

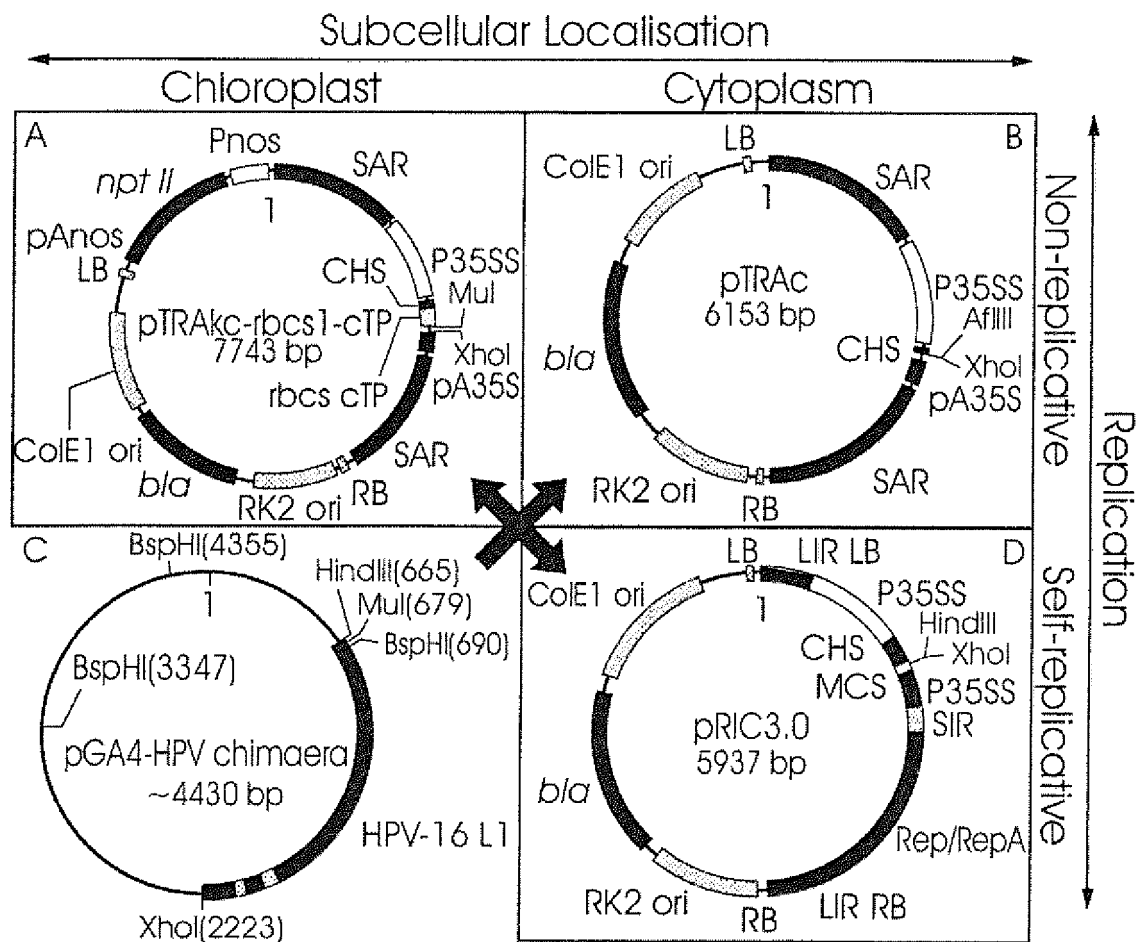


Fig. 1

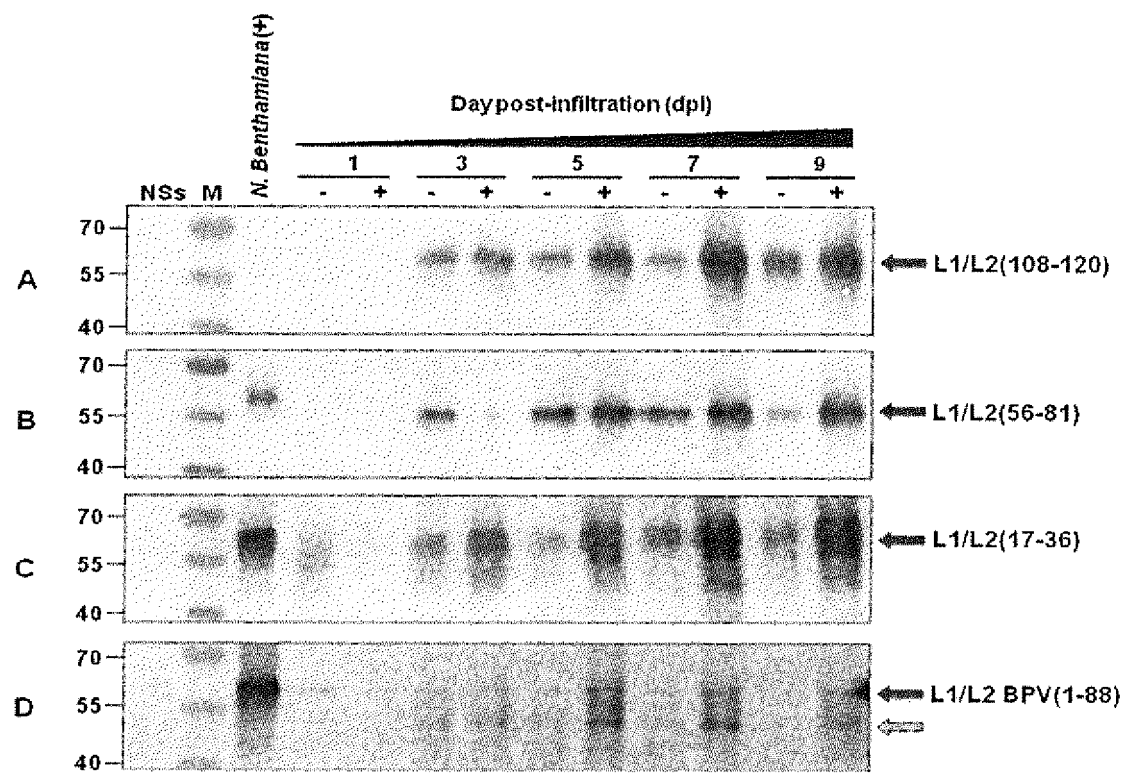
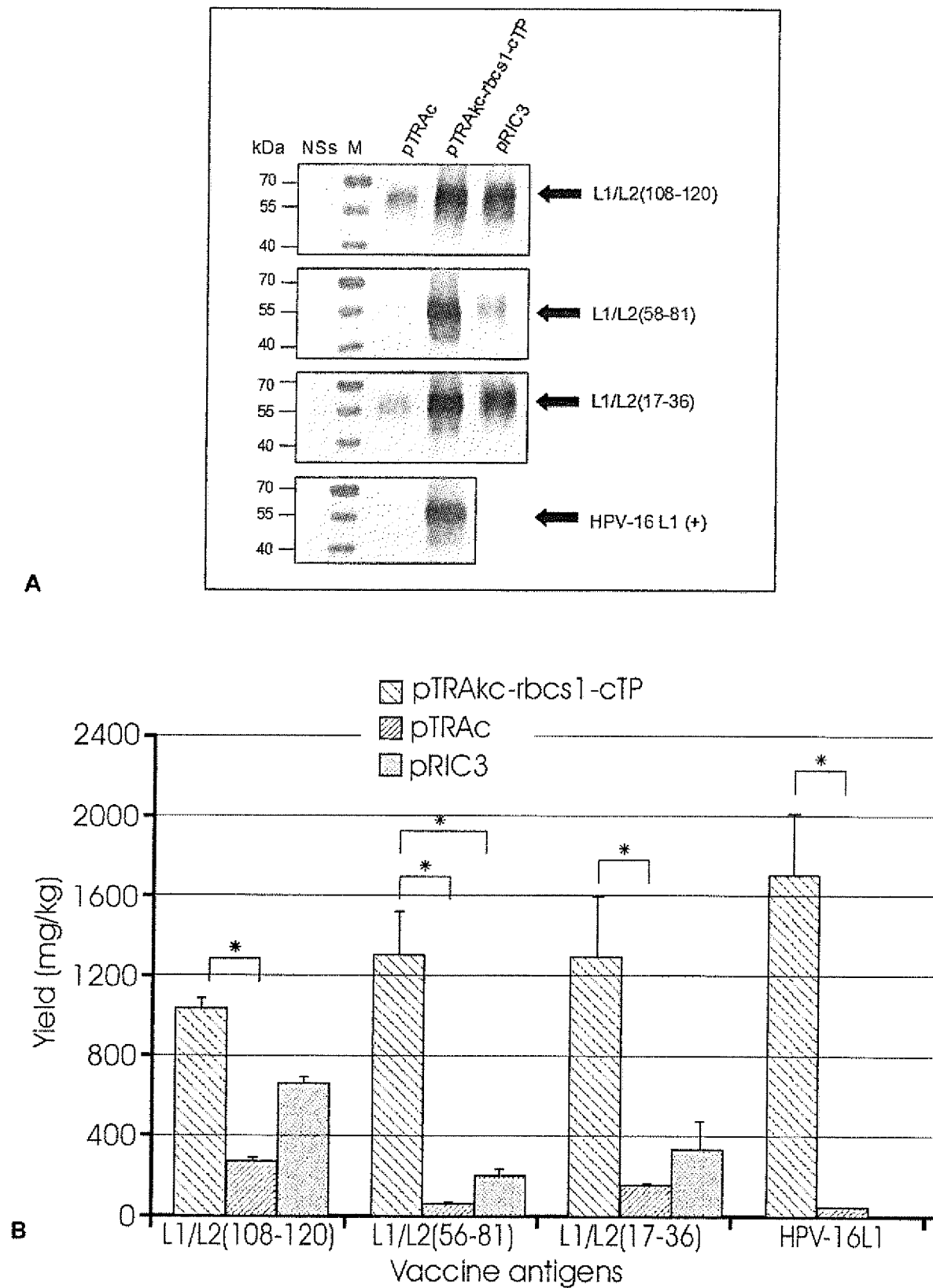


Fig. 2

**Fig. 3**

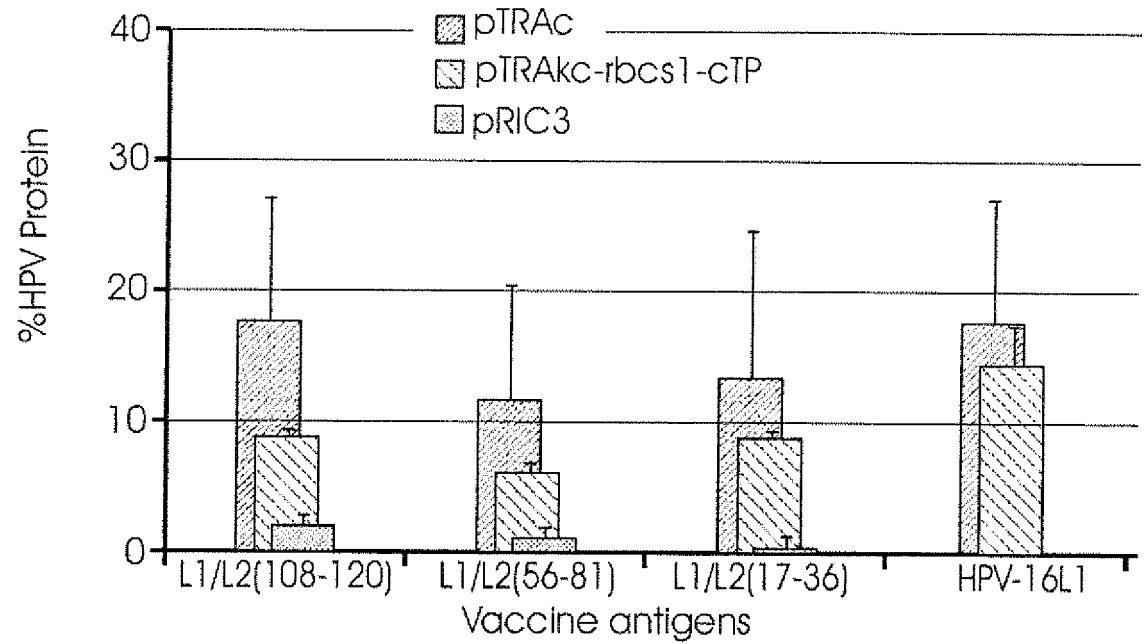


Fig. 4

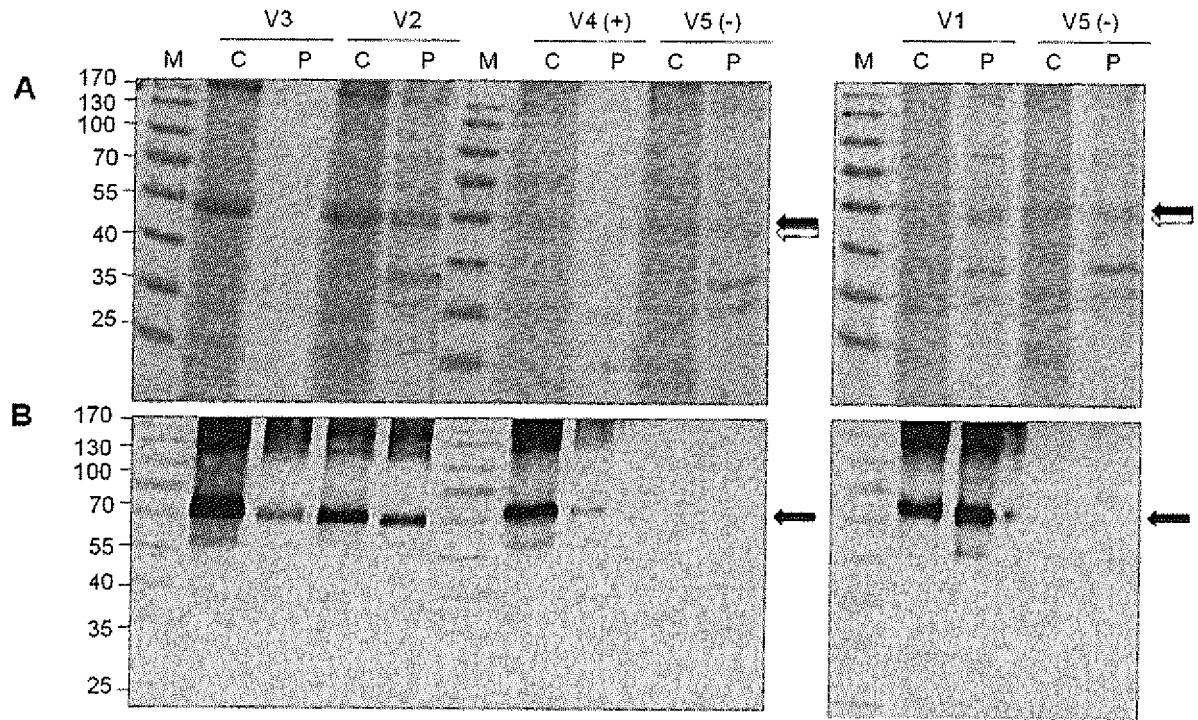
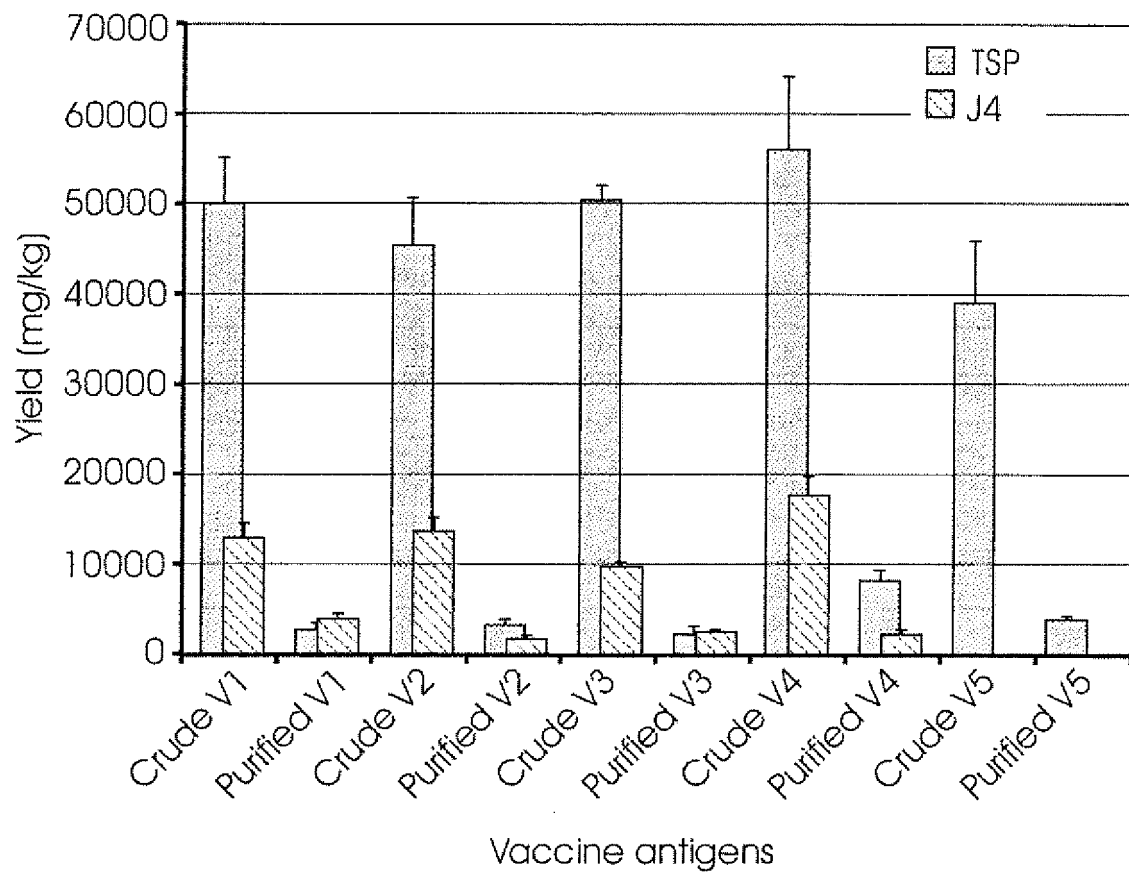


Fig. 5

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**Fig. 6**

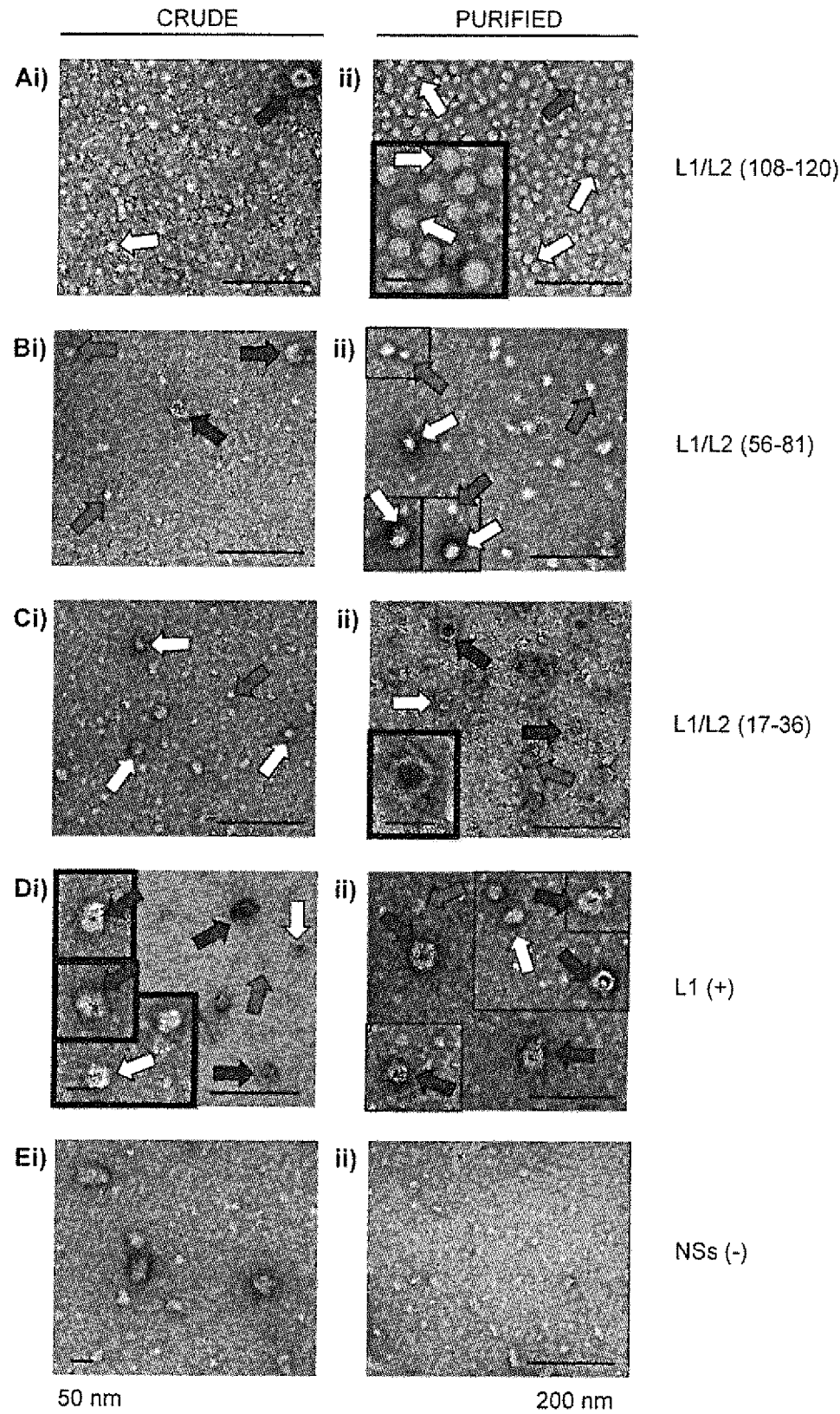


Fig. 7

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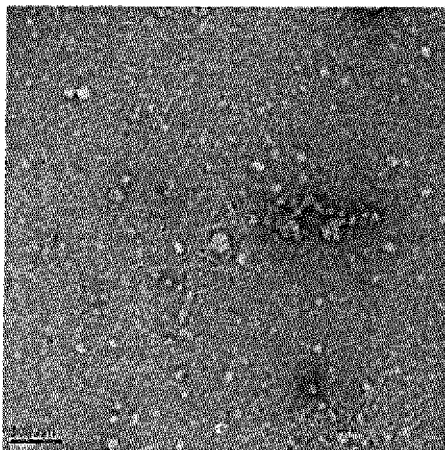


Fig. 8

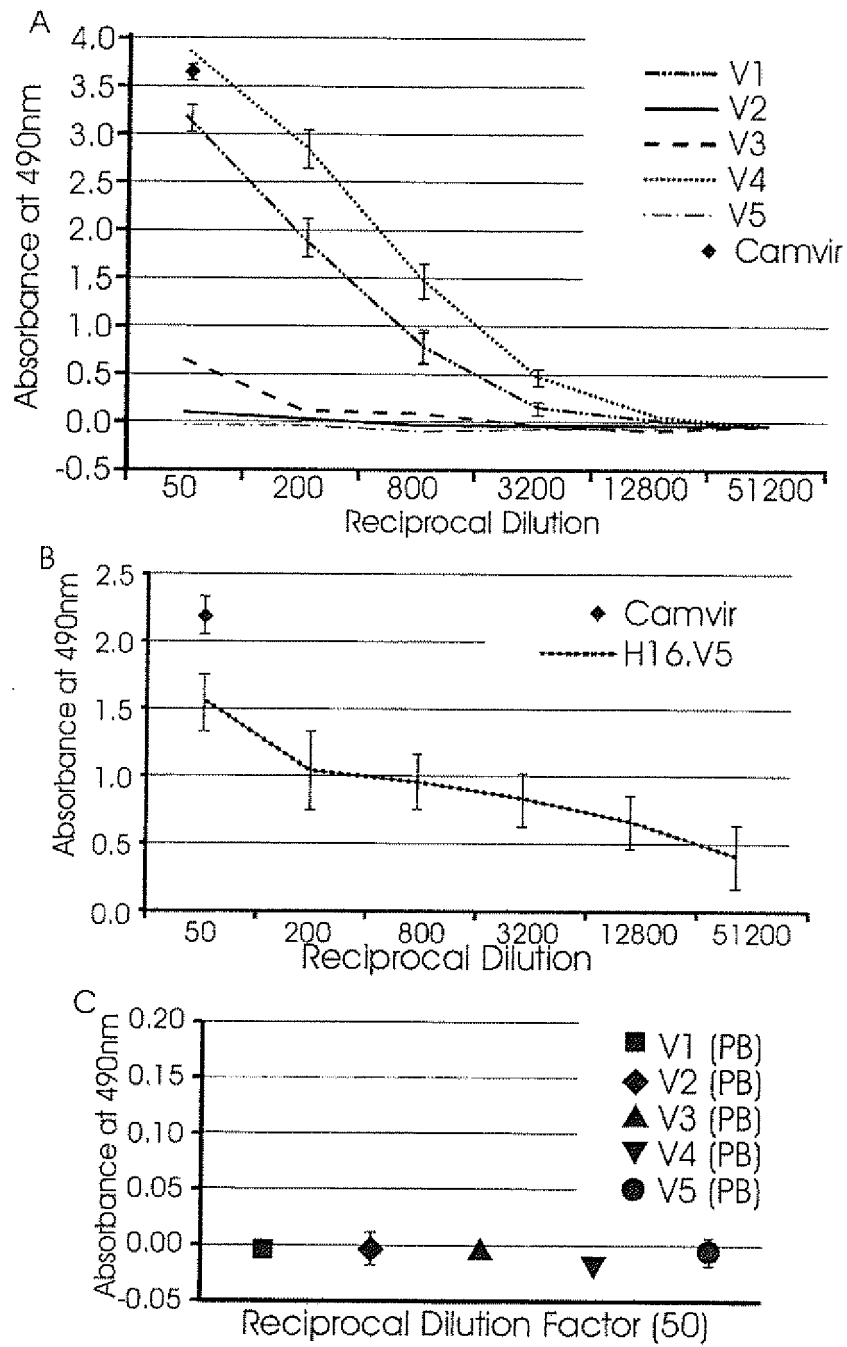


Fig. 9

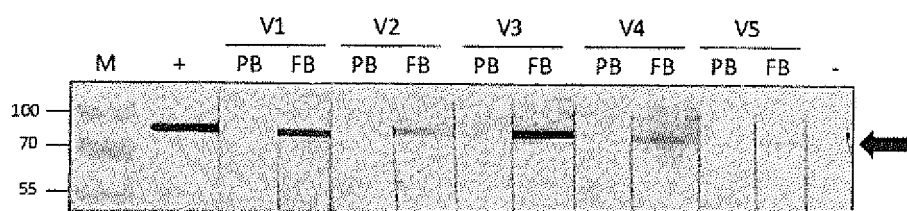


Fig. 10

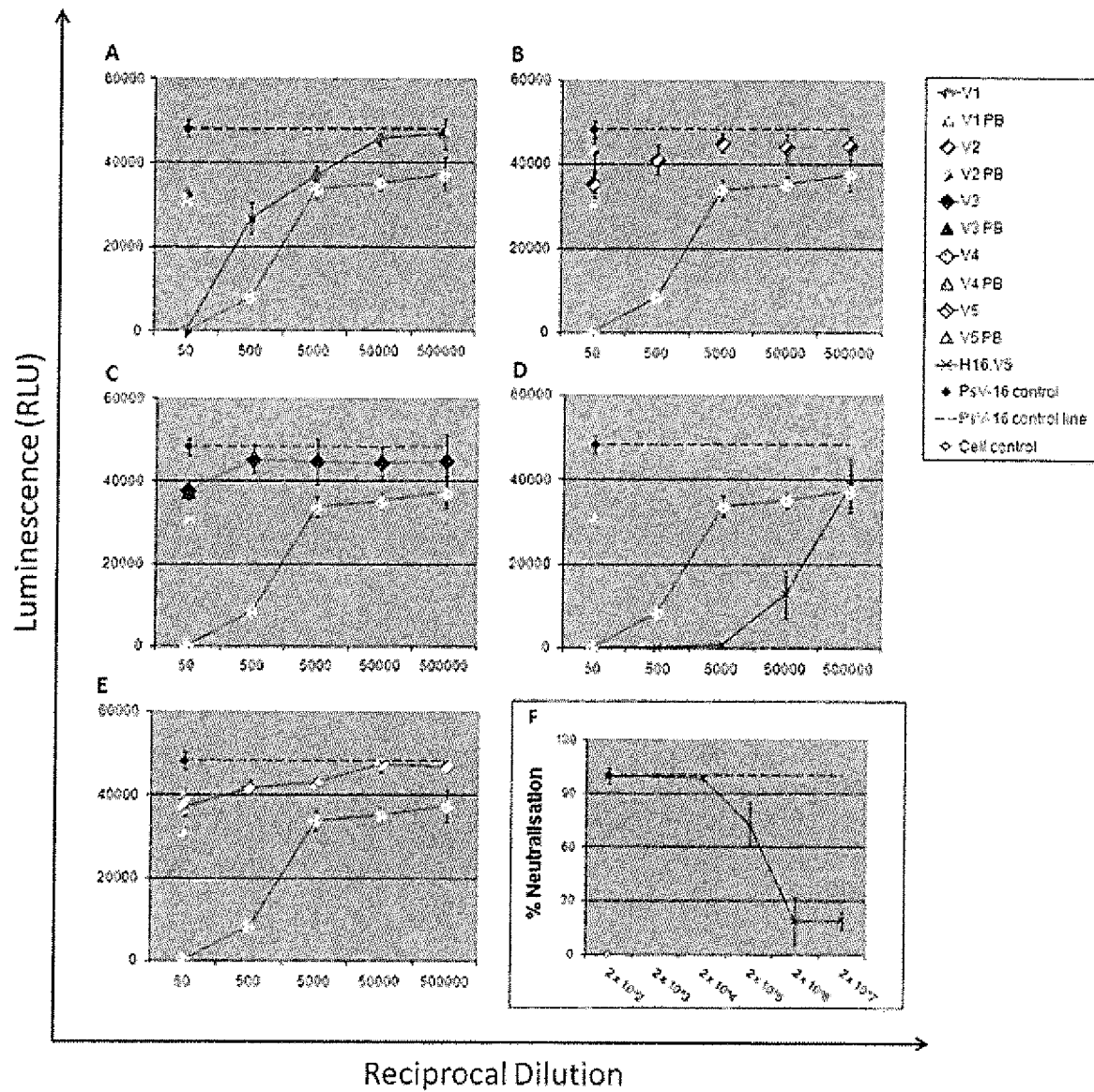


Fig. 11

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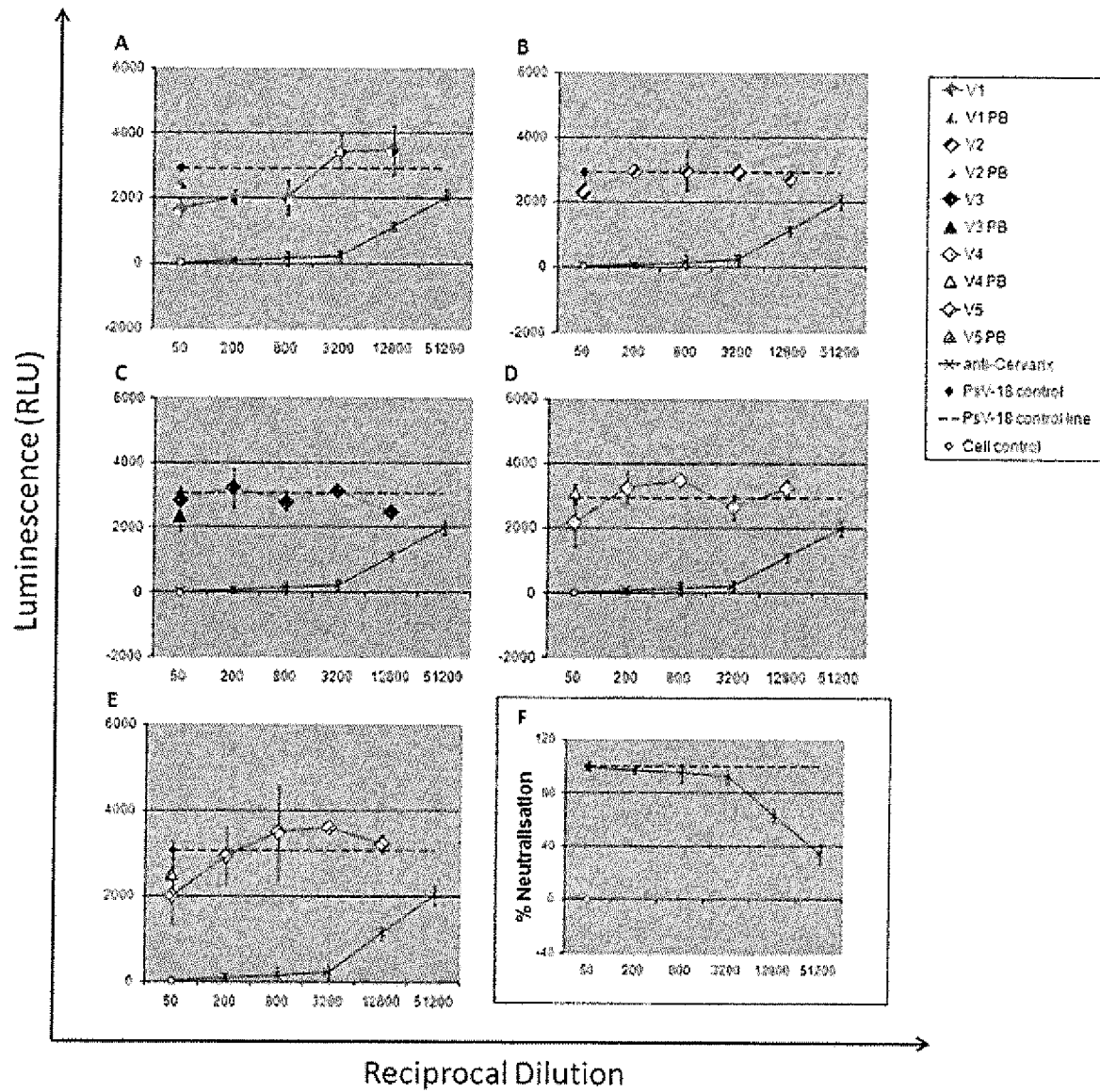


Fig. 12

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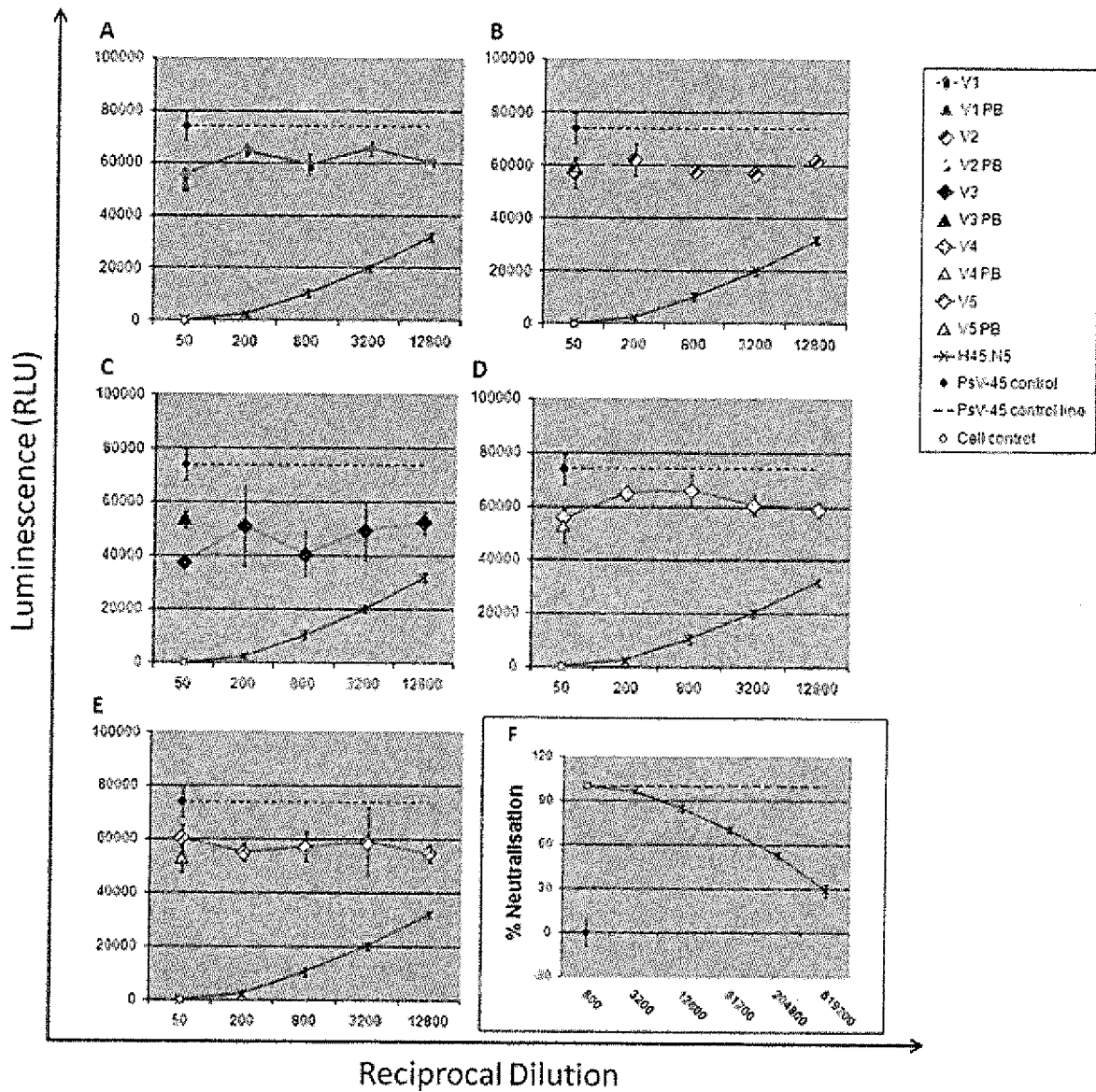


Fig. 13

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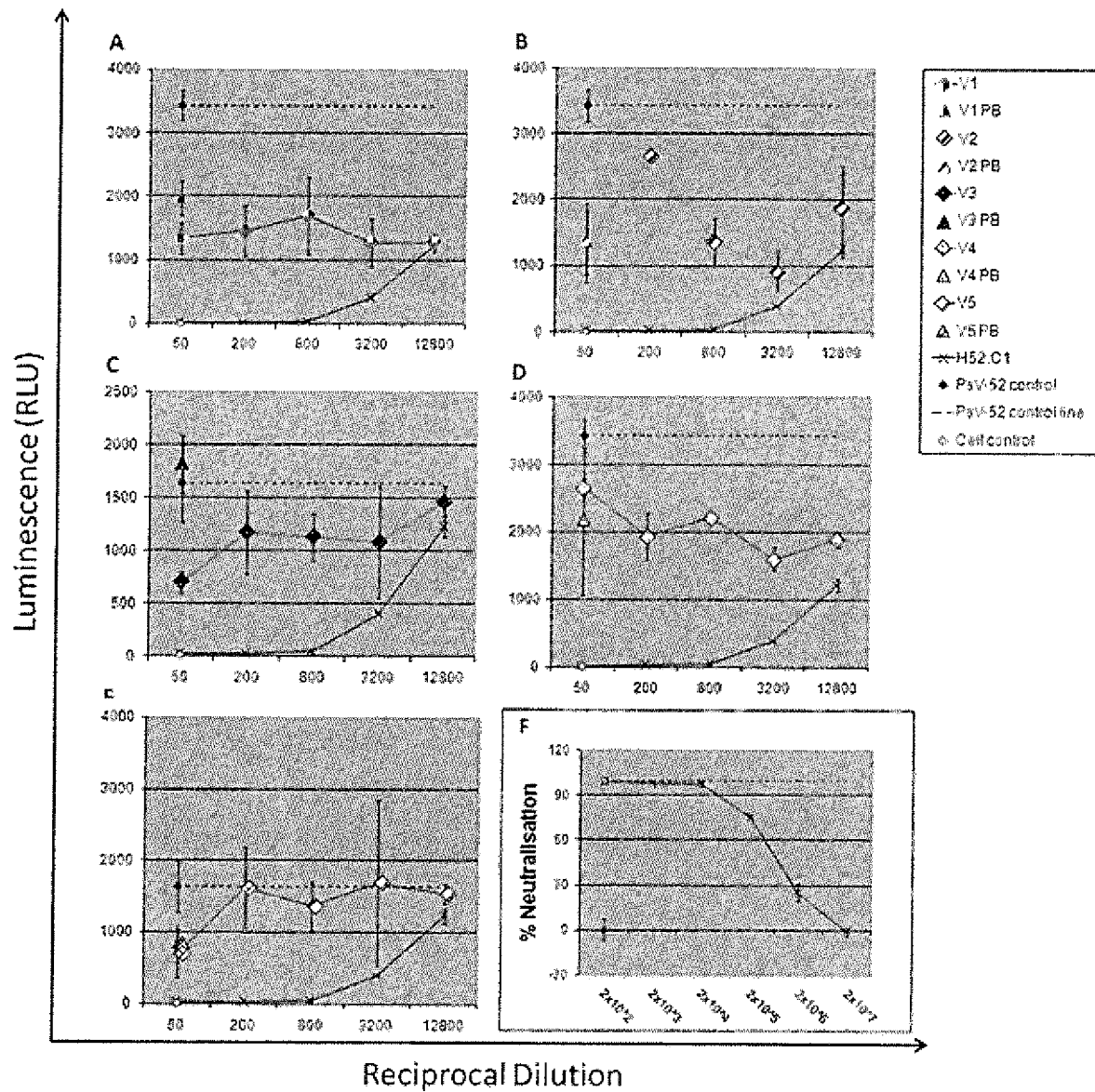


Fig. 14

SEQ ID NO: 1 – Amino acid sequence of HPV-16 L1

MSLWLPSEAT	VYLPPVPVSK	VVSTDEYVAR	TNIYYHAGTS	RLLAUGHYPYF	PIKKPNNNKI	60
LVPKVSGLQY	RVFRIHLPDP	NKFGFPDTSF	YNPDTQRLVW	ACVGVEVGRG	QPLGVGISGH	120
PLLNLDDTE	NASAYAANAG	VDNRECISMD	YKQTQLCLIG	CKPPIGEHWG	KGSPCTNVAV	180
NPGDCPPEL	INTVIQDGD	VDTGFGAMDF	TTLQANKSEV	PLDICTSICK	YPDYIKMVSE	240
PYGDSLFFYL	RREQMFVRHL	FNRAGAVGEN	VPDDLVIKGS	GSTANLASSN	YFPTPSGSMV	300
TSDAQIFNKP	YWLQRAQGHN	NGICWGNQLF	VTVVDTRST	NMSLCAAIST	SETTYKNTNF	360
KEYLRHGEEY	DLQFIFQLCK	ITLTADVMTY	IHSMNSTILE	DWNFGLQPPP	GGTLEDTYRF	420
VTSQAIACQK	HTPPAPKEDP	LKKYTFWEVN	LKEKFSADLD	QFPLGRKFLL	QAGLKAKPKF	480
TLGKRKATPT	TSSTSTTAKR	KKRKL				505

Fig. 15

SEQ ID NO: 2 – Human-codon optimised HPV-16 L1 nucleotide sequence

atgtccctgt	ggctgcccag	cgaggccacc	gtgtacctgc	cccccggtgc	cgtgagcaag	60
gtggtgagca	ccgatgagta	cgtggcccgg	accaacatct	actaccacgc	cggcacctcc	120
agactgctgg	ccgtggggcca	cccctacttc	cccatcaaga	agcccaacaa	caacaagatc	180
ctggtgccc	aggtgagcgg	cctgcaatac	cgggtgttca	gaatccacct	gcccagcccc	240
aataagtctg	gcttccccga	caccagcttc	tacaaccccc	acaccagag	actggtgtgg	300
gcttgctgg	gcgtggaggt	gggcagaggc	cagcctctgg	gcgtgggcat	cagcggccac	360
cctctgctga	acaagctgga	cgacaccgag	aacgccagcg	cctacgcgcg	caacgcgggc	420
gtggataaca	gagaatgcat	cagcatggac	tacaagcaga	cccagctgtg	cctcatcggc	480
tgaagcccc	ccatcgggca	gactgggggc	aagggcagcc	cctgcaccaa	cgtggccgtg	540
aatcctggcg	actgtcctcc	cctggaactc	atcaacaccg	tgatccagga	cggcgacatg	600
gtggacaccg	gcttcggcgc	catggacttc	accaccctcc	aggccaataa	gagcgagggtg	660
cccctggaca	tctgcaccag	catctgcaag	taccccgact	acatcaagat	ggtgagcgag	720
ccctacggcg	atagcctggt	cttctacctg	cggcgggagc	agatgttcgt	gcggcacctg	780
ttcaacagag	ccggcgccgt	gggcgagaac	gtgcccagcg	acctgtacat	caagggcagc	840
ggcagcaccg	ccaacctggc	cagcagcaac	tacttcccta	ccccagcgg	ctccatgggtg	900
accagcgacg	cccagatctt	caacaagccc	tactggctcc	agagagccca	gggccacaac	960
aatggcatct	gctggggcaa	ccagctgttc	gtgaccgtgg	tggataccac	ccggagcacc	1020
aacatgtccc	tgtgcgccgc	catcagcacc	agcgagacca	cctacaagaa	caccaacttc	1080
aaggagtacc	tgaggcacgg	cgaggagtac	gacctccagt	tcattctcca	gctgtgcaag	1140
atcacccctca	ccgcccagct	gatgacctac	atccacagca	tgaacagcac	catcctggag	1200
gactggaact	tcggcctgca	gccccctcct	ggcggcaccc	tggaggacac	ctacagattc	1260
gtgaccagcc	aggccatcgc	atgccagaag	cacacccctc	ccgcccctaa	ggaggacccc	1320
ctgaagaagt	acaccttctg	ggaggtgaac	ctgaaggaga	agttcagcgc	cgacctggac	1380
cagttccctc	tgggcagaaa	gttcctgctg	caagccggcc	tgaaggccaa	gcctaagttc	1440
accctgggca	agagaaaggc	cacccccacc	acaagcagca	ccagcaccac	cgccaagcgg	1500
aagaagcgca	agctgtgata	g				1521

Fig. 16

SEQ ID NO: 3 – L2(108-120) epitope

LVEETSFIDA GAP

13

Fig. 17

SEQ ID NO: 4 – L2(56-81) epitope

GGLGIGTGSG TGGRTGYIPL GTRPPT

26

Fig. 18

SEQ ID NO: 5 – L2(17-36) epitope

QLYKTCKQAG TCPPDIIPKV

20

Fig. 19

SEQ ID NO: 6 – L2 BPV(1-88) epitope

MSARKRVKRA SAYDLYRTCK QAGTCPPDVI PKVEGDTIAD KILKFGGLAI YLGGLGIGTW
STGRVAAGGS PRYTPLRTAG STSSLASI

60

88

Fig. 20

SEQ ID NO: 7 – Human-codon optimised L2(108-120) nucleotide sequence

ctggtggagg agaccagctt catcgacgcc ggagcccccg c

41

Fig. 21

SEQ ID NO: 8 – Human-codon optimised L2(56-81) nucleotide sequence

ggcggcctgg gcatcggcac cggcagcggc accgggggca ggaccggcta catccccctg
ggcaccagac cccccacc

60

78

Fig. 22

SEQ ID NO: 9 – Human-codon optimised L2(17-36) nucleotide sequence

cagctgtaca agacctgcaa gcaggccggc acctgcccc ctgacatcat cccaaggtg

60

Fig. 23

SEQ ID NO: 10 – Human-codon optimised L2 BPV(1-88) nucleotide sequence

atgagcgccc	ggaagcgggt	gaagcgggccc	agcgccctacg	acctgtaccg	gacctgcaag	60
caggccggca	cctgcccccc	tgacgtgata	cccaaggtgg	agggcgacac	aatcgccgac	120
aagatcctga	agttcggcgg	cctggccatc	tacctgggcg	gcctgggcat	tggcacctgg	180
tccaccggca	gagtggccgc	tggaggaagc	cctagatata	ccccctgcg	gaccgcccgc	240
agcacaagca	gcctggccag	catctgatga				270

Fig. 24

SEQ ID NO: 22 – HPV 16 L1/L2(108-120) chimaeric polypeptide

MSLWLPSEAT	VYLPPVPVSK	VVSTDEYVAR	TNIYYHAGTS	RLLAUGHYPYF	PIKKPNNNKI	60
LVPKVSGQLQY	RVFRIHLPDP	NKFGFPDTSF	YNPDTQRLVW	ACVGVEVGRG	QPLGVGISGH	120
PLLNLKDDTE	NASAYAANAG	VDNRECISMD	YKQTQLCLIG	CKPPIGEHWG	KGSPCTNVAV	180
NPGDCPPLEL	INTVIQDGD	VDTGFGAMDF	TTLQANKSEV	PLDICTSICK	YPDYIKMVSE	240
PYGDSLFFYL	RREQMFVRHL	FNRAGAVGEN	VPDDLVIKGS	GSTANLASSN	YFPTPSGSMV	300
TSDAQIFNKP	YWLQRAQGHN	NGICWGNQLF	VTVVDTTRST	NMSLCAAIST	SETTYKNTNF	360
KEYLRHGEEY	DLQFIFQLCK	ITLTADVMTY	IHSMNSTILE	DWNFGLQPPP	GGTLVEETSF	420
IDAGAPACQK	HTPPAPKEDP	LKKYTFWEVN	LKEKFSADLD	QFPLGRKFLL	QAGLKAKPKF	480
TLGKRKATPT	TSSTSTTAKR	KKRKL				505

Fig. 25

SEQ ID NO: 23 – HPV 16 L1/L2(56-81) chimaeric polypeptide

MSLWLPSEAT	VYLPPVPVSK	VVSTDEYVAR	TNIYYHAGTS	RLLAUGHYPYF	PIKKPNNNKI	60
LVPKVSGQLQY	RVFRIHLPDP	NKFGFPDTSF	YNPDTQRLVW	ACVGVEVGRG	QPLGVGISGH	120
PLLNLKDDTE	NASAYAANAG	VDNRECISMD	YKQTQLCLIG	CKPPIGEHWG	KGSPCTNVAV	180
NPGDCPPLEL	INTVIQDGD	VDTGFGAMDF	TTLQANKSEV	PLDICTSICK	YPDYIKMVSE	240
PYGDSLFFYL	RREQMFVRHL	FNRAGAVGEN	VPDDLVIKGS	GSTANLASSN	YFPTPSGSMV	300
TSDAQIFNKP	YWLQRAQGHN	NGICWGNQLF	VTVVDTTRST	NMSLCAAIST	SETTYKNTNF	360
KEYLRHGEEY	DLQFIFQLCK	ITLTADVMTY	IHSMNSTILE	DWNFGLQPPP	GGTGGLGIGT	420
GSGTGGRGTG	IPLGTRPPTP	LKKYTFWEVN	LKEKFSADLD	QFPLGRKFLL	QAGLKAKPKF	480
TLGKRKATPT	TSSTSTTAKR	KKRKL				505

Fig. 26

SEQ ID NO: 24 – HPV 16 L1/L2(17-36) chimaeric polypeptide

MSLWLPSEAT	VYLPPVPVSK	VVSTDEYVAR	TNIYYHAGTS	RLLAUGHYPYF	PIKKPNNNKI	60
LVPKVSGQLQY	RVFRIHLPDP	NKFGFPDTSF	YNPDTQRLVW	ACVGVEVGRG	QPLGVGISGH	120
PLLNLKDDTE	NASAYAANAG	VDNRECISMD	YKQTQLCLIG	CKPPIGEHWG	KGSPCTNVAV	180
NPGDCPPLEL	INTVIQDGD	VDTGFGAMDF	TTLQANKSEV	PLDICTSICK	YPDYIKMVSE	240
PYGDSLFFYL	RREQMFVRHL	FNRAGAVGEN	VPDDLVIKGS	GSTANLASSN	YFPTPSGSMV	300
TSDAQIFNKP	YWLQRAQGHN	NGICWGNQLF	VTVVDTTRST	NMSLCAAIST	SETTYKNTNF	360
KEYLRHGEEY	DLQFIFQLCK	ITLTADVMTY	IHSMNSTILE	DWNFGLQPPP	GGTQLYKTCK	420
QAGTCPPDII	PKVPAPKEDP	LKKYTFWEVN	LKEKFSADLD	QFPLGRKFLL	QAGLKAKPKF	480
TLGKRKATPT	TSSTSTTAKR	KKRKL				505

Fig. 27

SEQ ID NO: 25 – HPV 16 L1/L2 BPV(1-88) chimaeric polypeptide

MSLWLPSEAT	VYLPPVPVSK	VVSTDEYVAR	TNIYYHAGTS	RLAVGHYPYF	PIKKPNNNKI	60
LVPKVSGLQY	RVFRIHLPDP	NKFGFPDTSF	YNPDTQRLVW	ACVGVEVGRG	QPLGVGISGH	120
PLLNLDDTE	NASAYAANAG	VDNRECISMD	YKQTQLCLIG	CKPPIGEHWG	KGSPCTNVAV	180
NPGDCPPELE	INTVIQDGD	VDTGFGAMDF	TTLQANKSEV	PLDICTSICK	YPDYIKMVSE	240
PYGDSLFFYL	RREQMFVRHL	FNAGAVGEN	VPDDLVIKGS	GSTANLASSN	YFPTPSGSMV	300
TSDAQIFNKP	YWLQRAQGHN	NGICWGNQLF	VTVVDTRST	NMSLCAAIST	SETTYKNTNF	360
KEYLRHGEEY	DLQFIFQLCK	ITLTADVMTY	IHSMNSTILE	DWNFGLQPPP	GGTMSARKRV	420
KRASAYDLR	TCKQAGTCPP	DVIPKVEGDT	IADKILKFGG	LAIYLGGLGI	GTWSTGRVAA	480
GGSPRYTPLR	TAGSTSSLAS	I				501

Fig. 28

SEQ ID NO: 26 – Human-codon optimised DNA nucleotide sequence encoding the HPV 16 L1/L2(108-120) chimaeric polypeptide

atgagcctgt	ggctgcccag	cgaggccacc	gtgtacctgc	cccccggtgc	cgtgagcaag	60
gtggtgagca	ccgatgagta	cgtggcccgg	accaacatct	actaccacgc	cggcacctcc	120
agactgctgg	ccgtgggcca	cccctacttc	cccatcaaga	agcccaacaa	caacaagatc	180
ctggtgccc	aggtgagcgg	cctgcaatac	cggtgtttca	gaatccacct	gcccagcccc	240
aataagtctg	gcttccccga	caccagcttc	tacaaccccc	acaccagag	actggtgtgg	300
gcctgcgtgg	gcgtggaggt	gggcagaggg	cagcctctgg	gcgtgggcat	cagcggccac	360
cctctgctga	acaagctgga	cgacaccgag	aacgccagcg	cctacgccgc	caacgccggc	420
gtggataaca	gagaatgcat	cagcatggac	tacaagcaga	cccagctgtg	cctcatcggc	480
tgcaagcccc	ccatcggcga	gcactggggc	aagggcagcc	cctgcaccaa	cgtggccgtg	540
aatcctggcg	actgtcctcc	cctggaactc	atcaacaccg	tgatccagga	cggcgacatg	600
gtggacaccg	gcttcggcgc	catggacttc	accaccctcc	aggccaataa	gagcgaggtg	660
cccctggaca	tctgcaccag	catctgcaag	taccccgact	acatcaagat	ggtgagcgag	720
ccctacggcg	atagcctggt	cttctacctg	cggcgggagc	agatgttcgt	gcggcacctg	780
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accagcgacg	cccagatctt	caacaagccc	tactggctcc	agagagccca	gggccacaac	960
aatggcatct	gctggggcaa	ccagctgttc	gtgaccgtgg	tggataccac	ccggagcacc	1020
aacatgtccc	tgtgcgccgc	catcagcacc	agcgagacca	cctacaagaa	caccaacttc	1080
aaggagtacc	tgaggcacgg	cgaggagtac	gacctccagt	tcattctcca	gctgtgcaag	1140
atcacccctca	ccgccgacgt	gatgacctac	atccacagca	tgaacagcac	catcctggag	1200
gactggaact	tcggcctgca	gccccctcct	ggcggcaccc	tggtggagga	gaccagcttc	1260
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ctgaagaagt	acaccttctg	ggaggtgaac	ctgaaggaga	agttcagcgc	cgacctggac	1380
cagttccctc	tgggcagaaa	gttcctgctg	caagccggcc	tgaaggccaa	gcctaagttc	1440
accctggggca	agagaaaagg	cacccccacc	acaagcagca	ccagcaccac	cgccaagcgg	1500
aagaagcgca	agctgtgata	g				1521

Fig. 29

SEQ ID NO: 27 – Human-codon optimised DNA nucleotide sequence encoding the HPV 16 L1/L2(56-81) chimaeric polypeptide

atgagcctgt	ggctgcccag	cgaggccacc	gtgtacctgc	cccccggtgcc	cgtgagcaag	60
gtggtgagca	ccgatgagta	cgtggcccgg	accaacatct	actaccacgc	cggcacctcc	120
agactgctgg	ccgtgggcca	cccctacttc	cccatcaaga	agcccaacaa	caacaagatc	180
ctggtgcccc	aggtgagcgg	cctgcaatac	cgggtgttca	gaatccacct	gcccgaaccc	240
aataagttcg	gcttccccga	caccagcttc	tacaaccccg	acaccagag	actggtgtgg	300
gcctgcgtgg	gcgtggaggt	gggcagaggc	cagcctcttg	gcgtgggcat	cagcggccac	360
cctctgctga	acaagctgga	cgacaccgag	aacgccagcg	cctacgccgc	caacgccggc	420
gtggataaca	gagaatgcat	cagcatggac	tacaagcaga	cccagctgtg	cctcatcggc	480
tgcaagcccc	ccatcggcga	gcaactgggc	aagggcagcc	cctgcaccaa	cgtggccgtg	540
aatcctggcg	actgtcctcc	cctggaactc	atcaacaccg	tgatccagga	cggcgacatg	600
gtggacaccg	gcttcggcgc	catggacttc	accaccctcc	aggccaataa	gagcgaggtg	660
cccctggaca	tctgcaccag	catctgcaag	taccccgact	acatcaagat	ggtgagcgag	720
ccctacggcg	atagcctgtt	cttctacctg	cggcgggagc	agatgttcgt	gcggcacctg	780
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aatggcatct	gctggggcaa	ccagctgttc	gtgaccgtgg	tggataccac	ccggagcacc	1020
aacatgtccc	tgtgcgcgcg	catcagcacc	agcgagacca	cctacaagaa	caccaacttc	1080
aaggagtacc	tgaggcacgg	cgaggagtac	gacctccagt	tcatcttcca	gctgtgcaag	1140
atcacctca	ccgccgacgt	gatgacctac	atccacagca	tgaacagcac	catcctggag	1200
gactggaact	tcggcctgca	gccccctcct	ggcggcacag	gcggcctggg	catcggcacc	1260
ggcagcggca	ccgggggcag	gaccggctac	atccccctgg	gcaccagacc	ccccaccccc	1320
ctgaagaagt	acaccttctg	ggaggtgaac	ctgaaagaga	agttcagcgc	cgacctggac	1380
cagttccctc	tgggcccggaa	gttcctgctc	caggctgggc	tgaaggccaa	gcccgaagttc	1440
accctgggca	agcggaaggc	cacccccacc	acctccagca	ccagcaccac	cgccaagcgg	1500
aagaaacgga	agctgtgatg	a				1521

Fig. 30

SEQ ID NO: 28 – Human-codon optimised DNA nucleotide sequence encoding the HPV 16 L1/L2(17-36) chimaeric polypeptide

atgagcctgt	ggctgcccag	cgaggccacc	gtgtacctgc	cccccggtgcc	cgtgagcaag	60
gtggtgagca	ccgatgagta	cgtggcccgg	accaacatct	actaccacgc	cggcacctcc	120
agactgctgg	ccgtgggcca	cccctacttc	cccatcaaga	agcccaacaa	caacaagatc	180
ctggtgcccc	aggtgagcgg	cctgcaatac	cgggtgttca	gaatccacct	gcccgaaccc	240
aataagttcg	gcttccccga	caccagcttc	tacaaccccg	acaccagag	actggtgtgg	300
gcctgcgtgg	gcgtggaggt	gggcagaggc	cagcctcttg	gcgtgggcat	cagcggccac	360
cctctgctga	acaagctgga	cgacaccgag	aacgccagcg	cctacgccgc	caacgccggc	420
gtggataaca	gagaatgcat	cagcatggac	tacaagcaga	cccagctgtg	cctcatcggc	480
tgcaagcccc	ccatcggcga	gcaactgggc	aagggcagcc	cctgcaccaa	cgtggccgtg	540
aatcctggcg	actgtcctcc	cctggaactc	atcaacaccg	tgatccagga	cggcgacatg	600
gtggacaccg	gcttcggcgc	catggacttc	accaccctcc	aggccaataa	gagcgaggtg	660
cccctggaca	tctgcaccag	catctgcaag	taccccgact	acatcaagat	ggtgagcgag	720
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aatggcatct	gctggggcaa	ccagctgttc	gtgaccgtgg	tggataccac	ccggagcacc	1020
aacatgtccc	tgtgcgcgcg	catcagcacc	agcgagacca	cctacaagaa	caccaacttc	1080
aaggagtacc	tgaggcacgg	cgaggagtac	gacctccagt	tcatcttcca	gctgtgcaag	1140
atcacctca	ccgccgacgt	gatgacctac	atccacagca	tgaacagcac	catcctggag	1200
gactggaact	tcggcctgca	gccccctcct	ggcggcaccc	agctgtacaa	gacctgcaag	1260
caggccggca	cctgcccccc	tgacatcatc	cccaaggtgc	cagcccccaa	agaggacccc	1320
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cagttccctc	tgggcccggaa	gttcctgctc	caggctgggc	tgaaggccaa	gcccgaagttc	1440
accctgggca	agcggaaggc	cacccccacc	acaagcagca	ccagcaccac	cgccaagcgg	1500
aagaaacgga	agctgtgatg	a				1521

Fig. 31

SEQ ID NO: 29 – Human-codon optimised DNA nucleotide sequence encoding the HPV 16 L1/L2 BPV(1-88) chimaeric polypeptide

atgagcctgt	ggctgcccag	cgaggccacc	gtgtacctgc	cccccggtgcc	cgtgagcaag	60
gtggtgagca	cogatgagta	cgtggccccg	accaacatct	actaccaagc	cggcacctcc	120
agactgctgg	ccgtggggcca	cccctacttc	cccatcaaga	agcccaacaa	caacaagatc	180
ctggtgcccc	aggtgagcgg	cctgcaatac	cggtgtgtca	gaatccacct	gcccgaaccc	240
aataagttcg	gcttccccga	caccagcttc	tacaaccccc	acacccagag	actggtgtgg	300
gcctgcgtgg	gcgtggaggt	gggcagaggg	cagcctctgg	gcgtgggcat	cagcggccac	360
cctctgctga	acaagctgga	cgacaccgag	aacgccagcg	cctacgccgc	caacgccggc	420
gtggataaca	gagaatgcat	cagcatggac	tacaagcaga	cccagctgtg	cctcatcggc	480
tgcaagcccc	ccatcgggca	gcactggggc	aagggcagcc	cctgcaccaa	cgtggccgtg	540
aatcctggcg	actgtcctcc	cctggaactc	atcaacaccg	tgatccagga	cggcgacatg	600
gtggacaccg	gcttcggcgc	catggacttc	accacccctc	aggccaataa	gagcgagggtg	660
cccctggaca	tctgcaccag	catctgcaag	taccccgact	acatcaagat	ggtgagcgag	720
ccctacggcg	atagcctgtt	cttctacctg	cggcgggagc	agatgttcgt	gcggcacctg	780
ttcaacagag	ccggcgccgt	gggcgagaac	gtgcccgacg	acctgtacat	caagggcagc	840
ggcagcaccg	ccaacctggc	cagcagcaac	tacttcccta	ccccagcgcg	ctccatggtg	900
accagcgacg	cccagatctt	caacaagccc	tactggctcc	agagagccca	gggccacaac	960
aatggcatct	gctggggcaa	ccagctgttc	gtgacctgtg	tggataccac	ccggagcacc	1020
aacatgtccc	tgtgcgcgcg	catcagcacc	agcgagacca	cctacaagaa	caccaacttc	1080
aaggagtacc	tgaggcacgg	cgaggagtac	gacctccagt	tcattctcca	gctgtgcaag	1140
atcacctca	ccgccgacgt	gatgacctac	atccacagca	tgaacagcac	catcctggag	1200
gactggaact	tcggcctgca	gcctccccct	ggcggcacca	tgagcgcccc	gaagcgggtg	1260
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gacgtgatcc	ccaaggtgga	gggcgacaca	atcgccgaca	agatcctgaa	gttcggcggc	1380
ctggccatct	acctggggcg	cctgggcatt	ggcacctggt	ccaccggcag	agtggccgct	1440
ggaggaagcc	ctagatacac	ccccctgcgg	accgccggca	gcacaagcag	cctggccagc	1500
atctgatga						1509

Fig. 32