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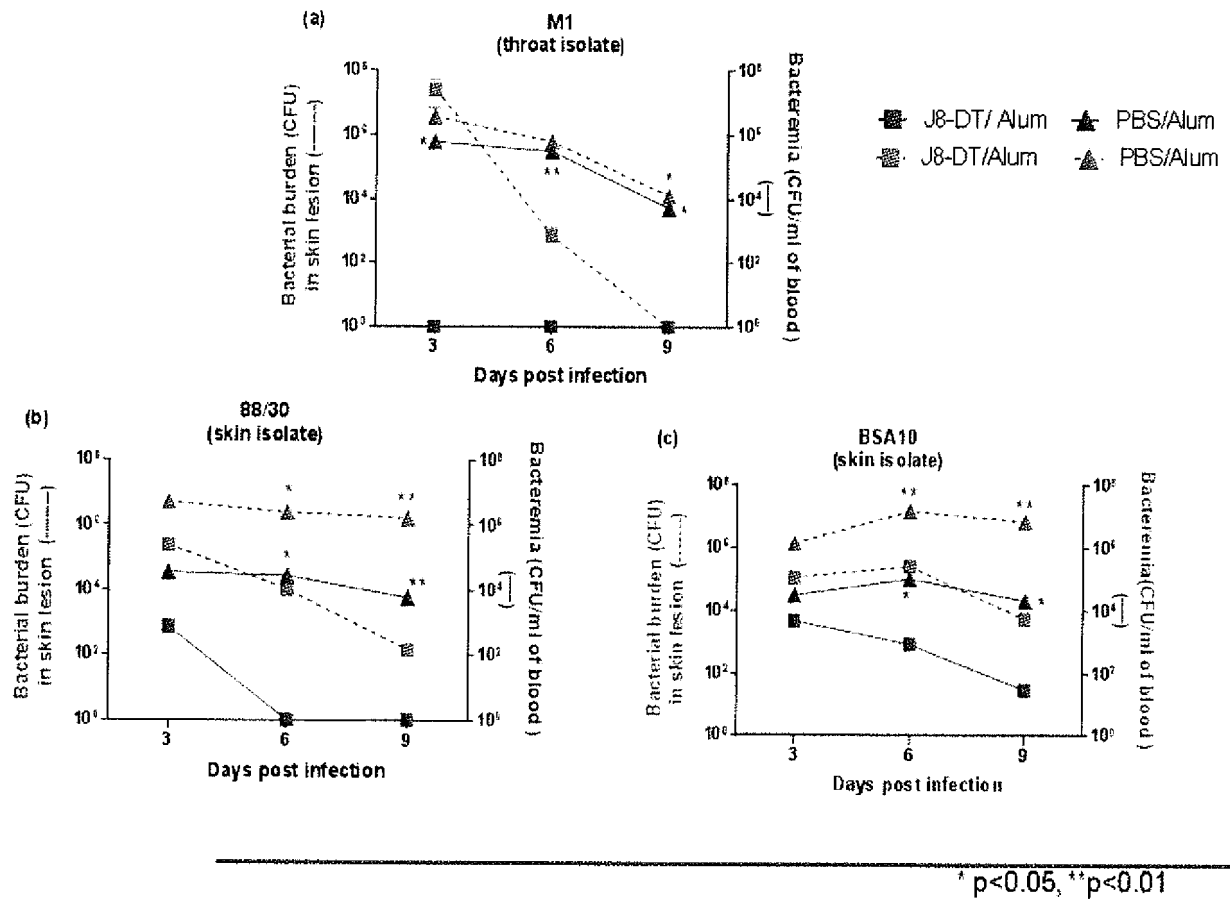


Figure 1

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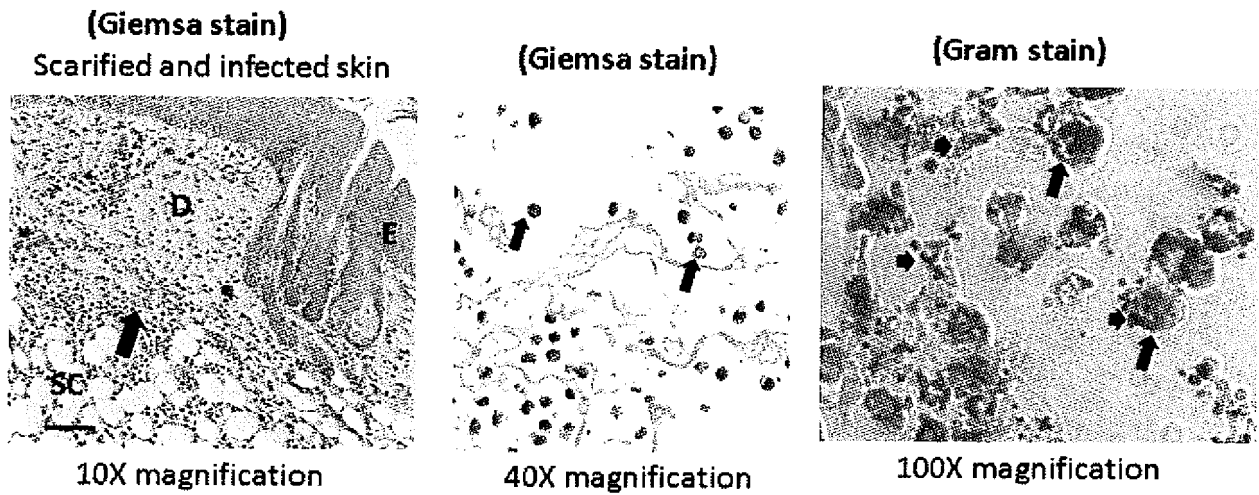


Figure 2

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GAS clinical isolate 90/31*

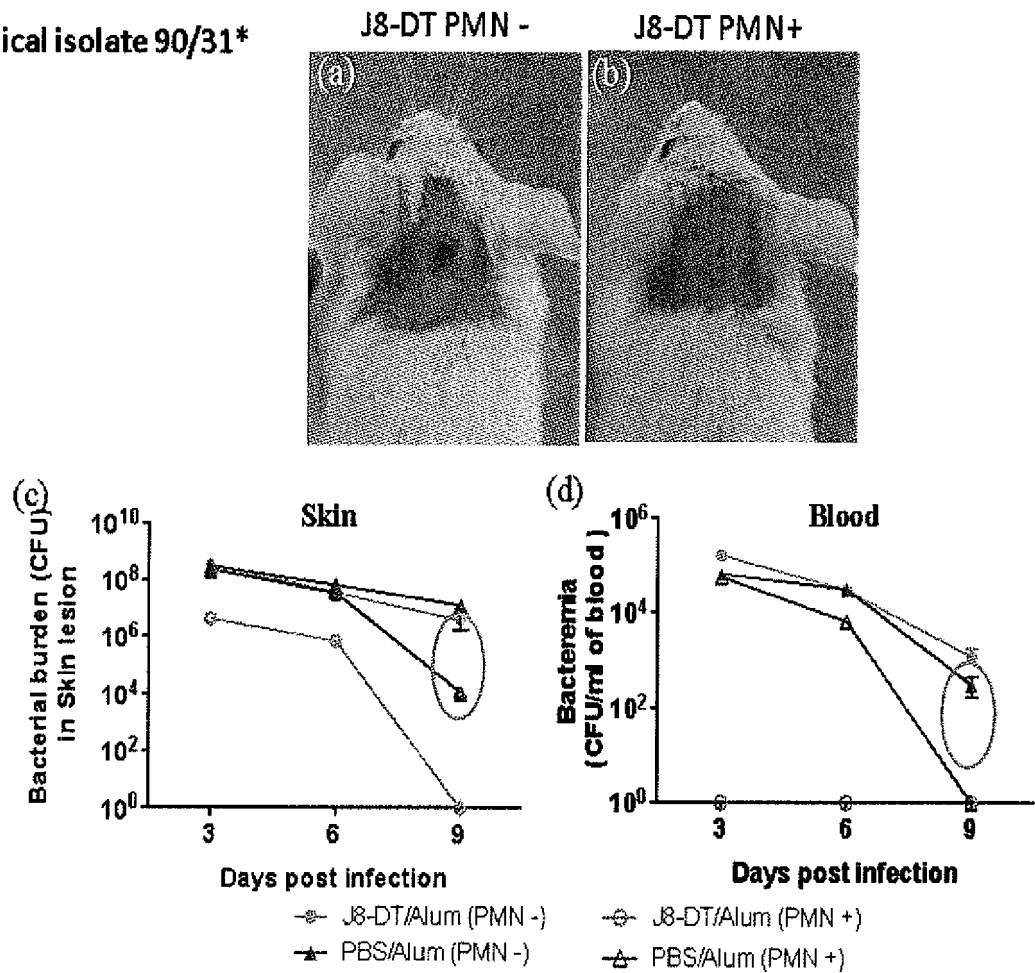


Figure 3

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

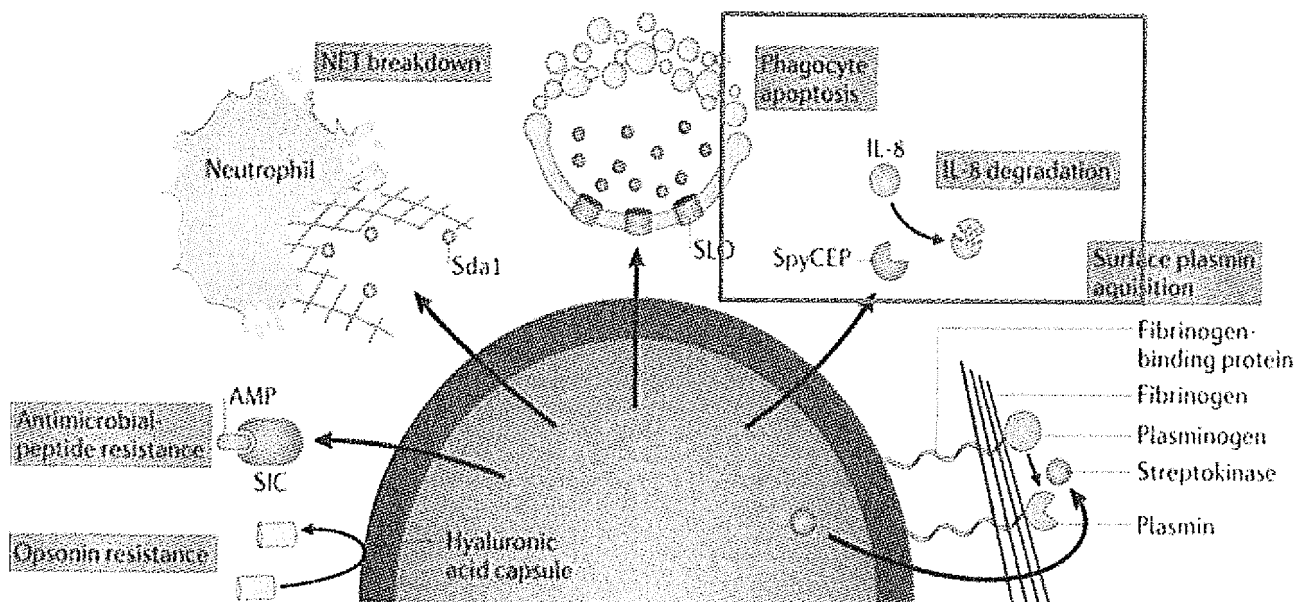
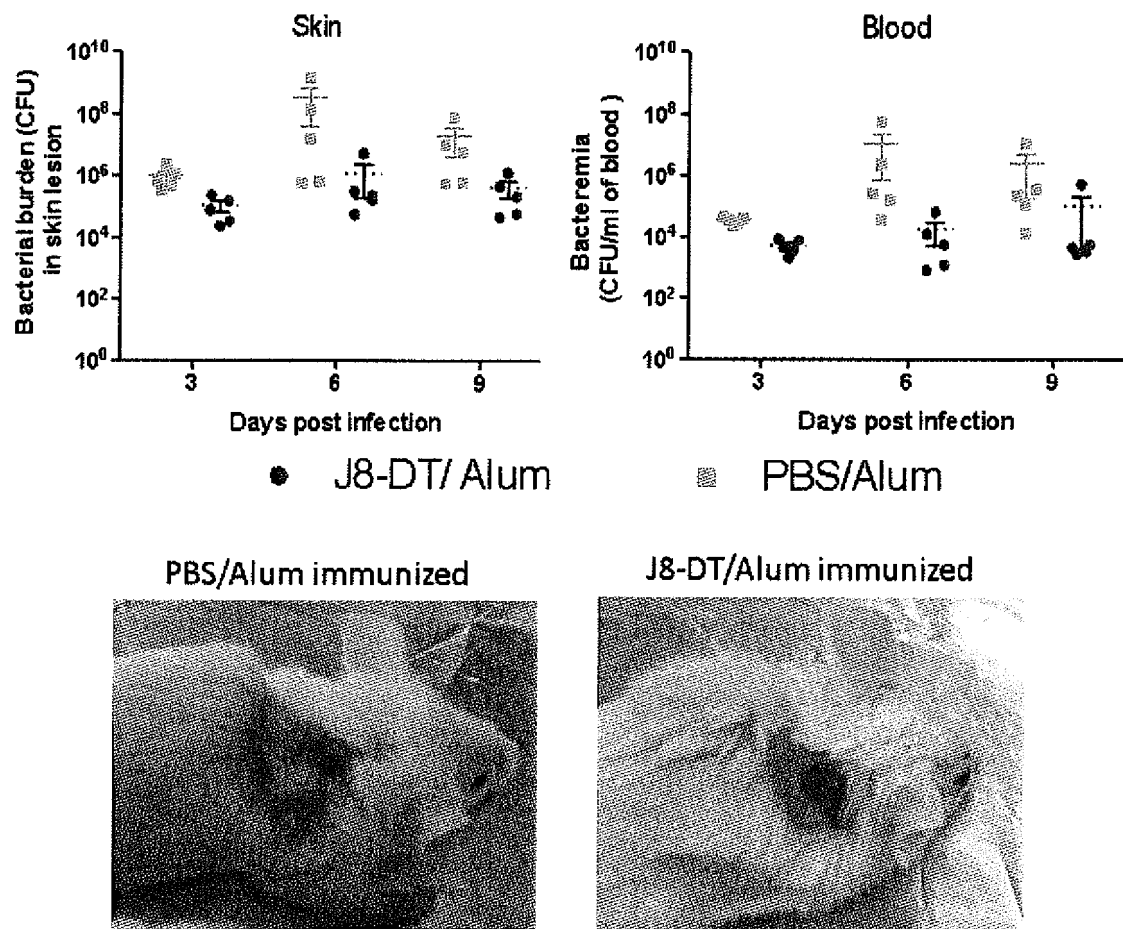


Figure 4

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**Figure 5**

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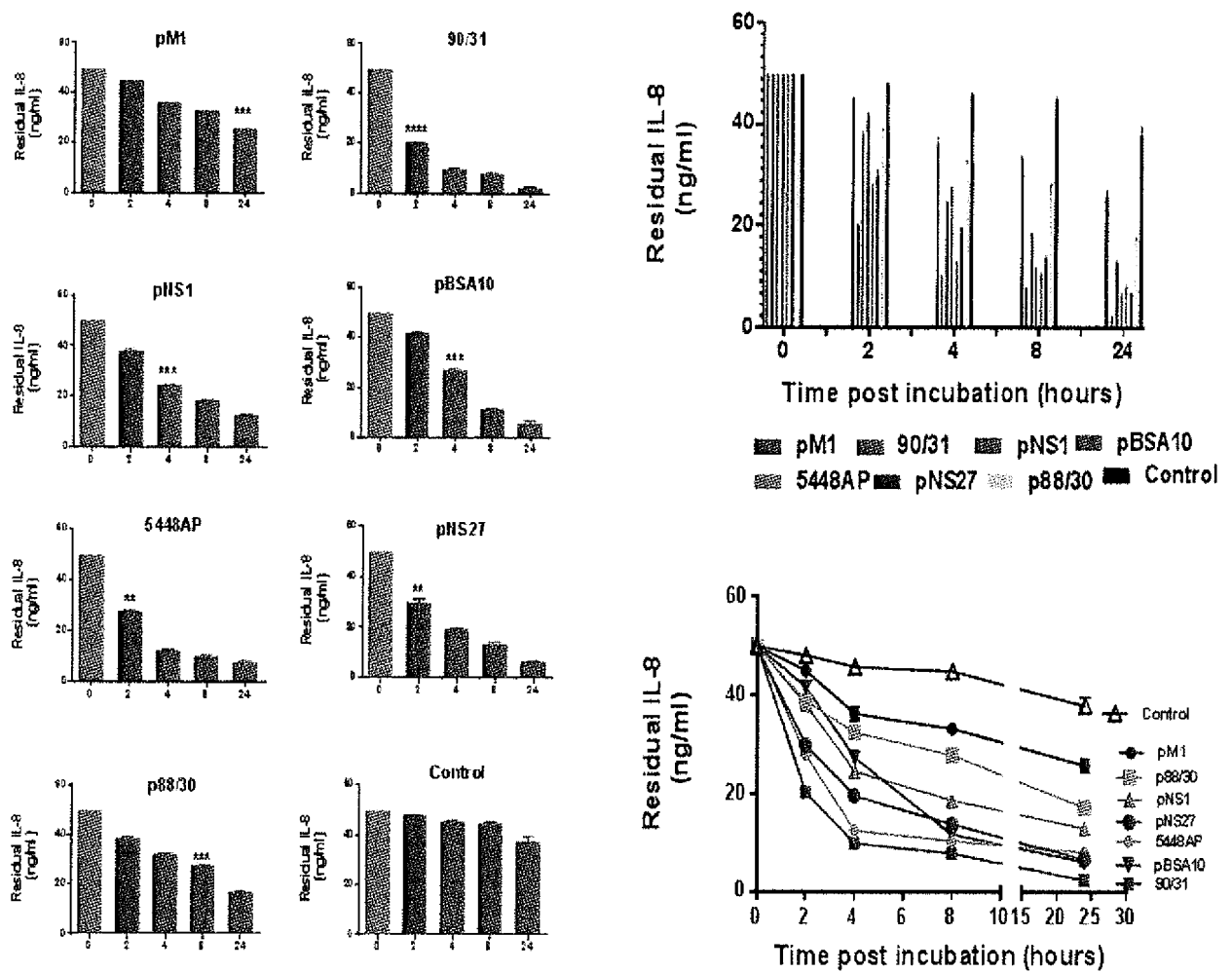


Figure 6

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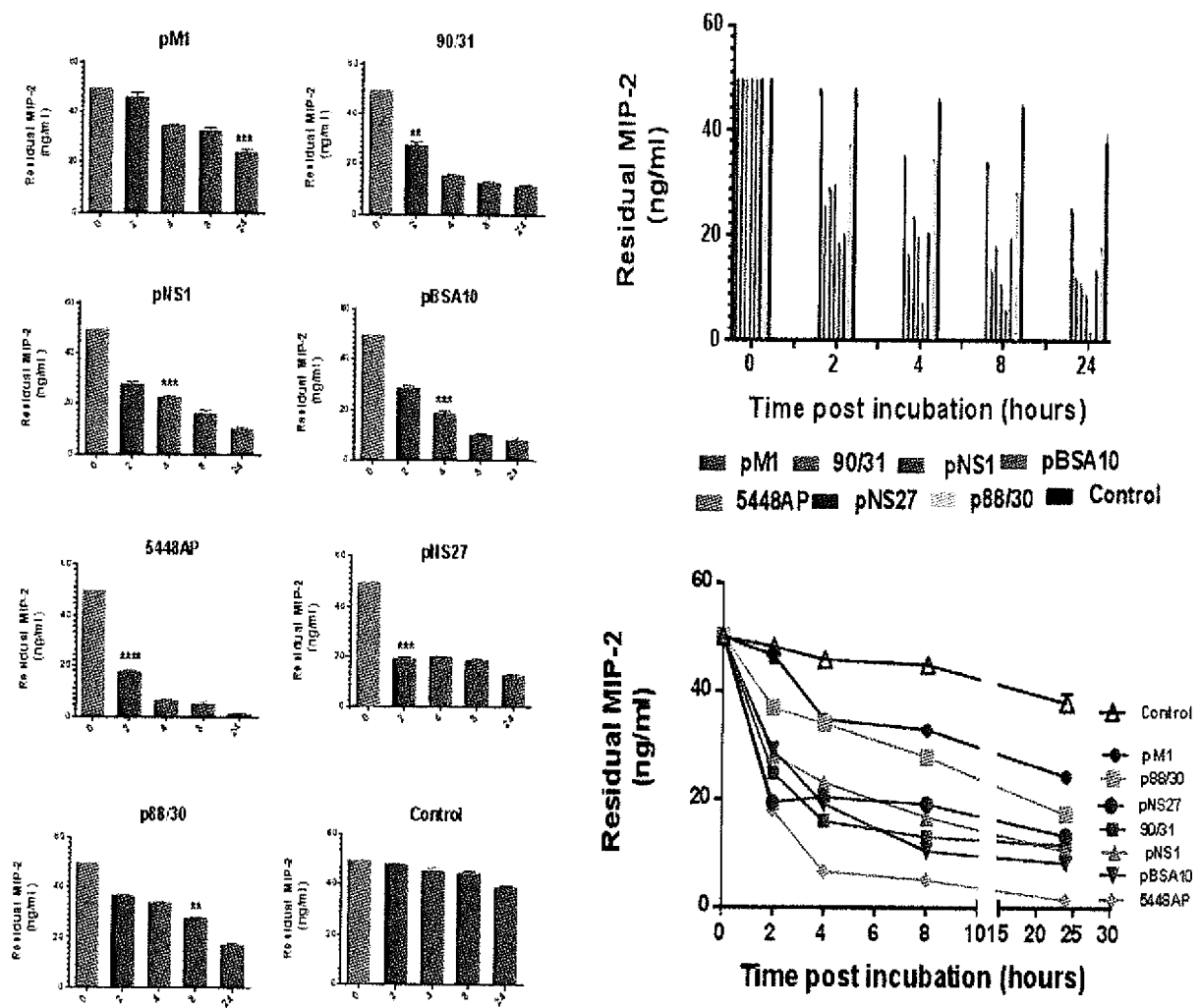


Figure 7

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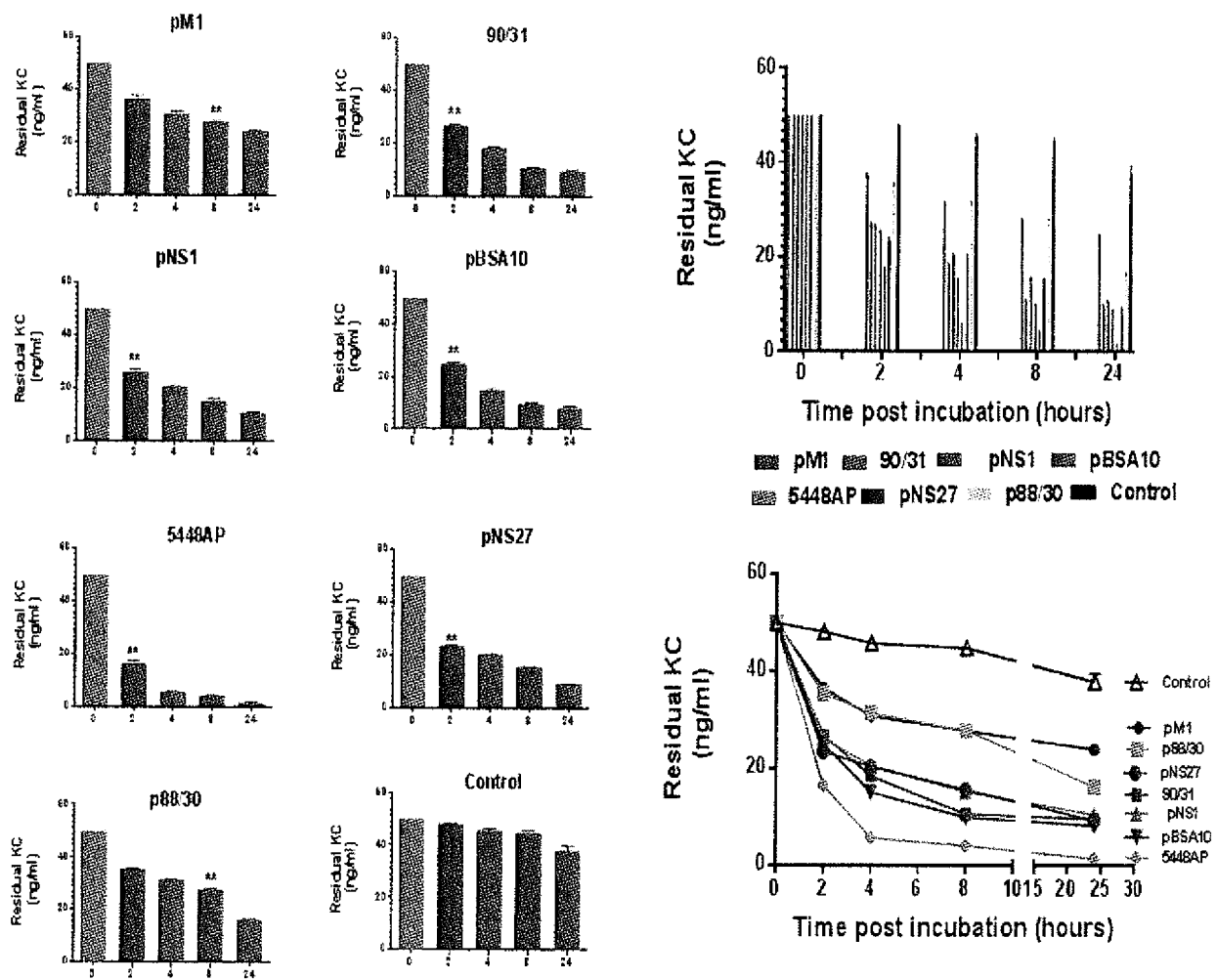
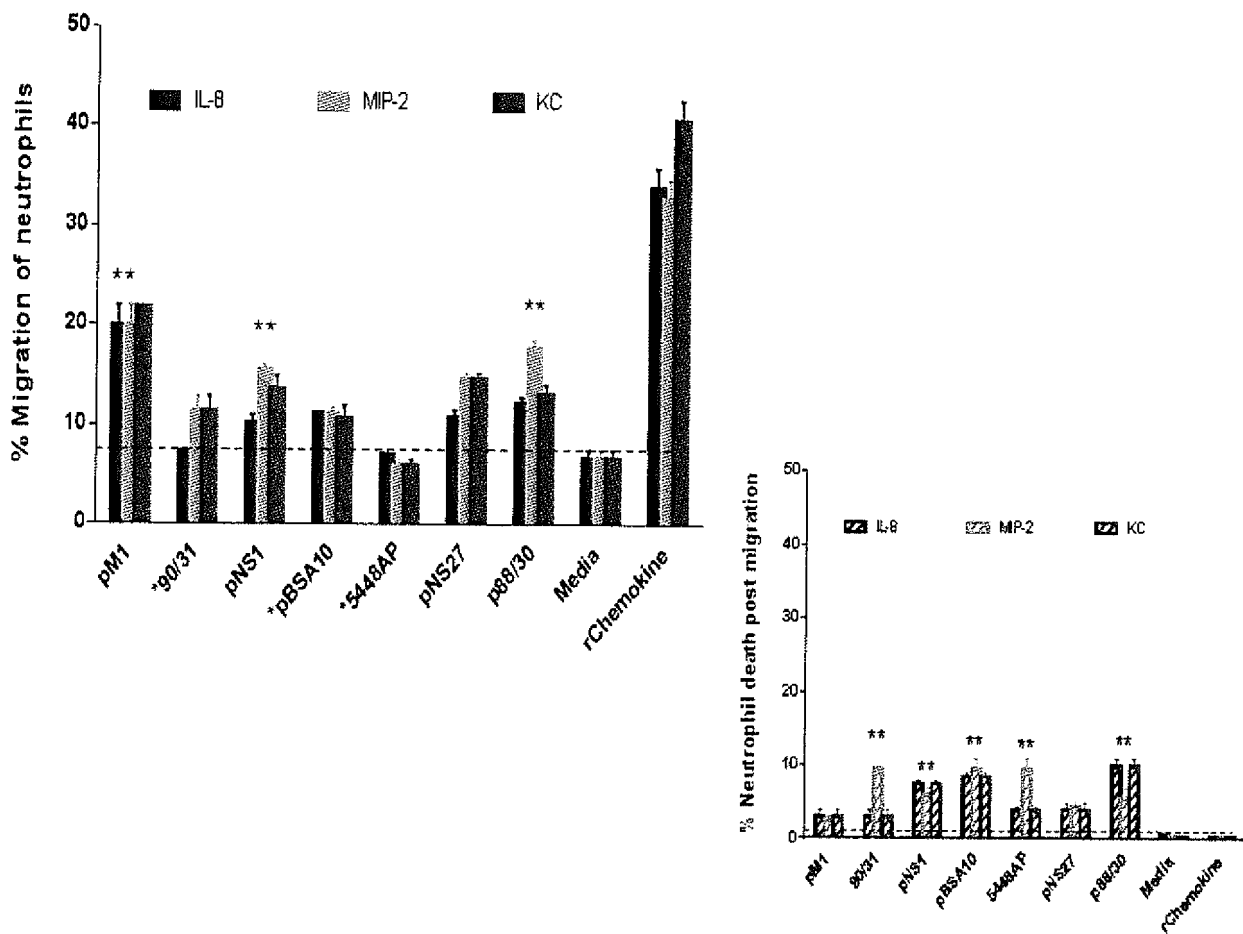


Figure 8

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**Figure 9**

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Skin infection with GAS 5448AP strain

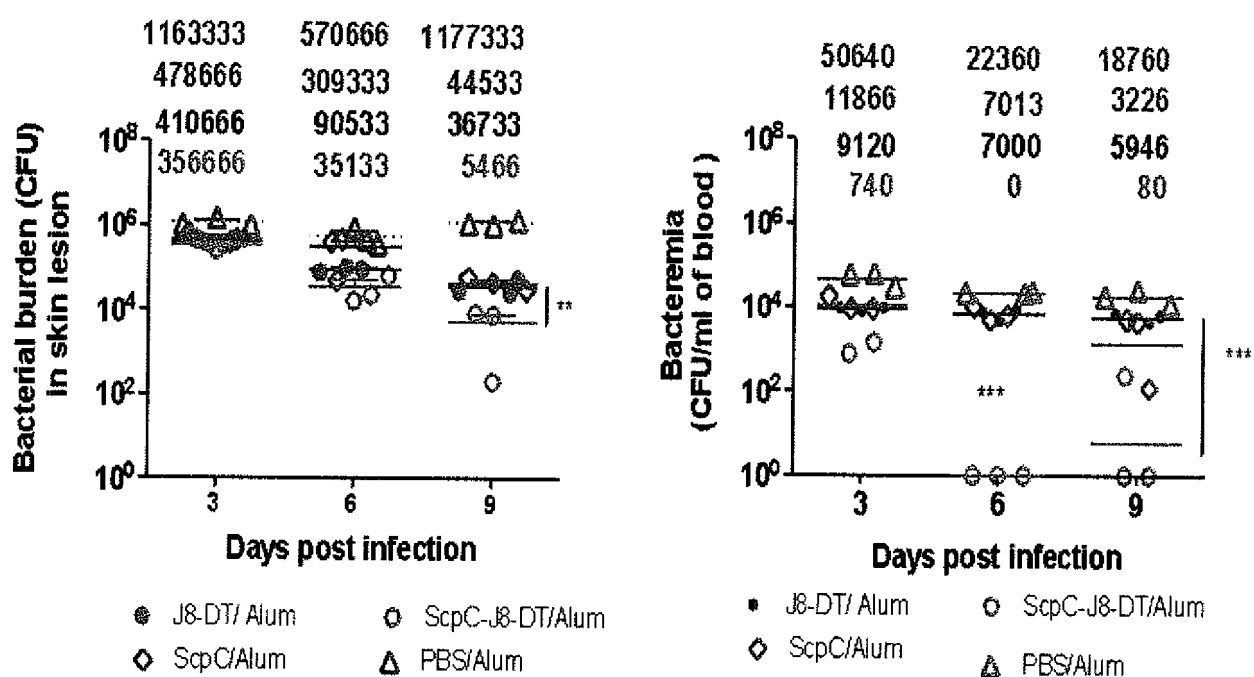
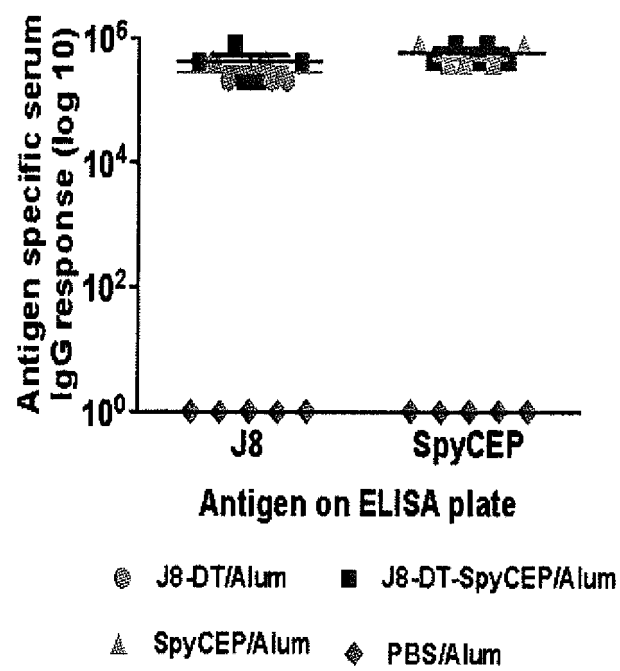
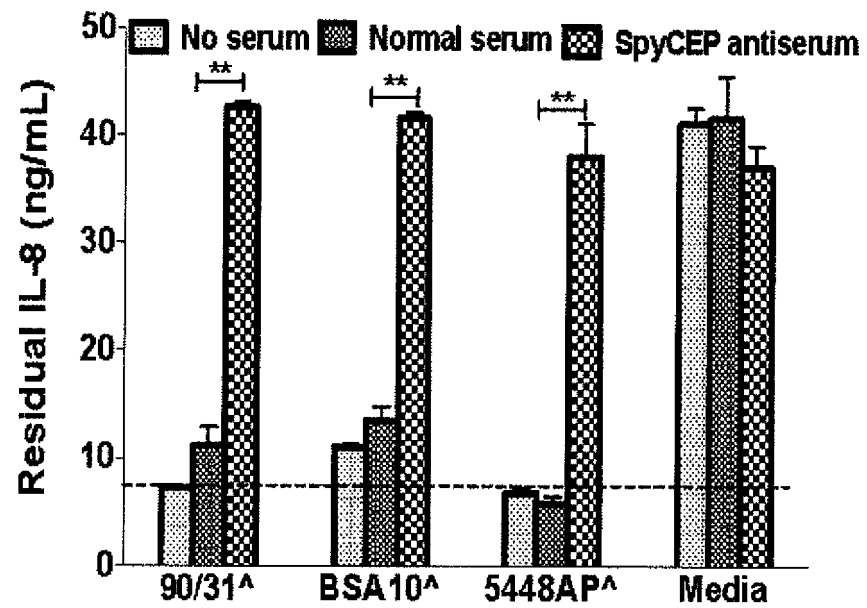


Figure 10

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**Figure 11**

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**Figure 12**

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

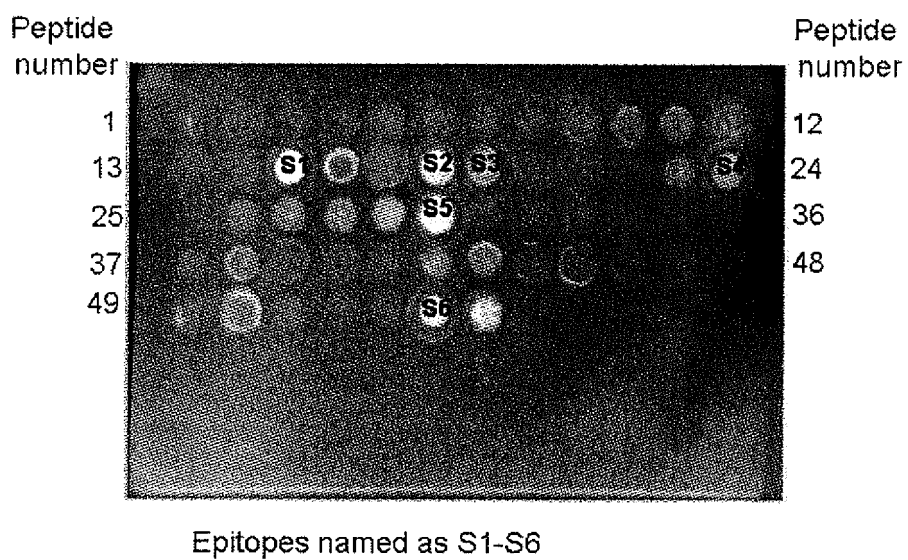
Figure 13

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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 TGRTPTSVAAINSKWVIQRL
39 INSKWVIQRLMTVKELENRA
40 MTVKELENRADLNHGKAIYS
41 DLNHGKAIYSESVDKDIKD
42 ESVDKDIKDSLGYDKSHQF
43 SLGYDKSHQFAYVKESTDAG
44 AYVKESTDAGYKAQDVKGKI
45 YKAQDVKGKIALIERDLNKT
46 ALIERDLNKTYDEMIALAKK
47 YDEMIALAKKHGALGVLI FN
48 HGALGVLI FN NKPGQSNRSM
49 NKPGQSNRSMRLTANGMGVP
50 RL TANGMGVPSAFISHEFGK
51 SAFISHEFGKAMSQNLNGNT
52 AMSQNLNGNTGSLEFDSVVS
53 GSLEFDSVVSKAPSQKGNEM
54 **KAPSQKGNEMNHFSNWGLTS**
55 SQKGNEMNHFSNWGLTSDGY

Figure 13 cont'd

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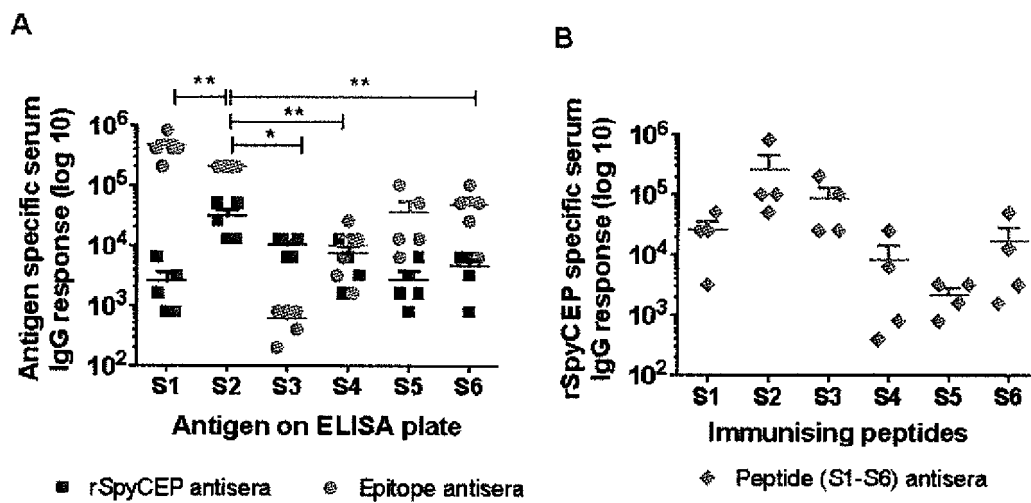
**Figure 14**

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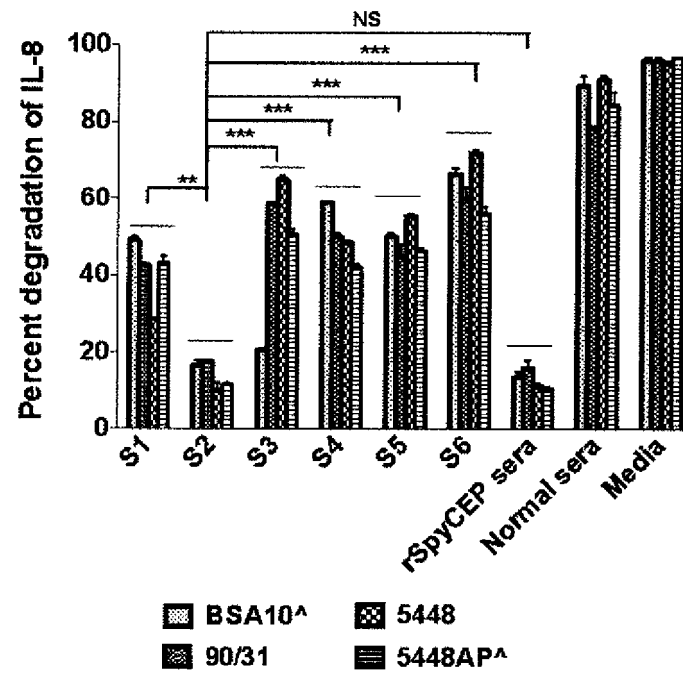
Epitope ID	Amino acid numbers	Sequence
S1	175-194	EDMLARQKAAGINYGSWIND
S2	205-224	NSDNIKENQFEDFDEDWENF
S3	215-234	EDFDEDWENFEFDAEPKAIK
S4	265-284	WTQTDDETKYESHGMHVTGI
S5	325-344	LFIKAIEDAVALGADVINS
S6	565-584	KAPSQKGNEMNHFSNWGLTS

Figure 15

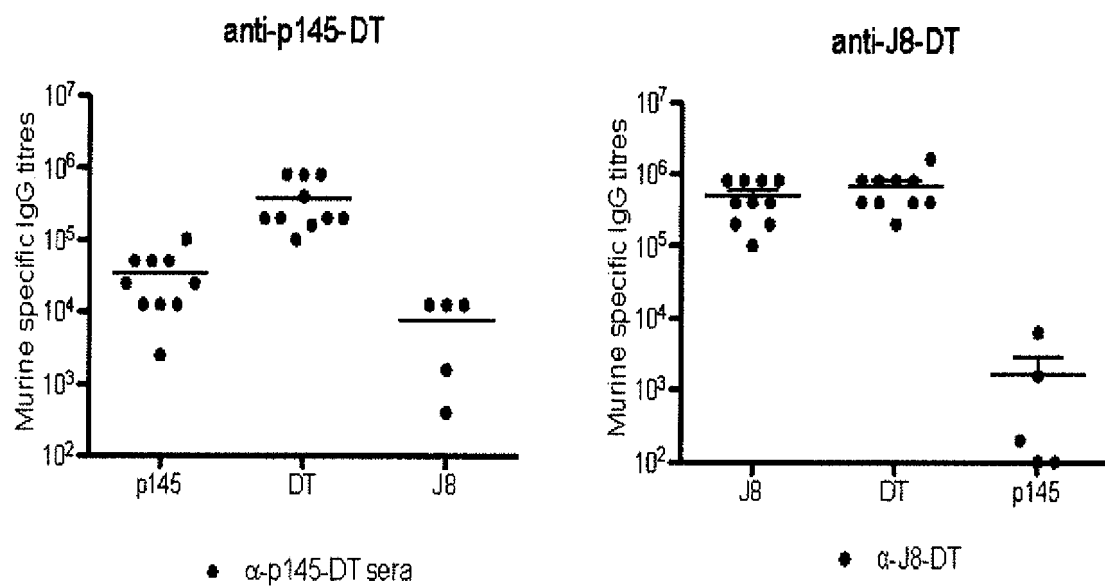
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**Figure 16**

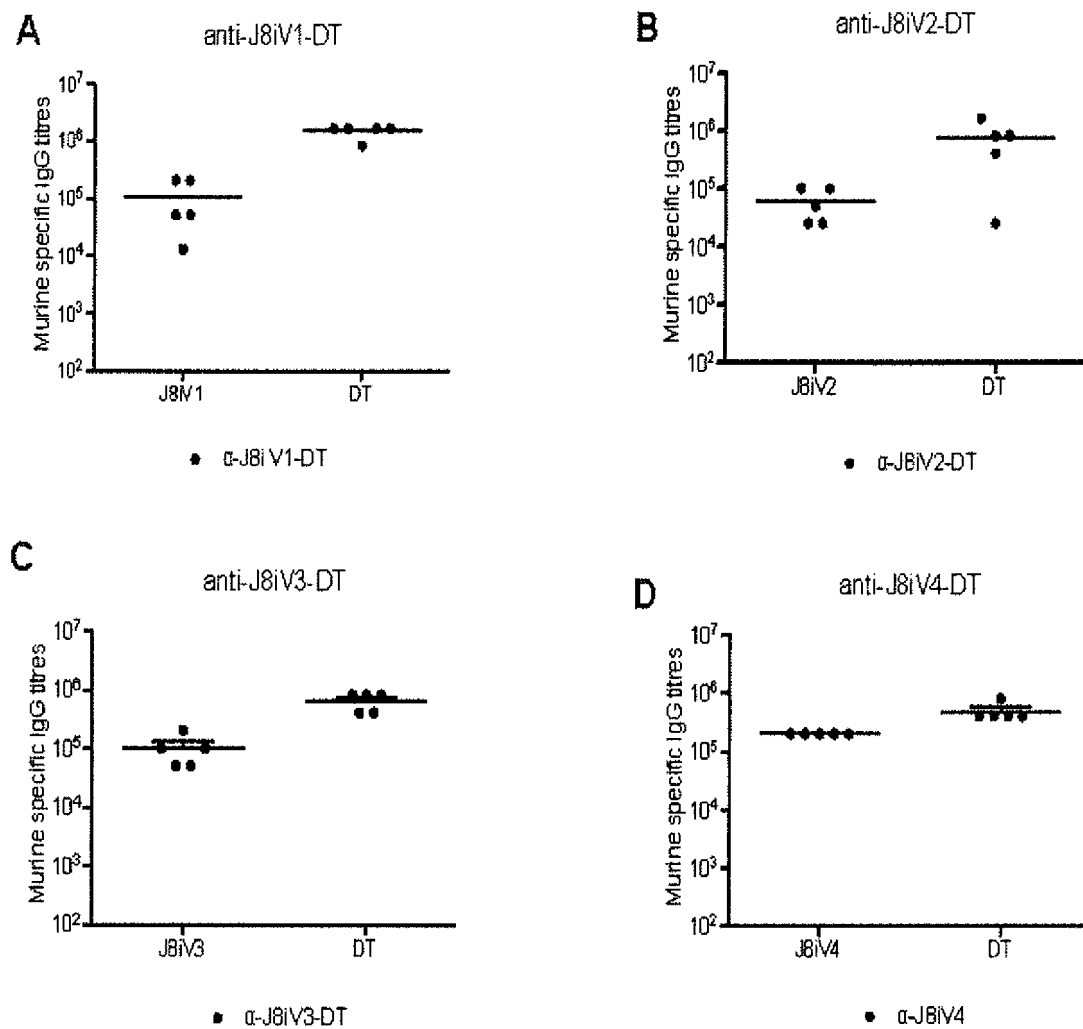
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**Figure 17**

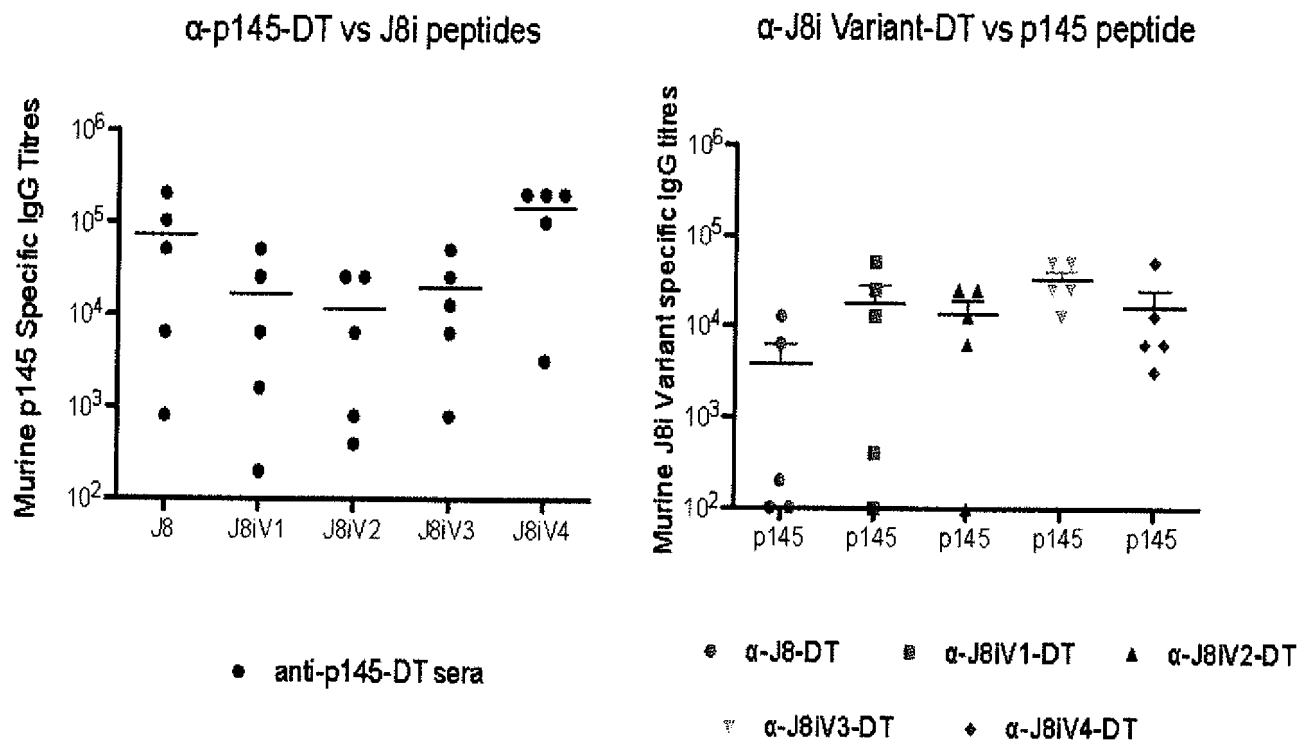
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**Figure 18**

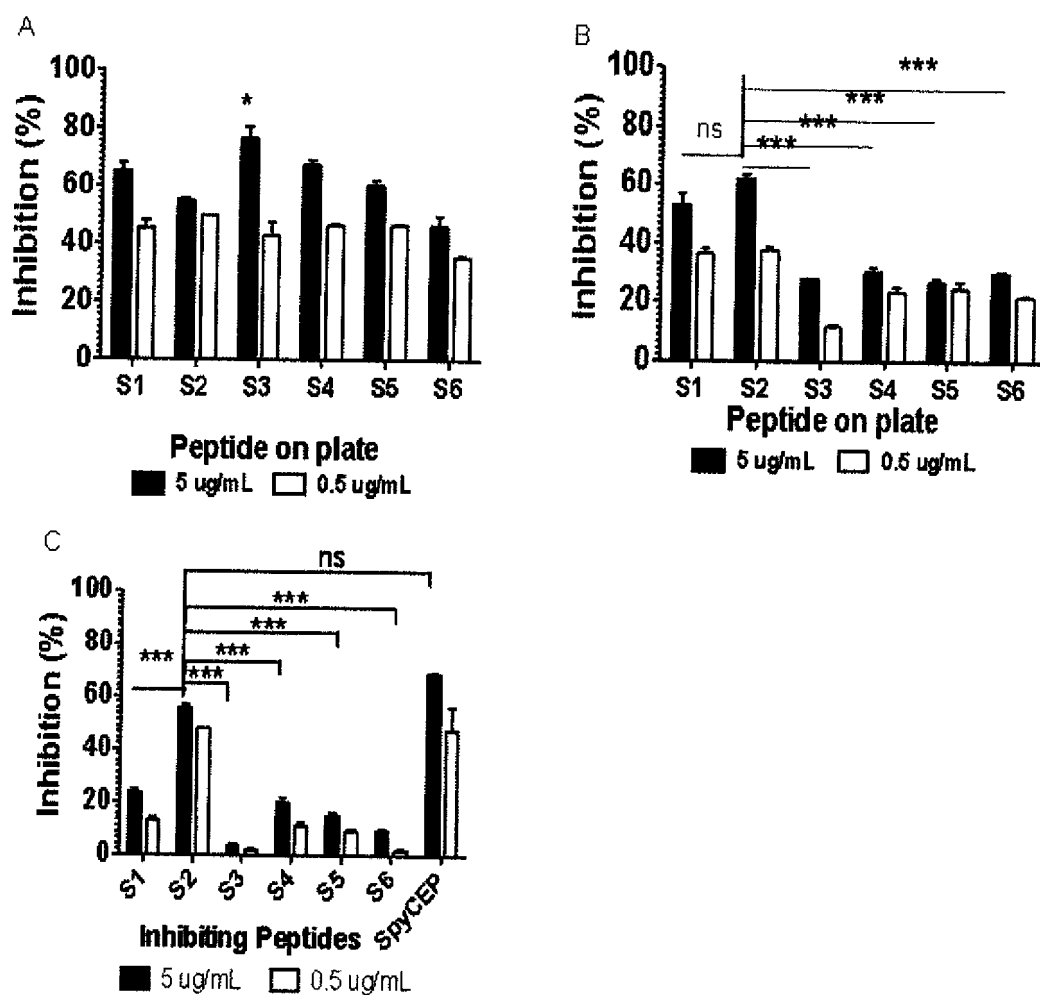
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**Figure 19**

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**Figure 20**

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* p<0.05, **p<0.01, ***p<0.001

Figure 21

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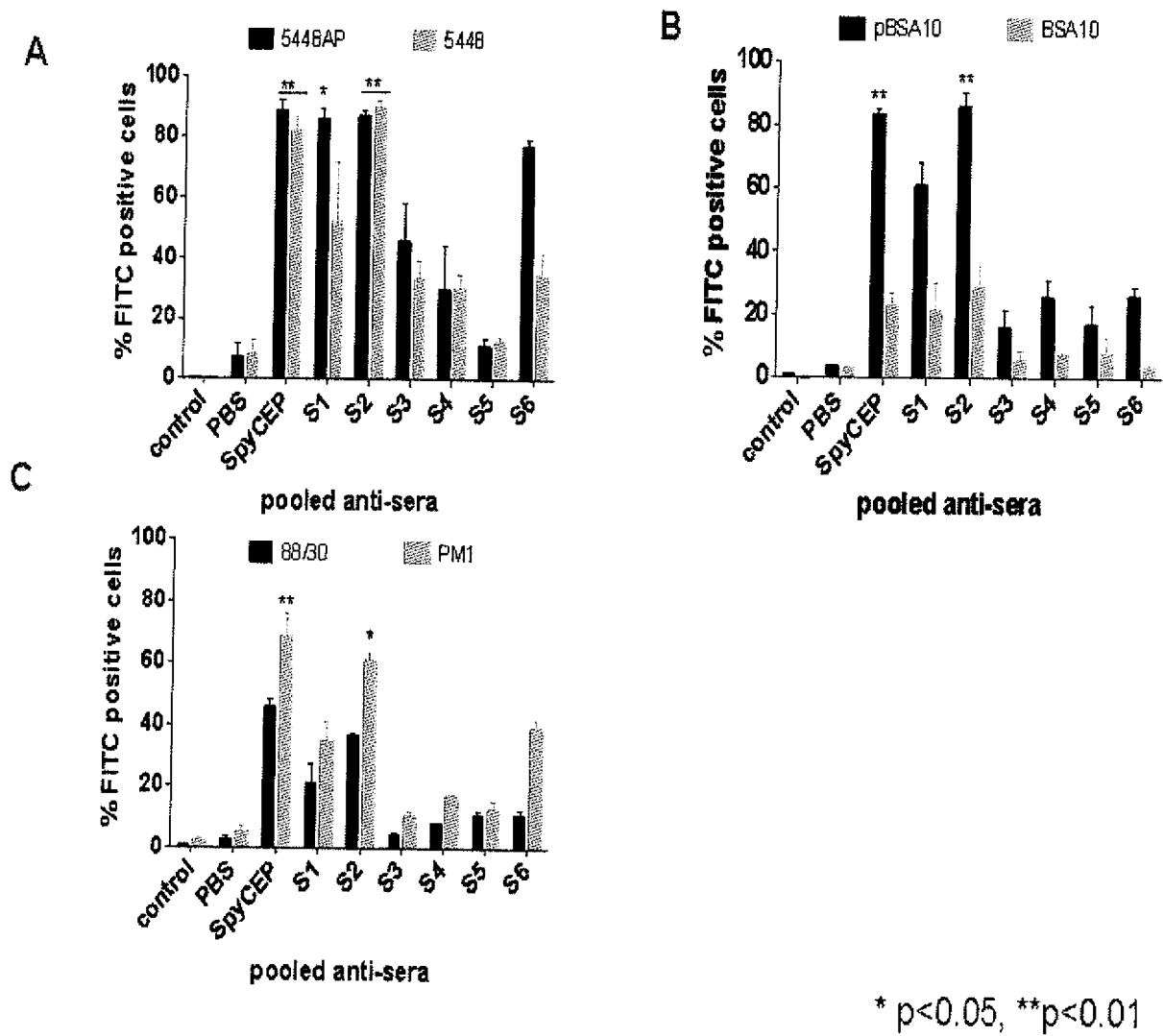


Figure 22

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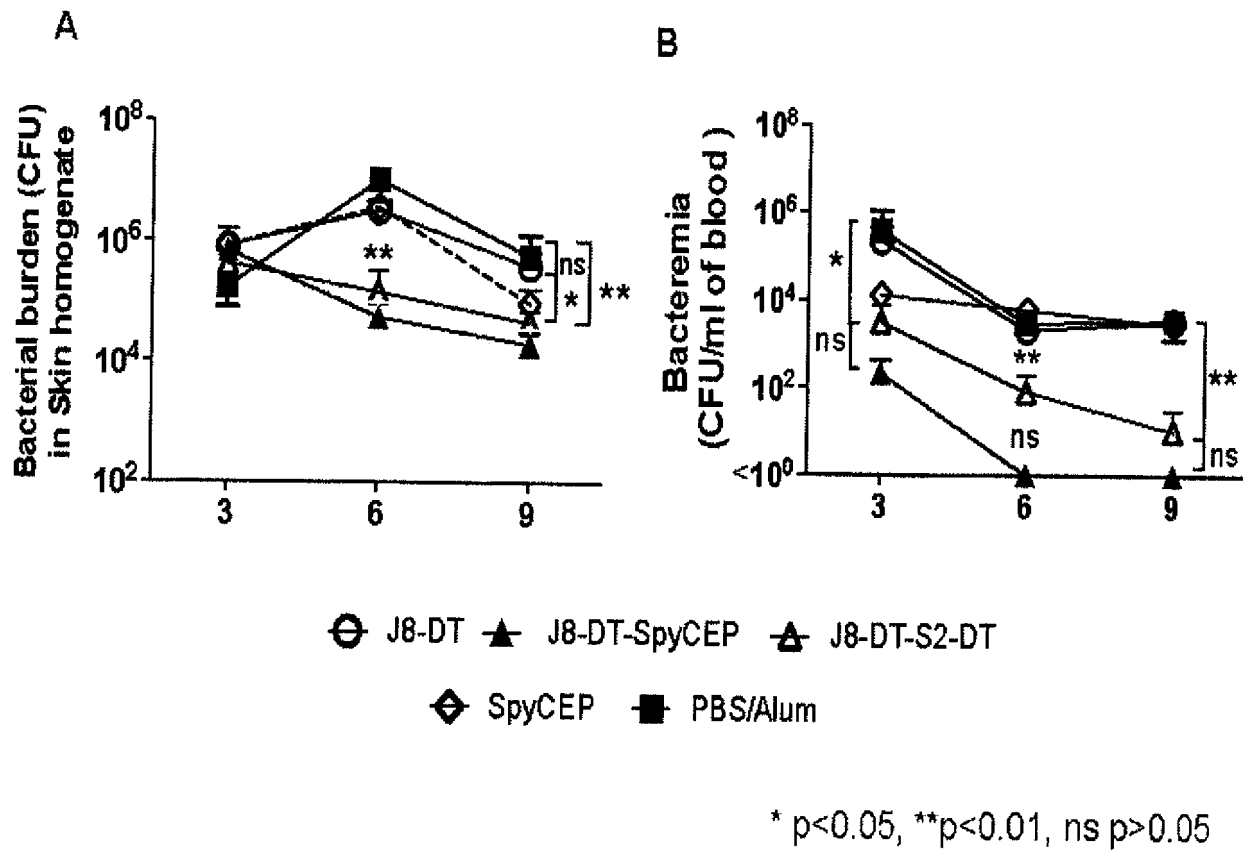
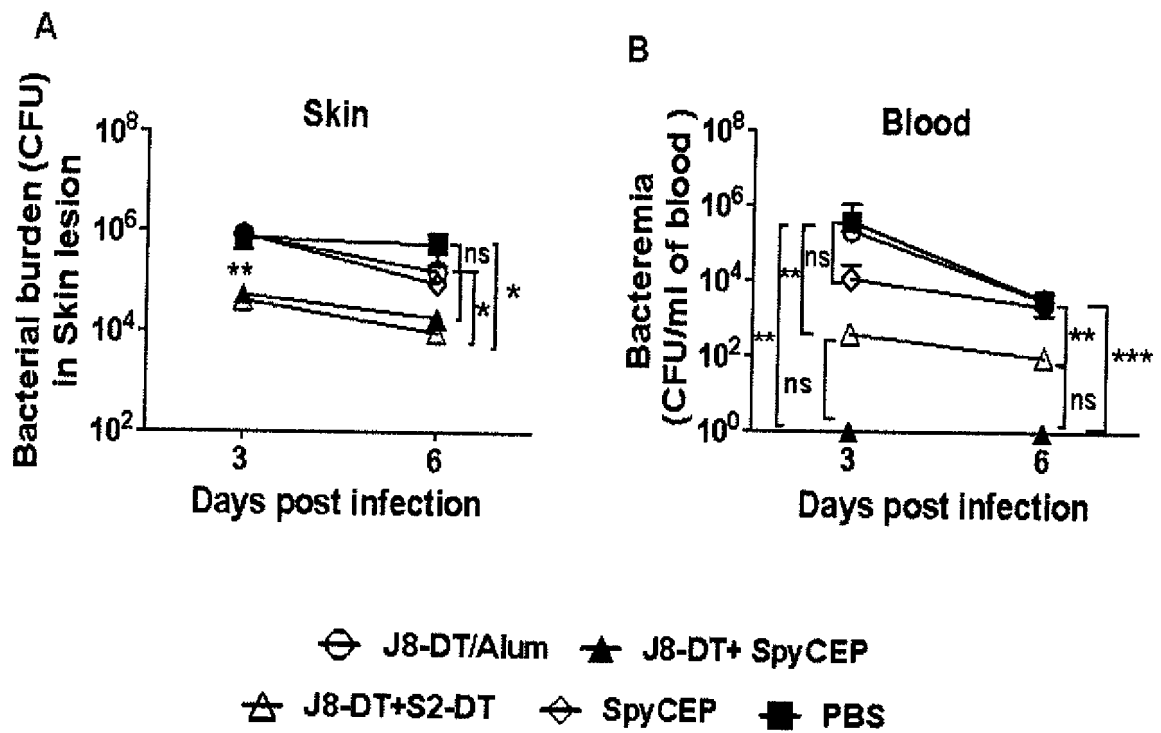


Figure 23

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* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 24