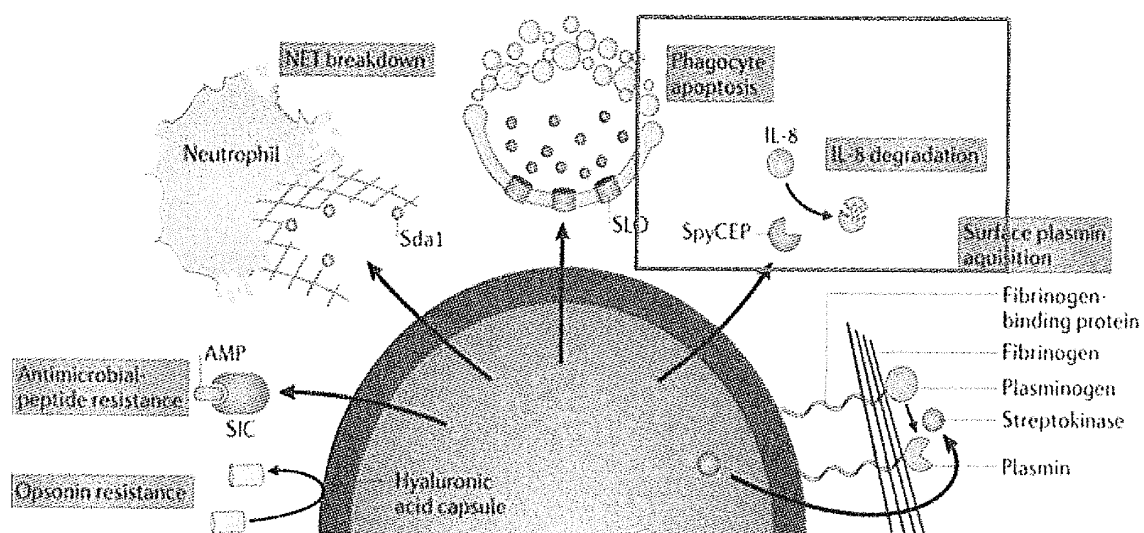
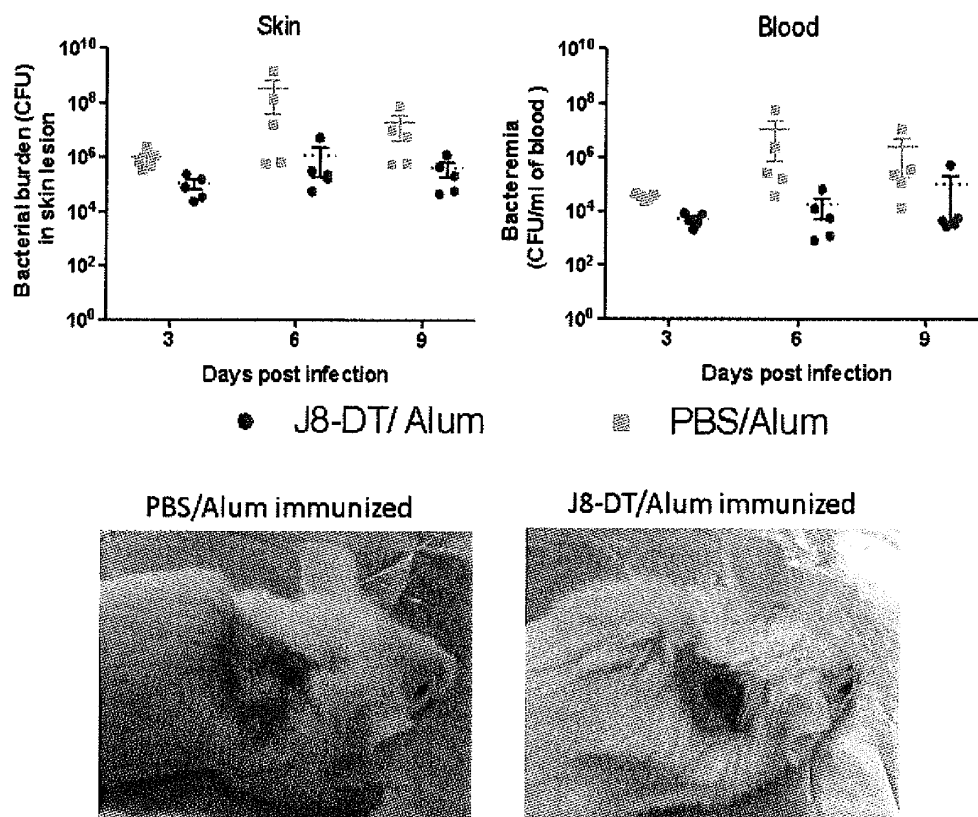


Figure 4

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**Figure 5**

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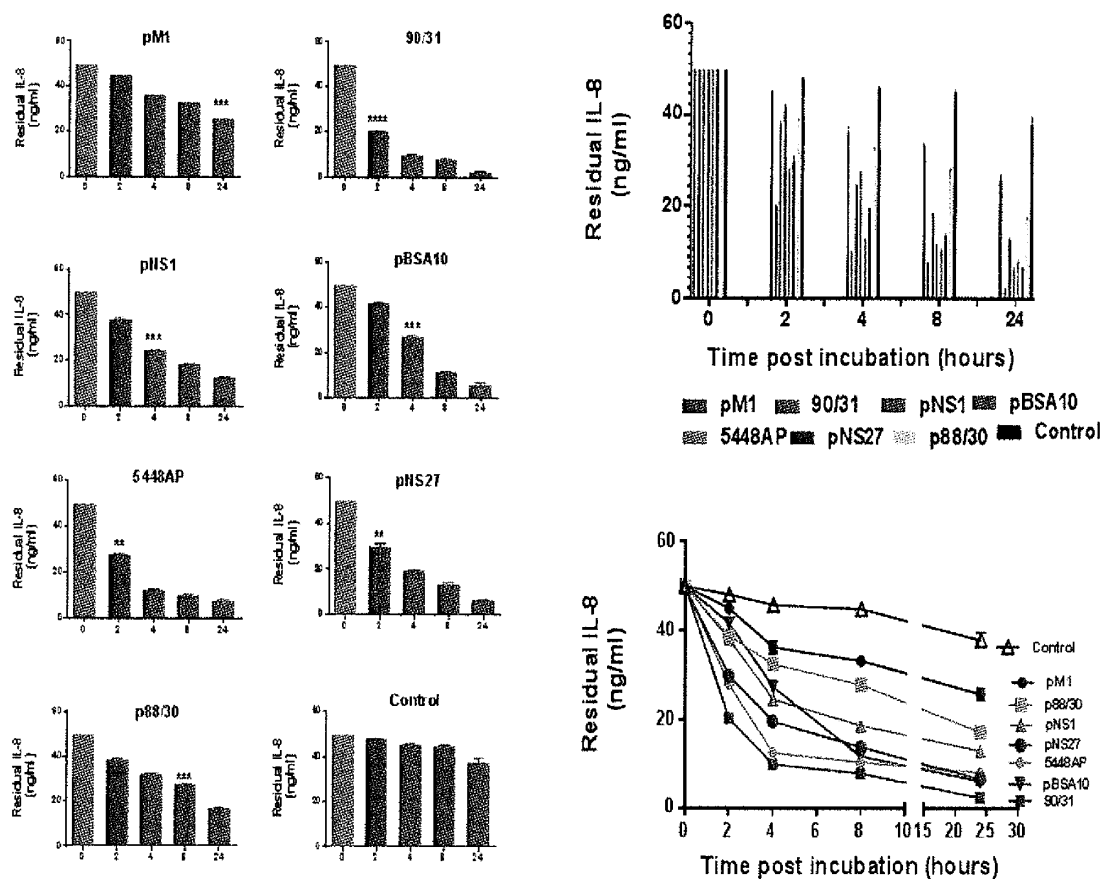


Figure 6

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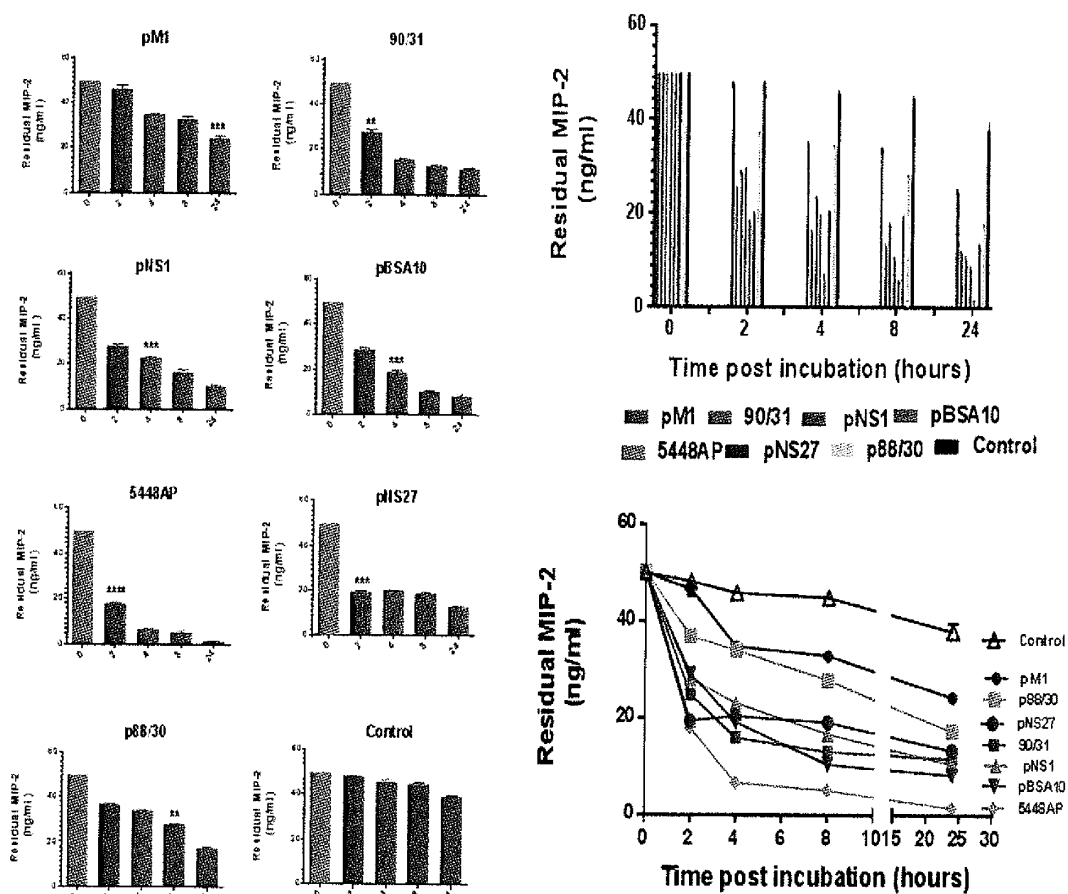


Figure 7

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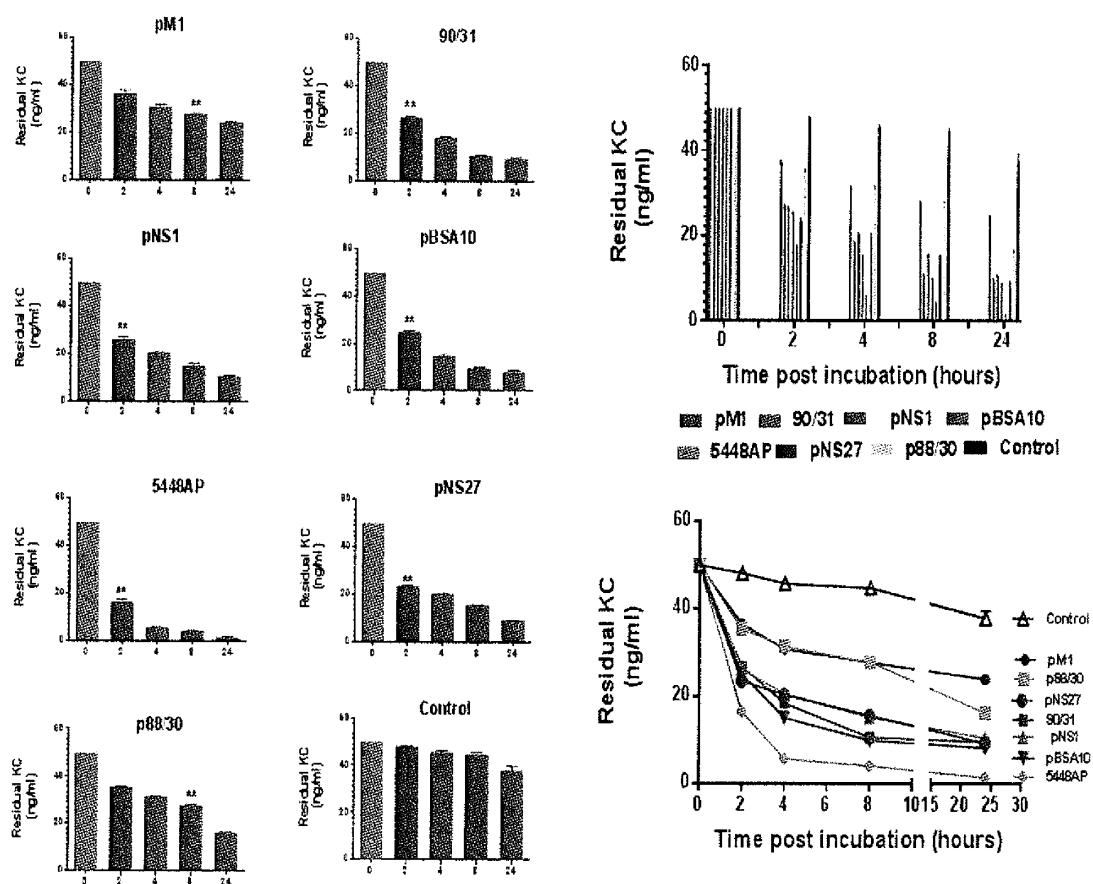
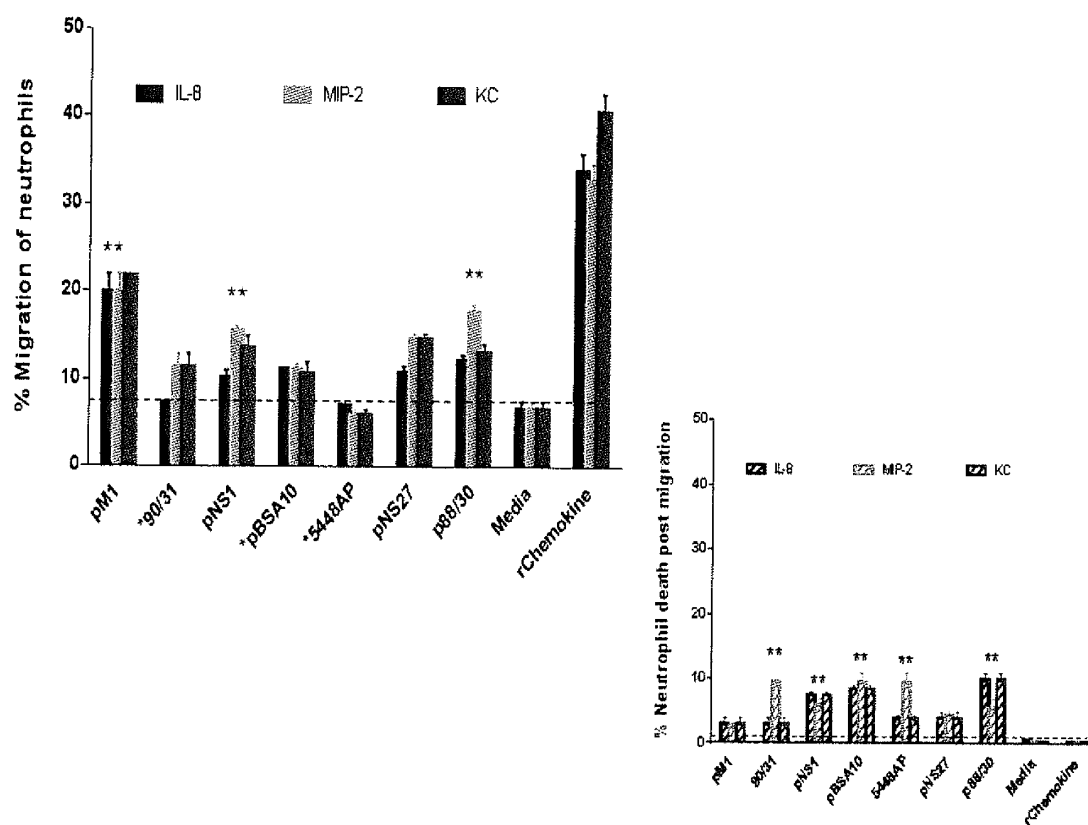


Figure 8

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**Figure 9**

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Skin infection with GAS 5448AP strain

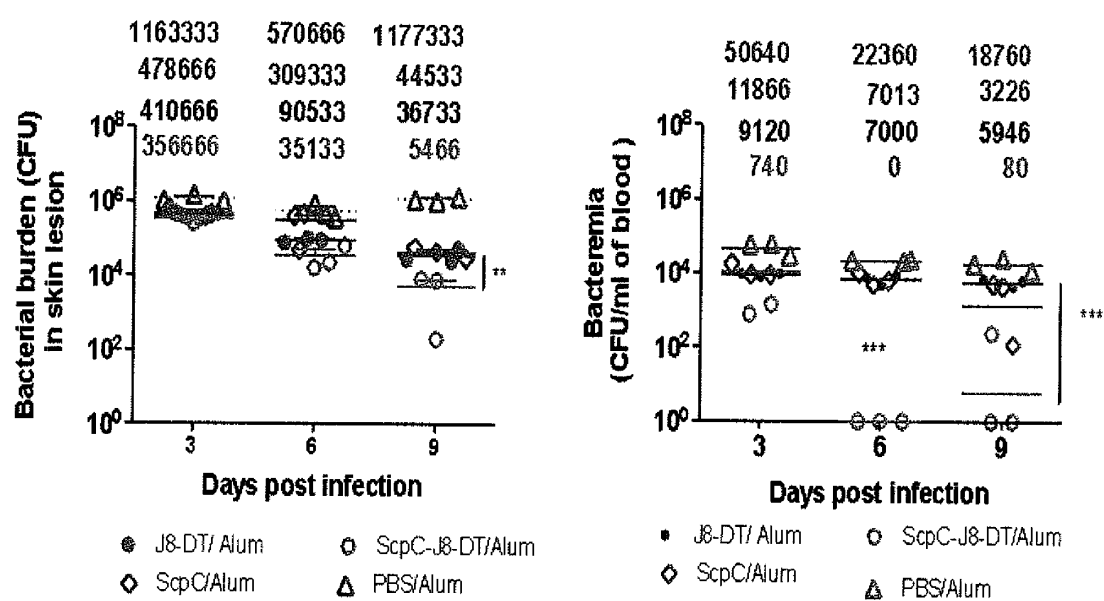
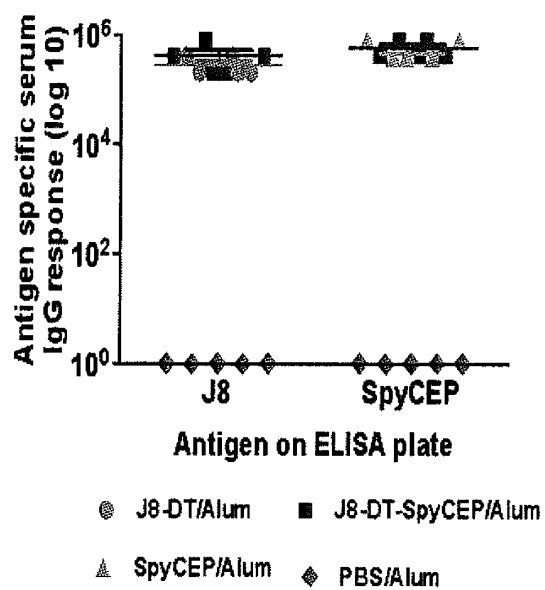
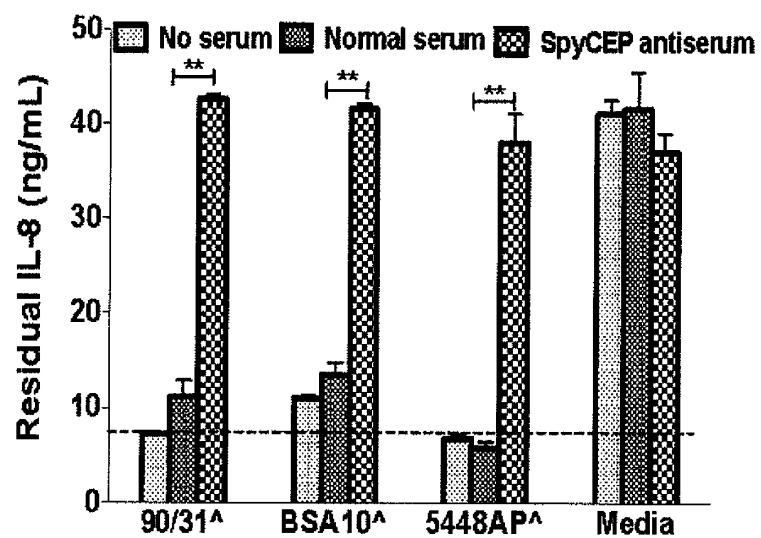


Figure 10

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**Figure 11**

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**Figure 12**

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Peptide number	Sequence
1	DELSTMSEPTITNHAQQQAQ
2	ITNHAQQQAQHLTNTELSSA
3	HLTNTELSSAESQSPDTSQI
4	ESQSPDTSQITLKTNREKEQ
5	TLKTNREKEQSQDLVSEPTT
6	SQDLVSEPTTTELADTDSAP
7	TELADTDSAPMANTGPDATQ
8	MANTGPDATQKSASLPPVNT
9	KSASLPPVNTDVHDWVKTG
10	DVHDWVKTGAWDKGYKGQG
11	AWDKGYKGQGVVAVIDTGI
12	KVVAVIDTGIDPAHQSMRIS
13	DPAHQSMRISDVSTAKVKSK
14	DVSTAKVKSKEDMLARQKAA
15	EDMLARQKAAGINYGSWIND
16	GINYGSWINDKVVFAHNYVE
17	KVVFAHNYVENSJNIKENQF
18	NSDNIKENQFEDFDEDWENF
19	EDFDEDWENFEFDAEPKAIK
20	EFDAEPKAIKKHKIYRPQST
21	KHKIYRPQSTQAPKETVIKT
22	QAPKETVIKTEETDGSHDID
23	EETDGSHDIDWTQTDDETKY
24	WTQTDDETKYESHGMHVTGI
25	ESHGMHVTGIVAGNSKEAAA
26	VAGNSKEAAATGERFLGIAP
27	TGERFLGIAPEAQVMFMRVF

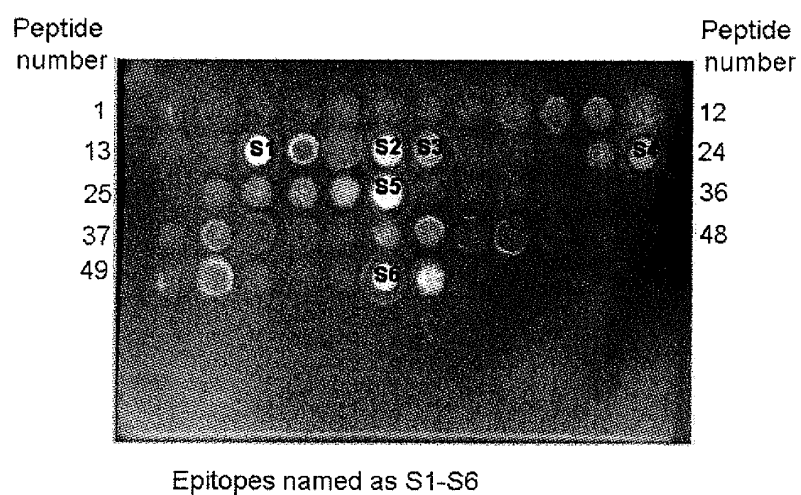
Figure 13

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28 EAQVMFMRVVFANDVMGSAES
29 ANDVMGSAESLFIKAIEDAV
30 **LFIKAIEDAVALGADVINS**
31 ALGADVINSLSGTANGAQLS
32 LGTANGAQLSGSKPLMEAIE
33 GSKPLMEAIEKAKKAGVSVV
34 KAKKAGVSVVVAAGNERVYG
35 VAAGNERVYGSDHDDPLATN
36 SDHDDPLATNPDYGLVGSPS
37 PDYGLVGSPSTGRTPTSVAA
38 TGRTPTSVAAINS KWWI QRL
39 INSKWWI QRLMTVKELENRA
40 MTVKELENRADLNHGKAIYS
41 DLNHGKAIYSESVD FKDIKD
42 ESVD FKDIKDSLGYDKSHQF
43 SLGYDKSHQFAYVKESTDAG
44 AYVKESTDAGYKAQDVKGKI
45 YKAQDVKGKIALIERDLNKT
46 ALIERDLNKTYDEMIALAKK
47 YDEMIALAKKHGALGVLI FN
48 HGALGVLI FN NKPQSNRSM
49 NKPQSNRSMRLTANGMGVP
50 RLTANGMGVPSAFISHEFGK
51 SAFISHEFGKAMSQLNGNGT
52 AMSQLNGNGTGSLEFDSVVS
53 GSLEFDSVVS KAPSQKGNEM
54 **KAPSQKGNEMNHFSNWGLTS**
55 SQKGNEMNHFSNWGLTSDGY

Figure 13 cont'd

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**Figure 14**

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Epitope ID	Amino acid numbers	Sequence
S1	175-194	EDMLARQKAAGINYGSWIND
S2	205-224	NSDNIKENQFEDFDEDWENF
S3	215-234	EDFDEDWENFEFDAEPKAIK
S4	265-284	WTQTDDETKYESHGMHVTGI
S5	325-344	LFIKAIEDAVALGADVINLS
S6	565-584	KAPSQKGNEMNHFSNWGLTS

Figure 15

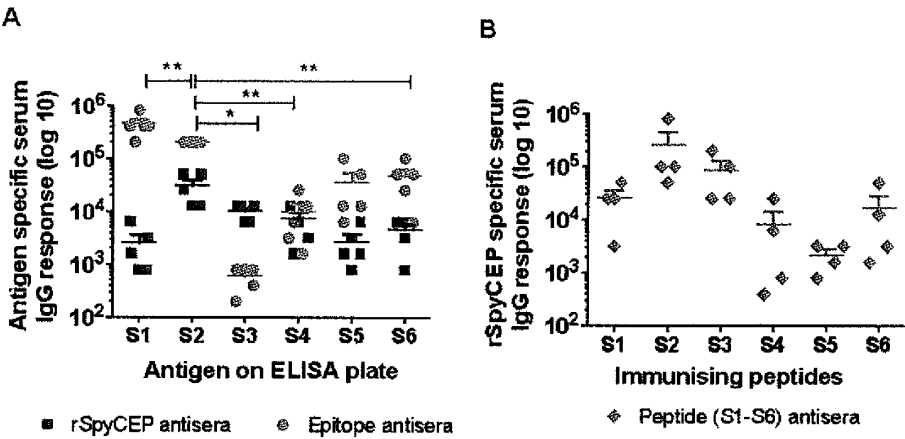


Figure 16

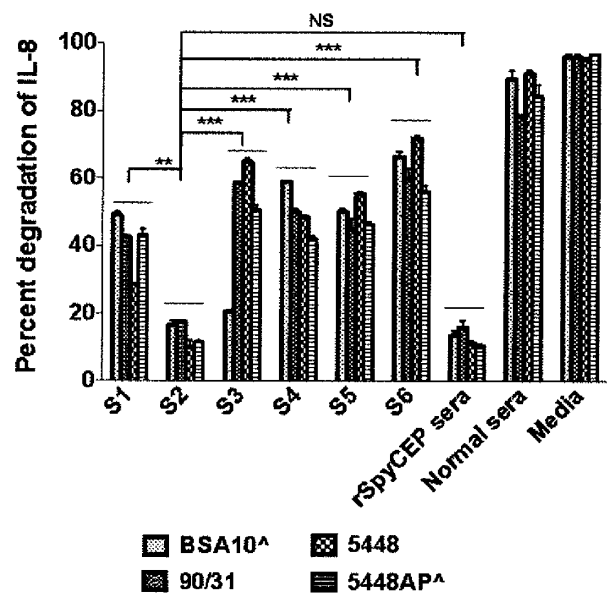


Figure 17

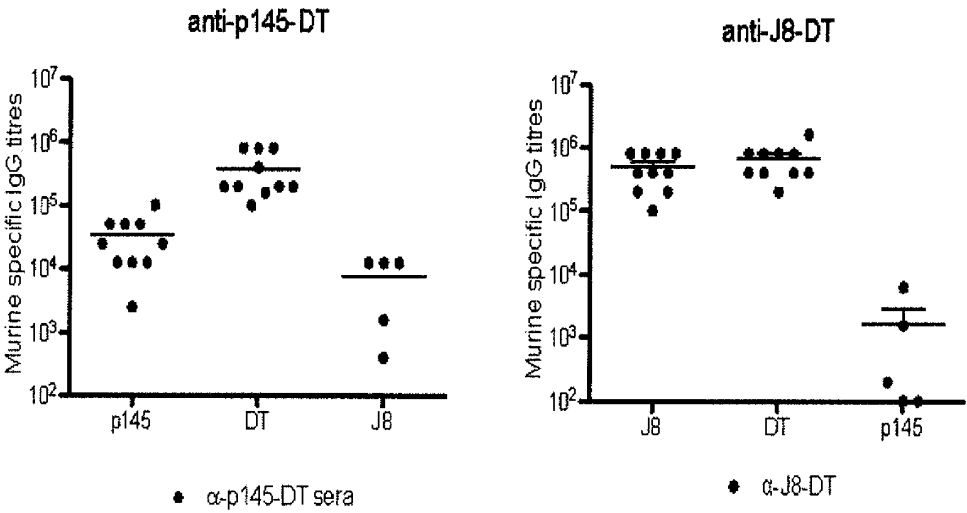


Figure 18

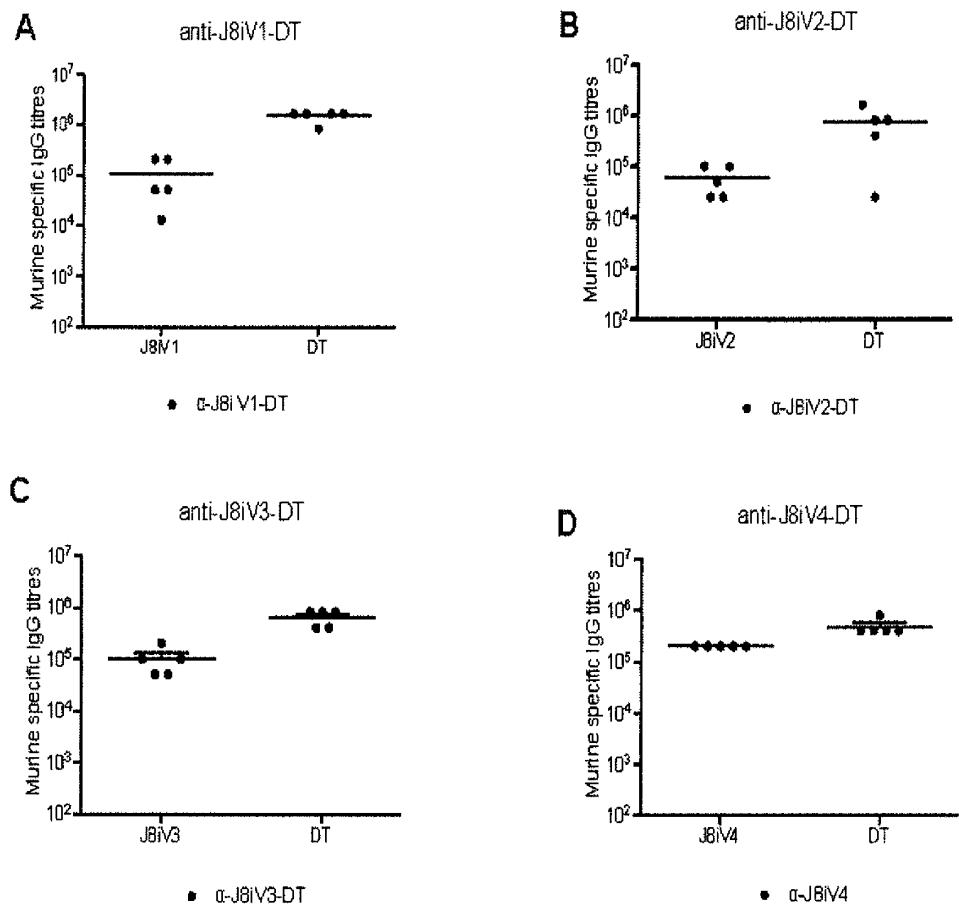


Figure 19

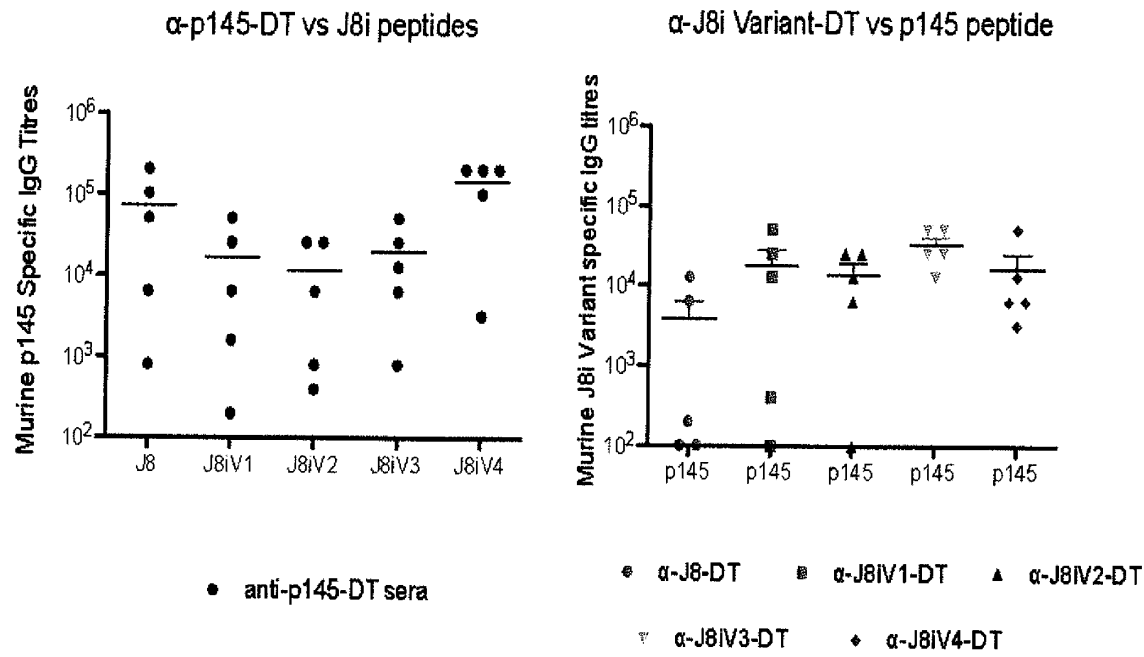


Figure 20

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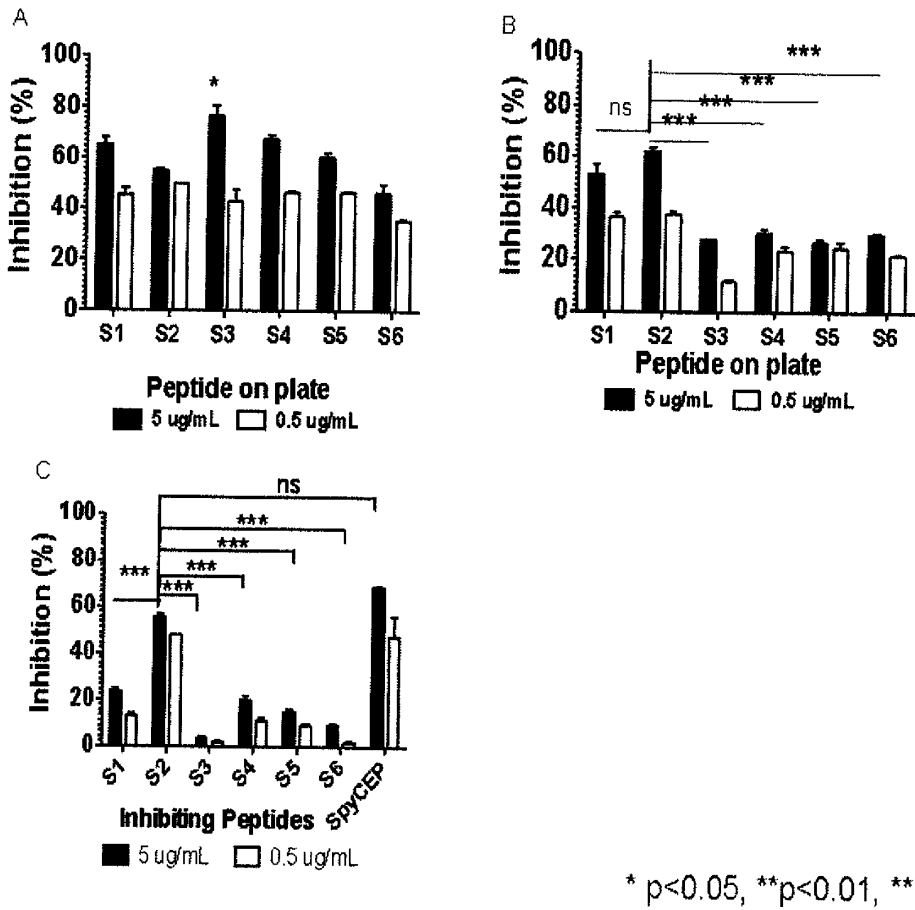


Figure 21

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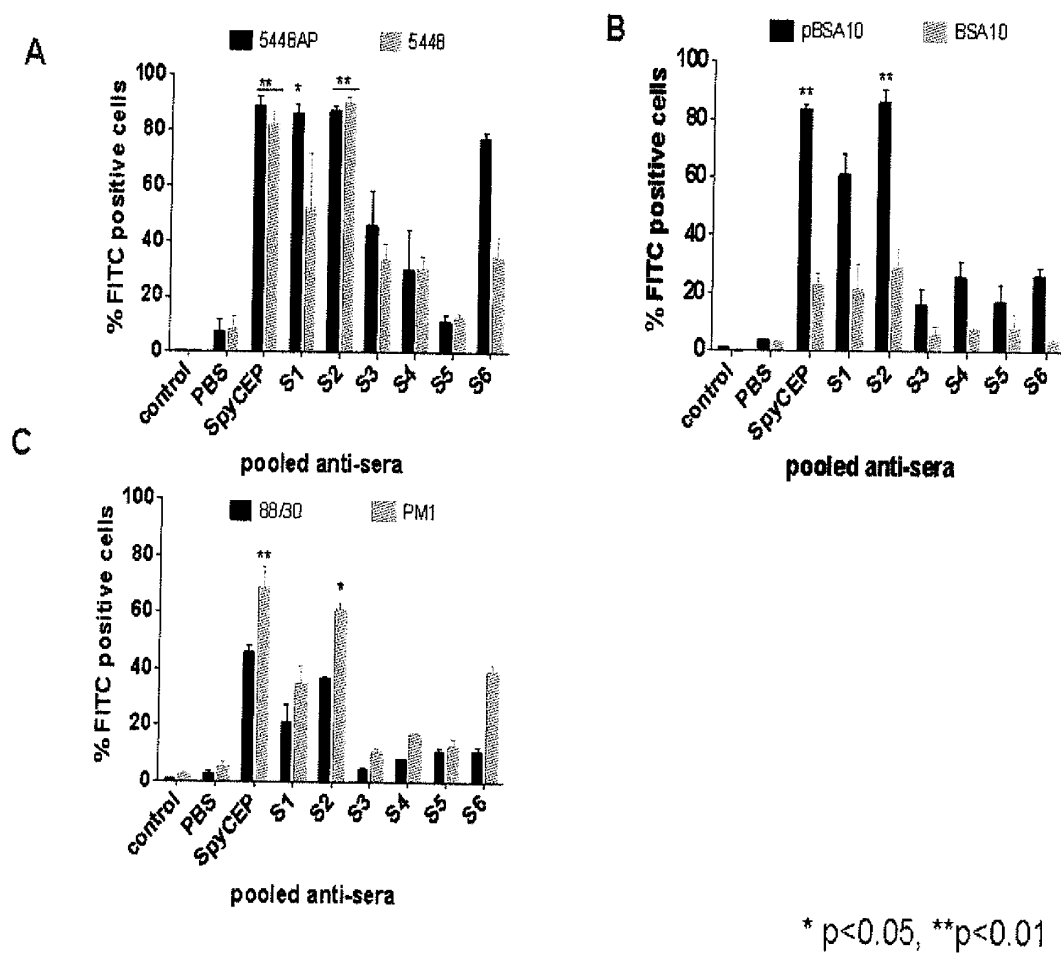
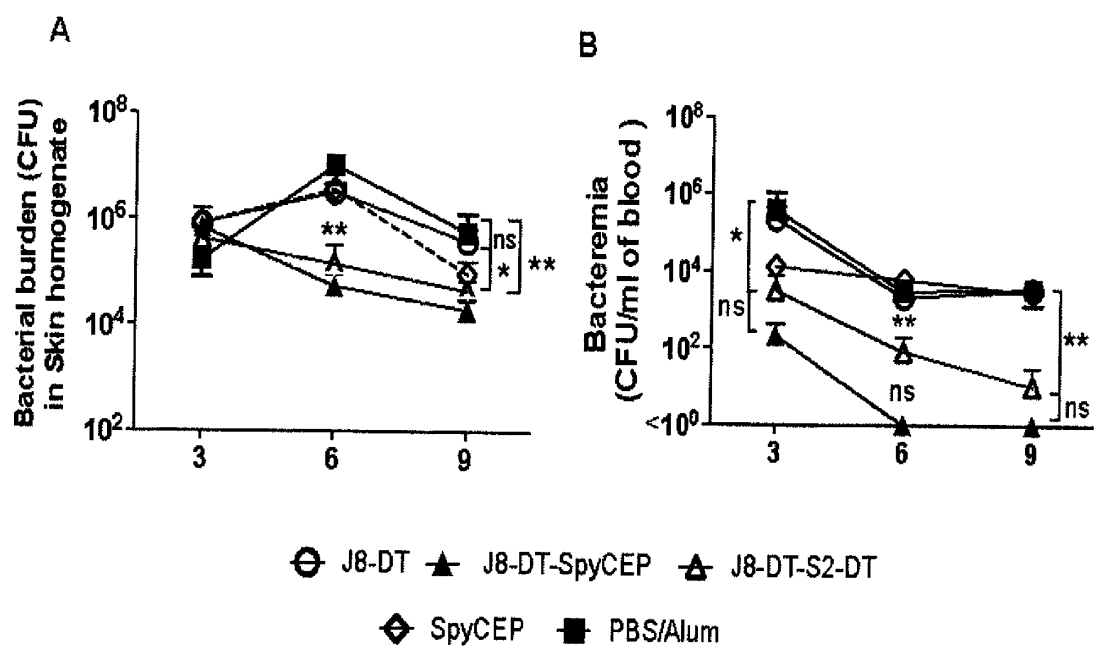


Figure 22

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* $p < 0.05$, ** $p < 0.01$, ns $p > 0.05$

Figure 23

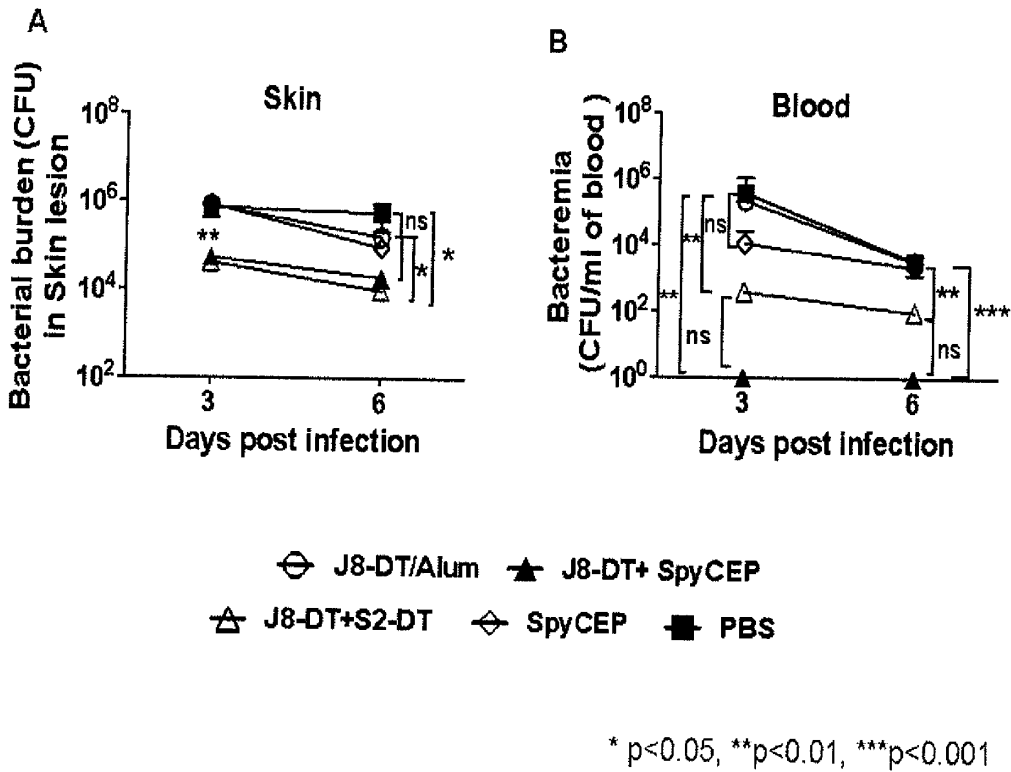


Figure 24