Fig. 1

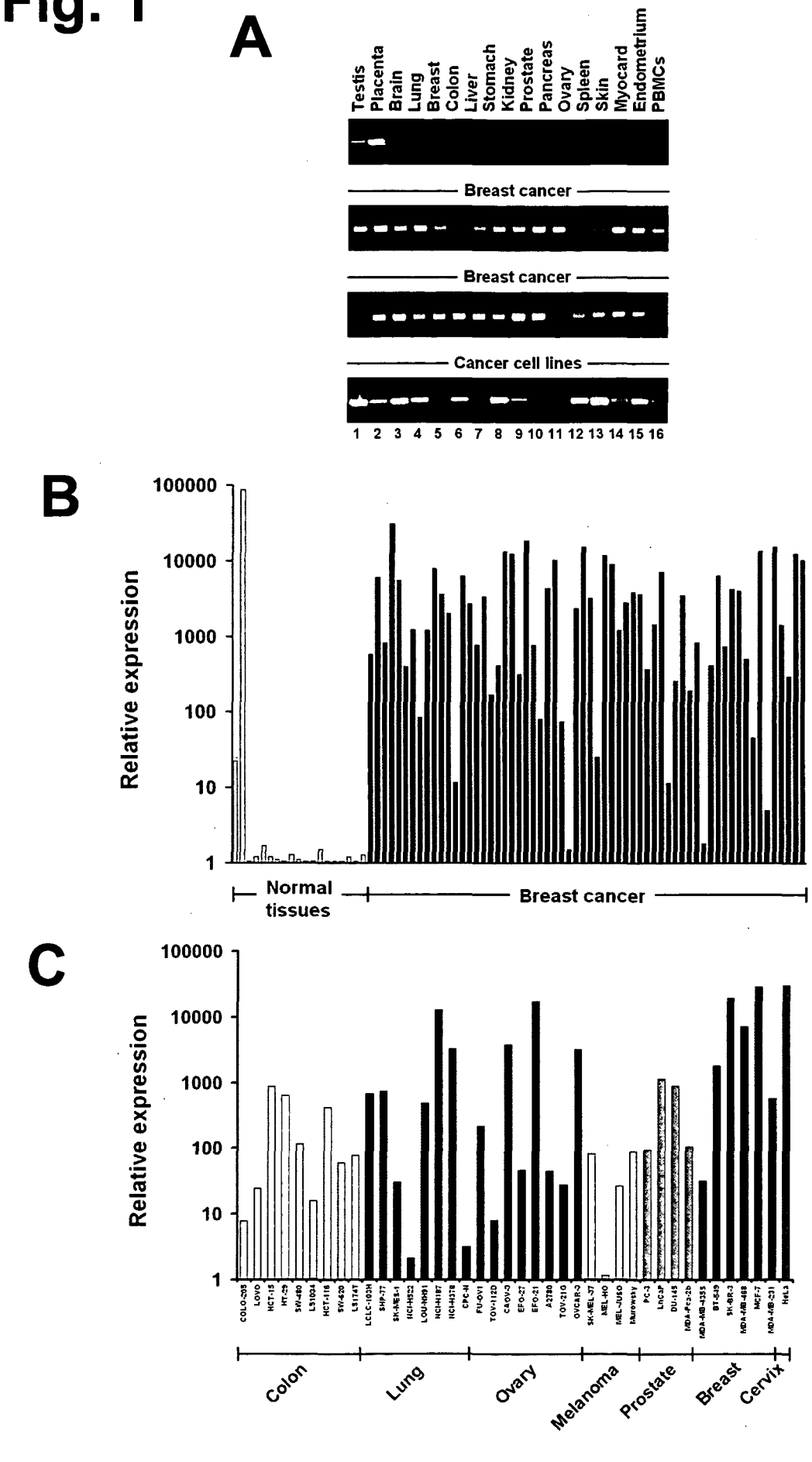

A
Testis
Placenta
Brain
Lung
Breast
Colon
Liver
Stomach
Kidney
Prostate
Pancreas
Ovary
Spleen
Skin
Myocard
Endometrium
PBMCs
Breast cancer
Breast cancer
Cancer cell lines
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
B
Relative expression
100000
10000
1000
100
10
1
Normal tissues
Breast cancer
C
Relative expression
100000
10000
1000
100
10
1
Colon
Lung
Ovary
Melanoma
Prostate
Breast
Cervix

Fig. 1

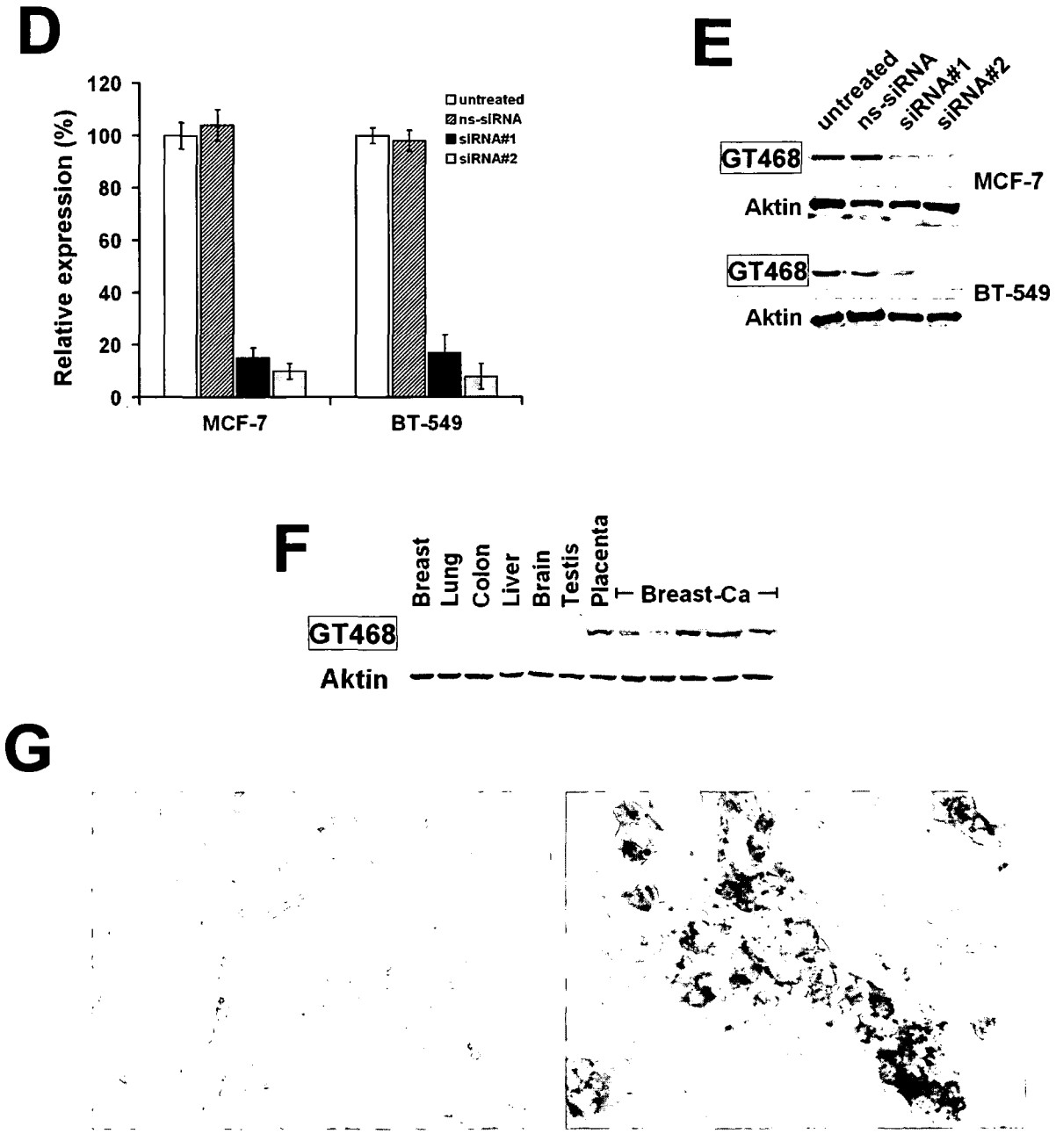
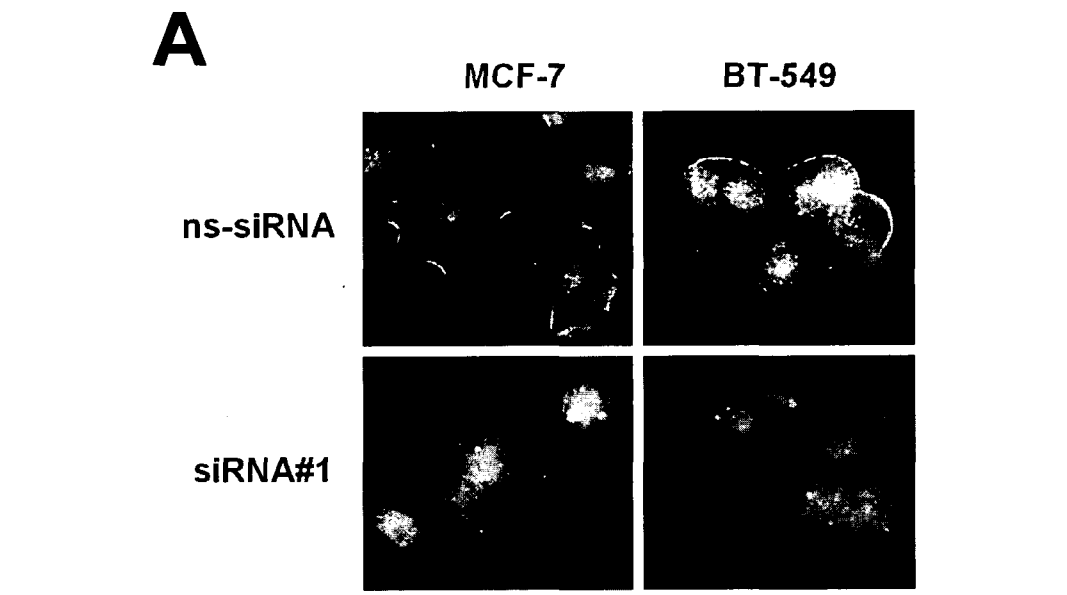

D
Relative expression (%)
120
100
80
60
40
20
0
untreated
ns-siRNA
siRNA#1
siRNA#2
MCF-7
BT-549
E
untreated
ns-siRNA
siRNA#1
siRNA#2
GT468
MCF-7
Aktin
GT468
BT-549
Aktin
F
Breast
Lung
Colon
Liver
Brain
Testis
Placenta
Breast-Ca
GT468
Aktin
G

Fig. 2



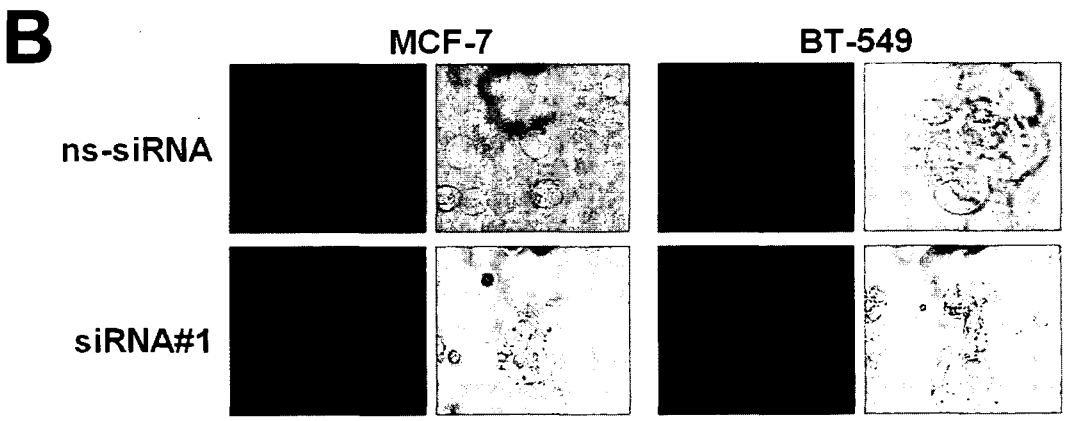


Fig. 3

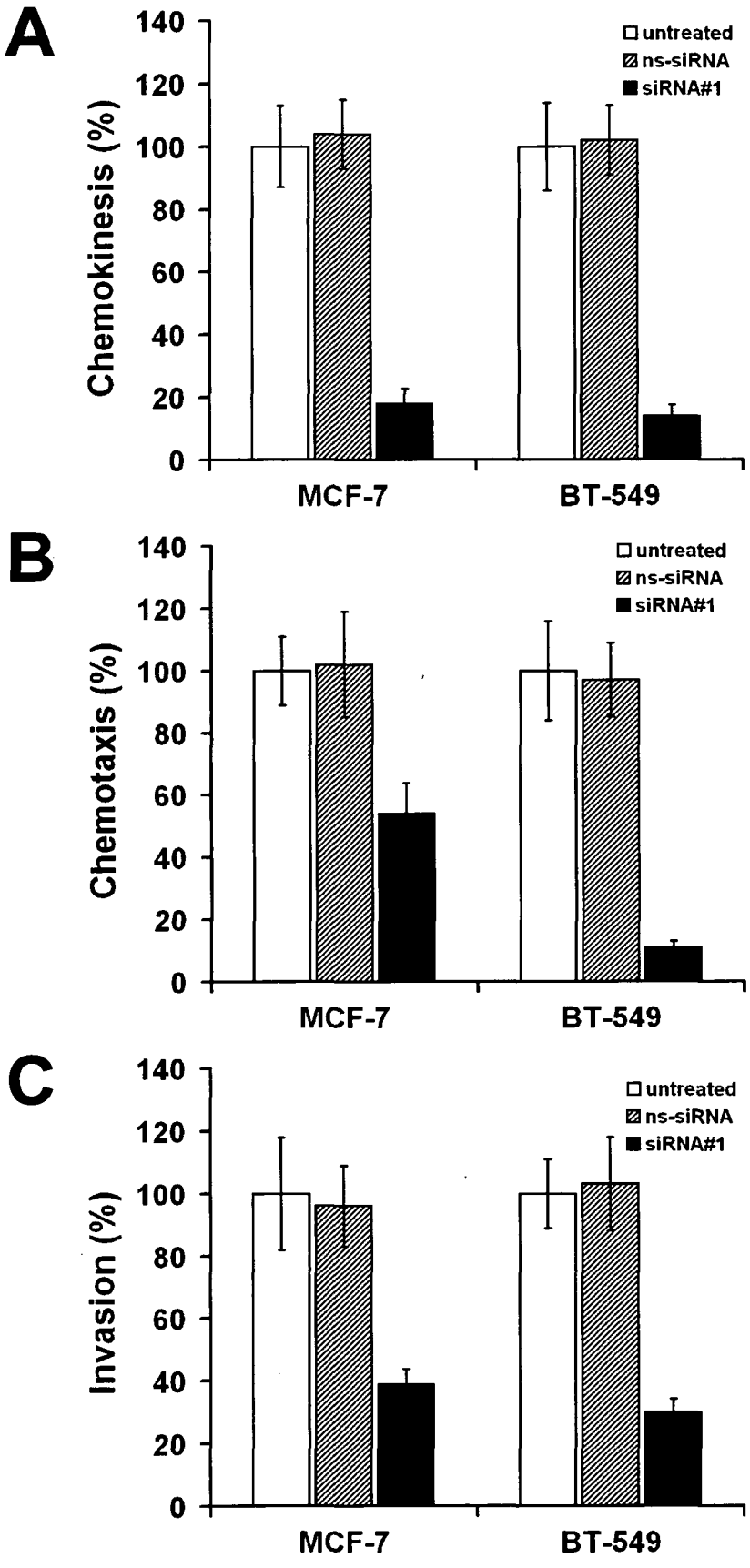

A
Chemokinesis (%)
140
120
100
80
60
40
20
0
untreated
ns-siRNA
siRNA#1
MCF-7
BT-549
B
Chemotaxis (%)
140
120
100
80
60
40
20
0
untreated
ns-siRNA
siRNA#1
MCF-7
BT-549
C
Invasion (%)
140
120
100
80
60
40
20
0
untreated
ns-siRNA
siRNA#1
MCF-7
BT-549

Fig. 4

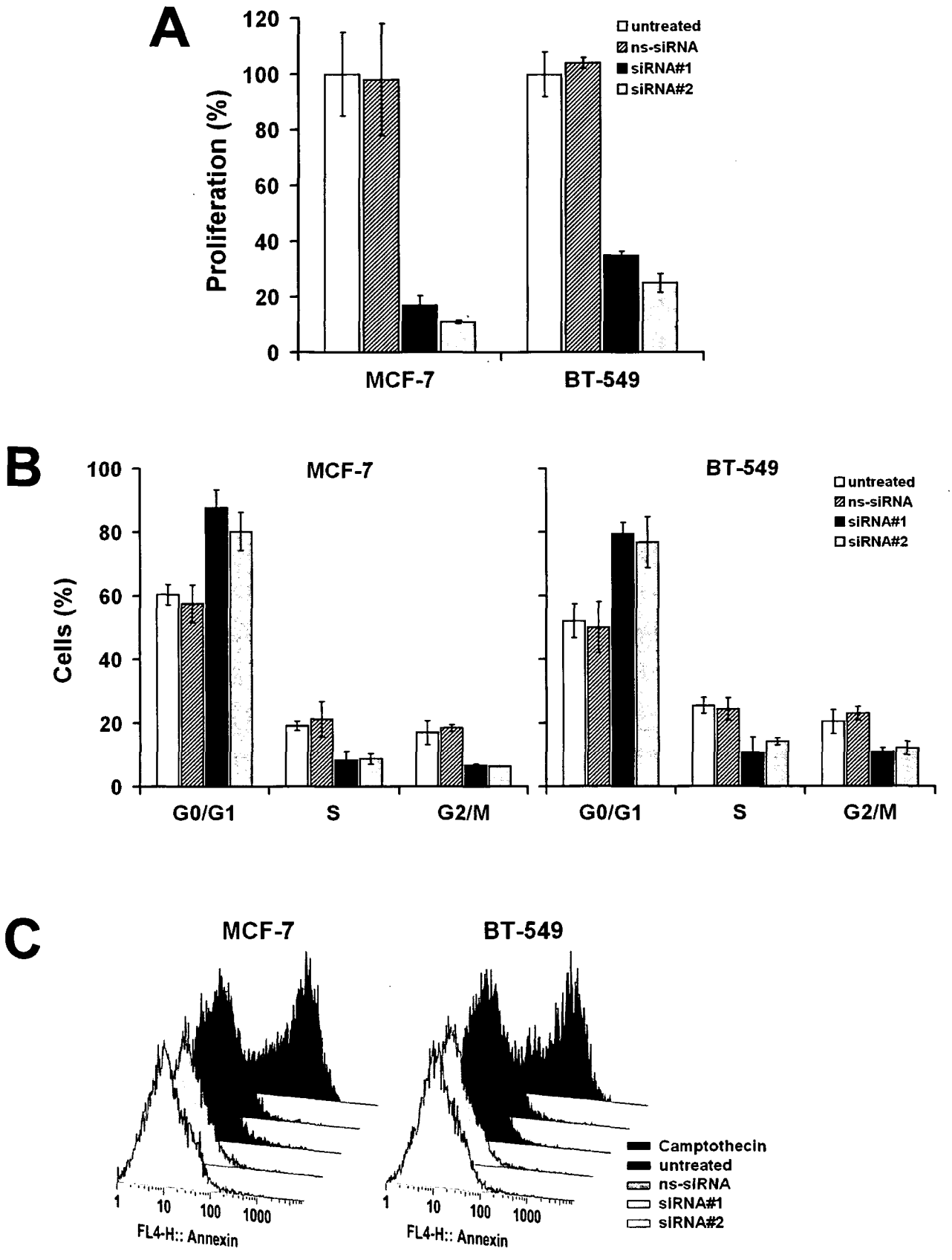

A
Proliferation (%)
120
100
80
60
40
20
0
untreated
ns-siRNA
siRNA#1
siRNA#2
MCF-7
BT-549
B
Cells (%)
100
80
60
40
20
0
MCF-7
BT-549
G0/G1
S
G2/M
G0/G1
S
G2/M
untreated
ns-siRNA
siRNA#1
siRNA#2
C
MCF-7
BT-549
1
10
100
1000
FL4-H:: Annexin
1
10
100
1000
FL4-H:: Annexin
Camptothecin
untreated
ns-siRNA
siRNA#1
siRNA#2

Fig. 5

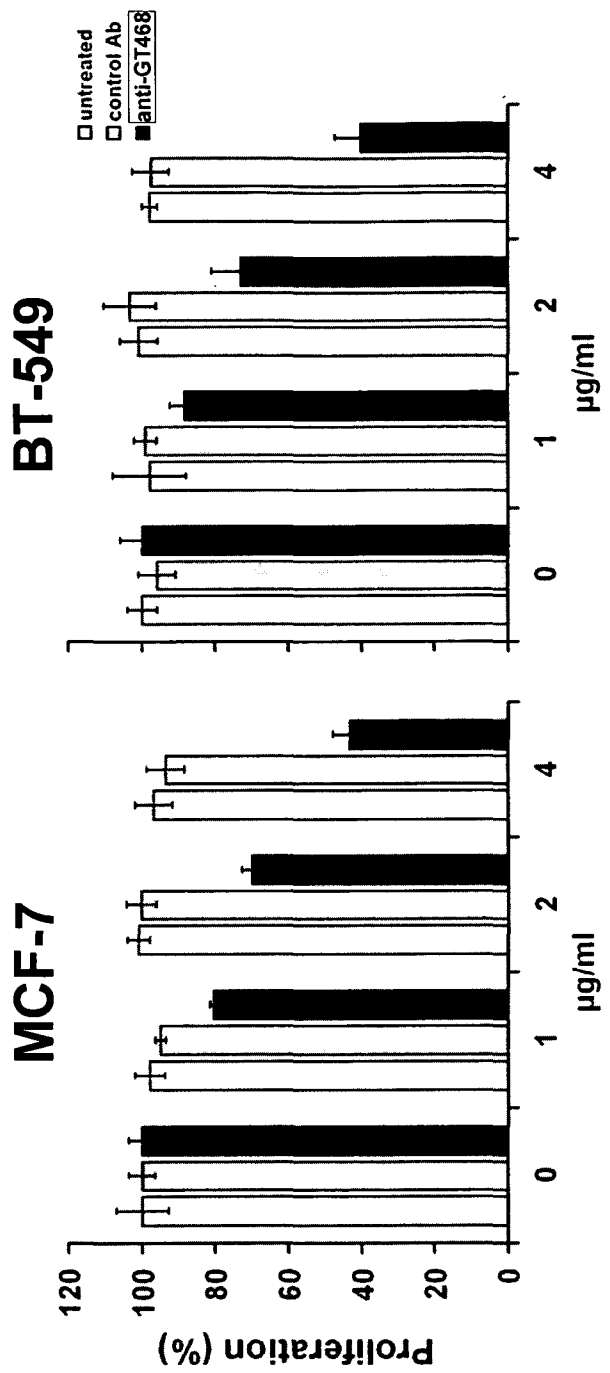

untreated
control Ab
anti-GT468
BT-549
MCF-7
Proliferation (%)
120
100
80
60
40
20
0
0
1
2
4
µg/ml

Fig. 6

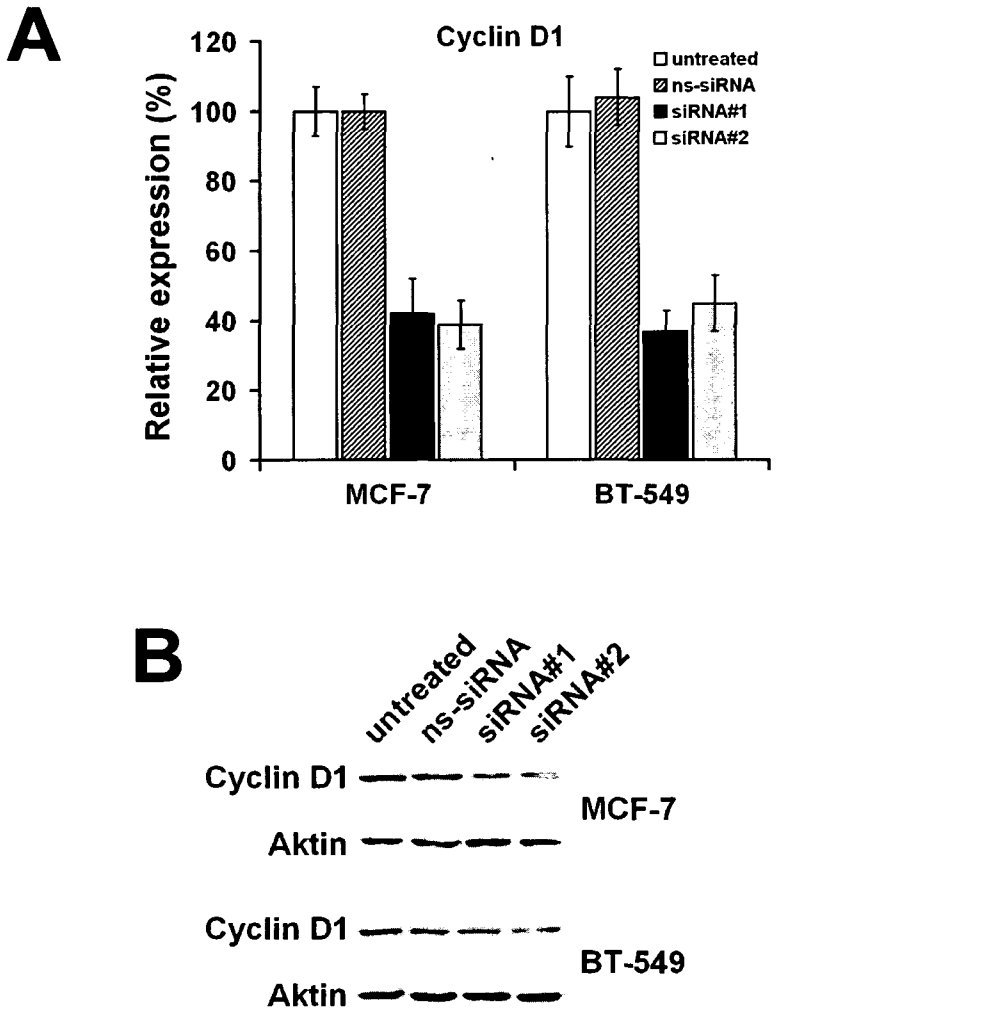

A
Cyclin D1
Relative expression (%)
120
100
80
60
40
20
0
untreated
ns-siRNA
siRNA#1
siRNA#2
MCF-7
BT-549
B
untreated
ns-siRNA
siRNA#1
siRNA#2
Cyclin D1
MCF-7
Aktin
Cyclin D1
BT-549
Aktin
C
untreated
ns-siRNA
siRNA#1
pAKT
AKT
MCF-7
Actin
pAKT
AKT
BT-549
Actin
D
untreated
control Ab
anti-GT468
pAKT
AKT
MCF-7
Actin
pAKT
AKT
BT-549
Actin

Fig. 7

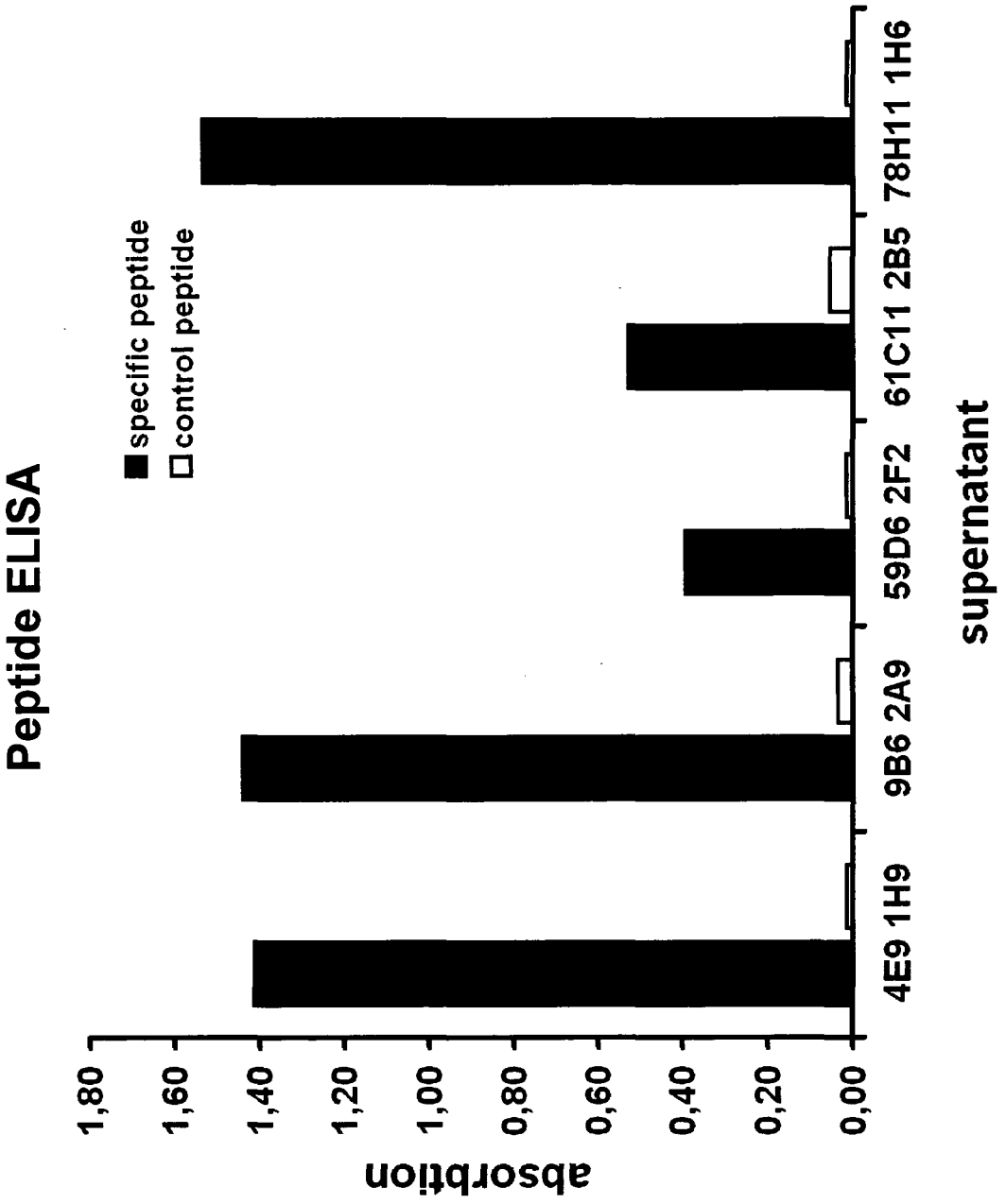

Peptide ELISA
specific peptide
control peptide
absorbtion
1,80
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
4E9 1H9
9B6 2A9
59D6 2F2
61C11 2B5
78H11 1H6
supernatant

Fig. 8

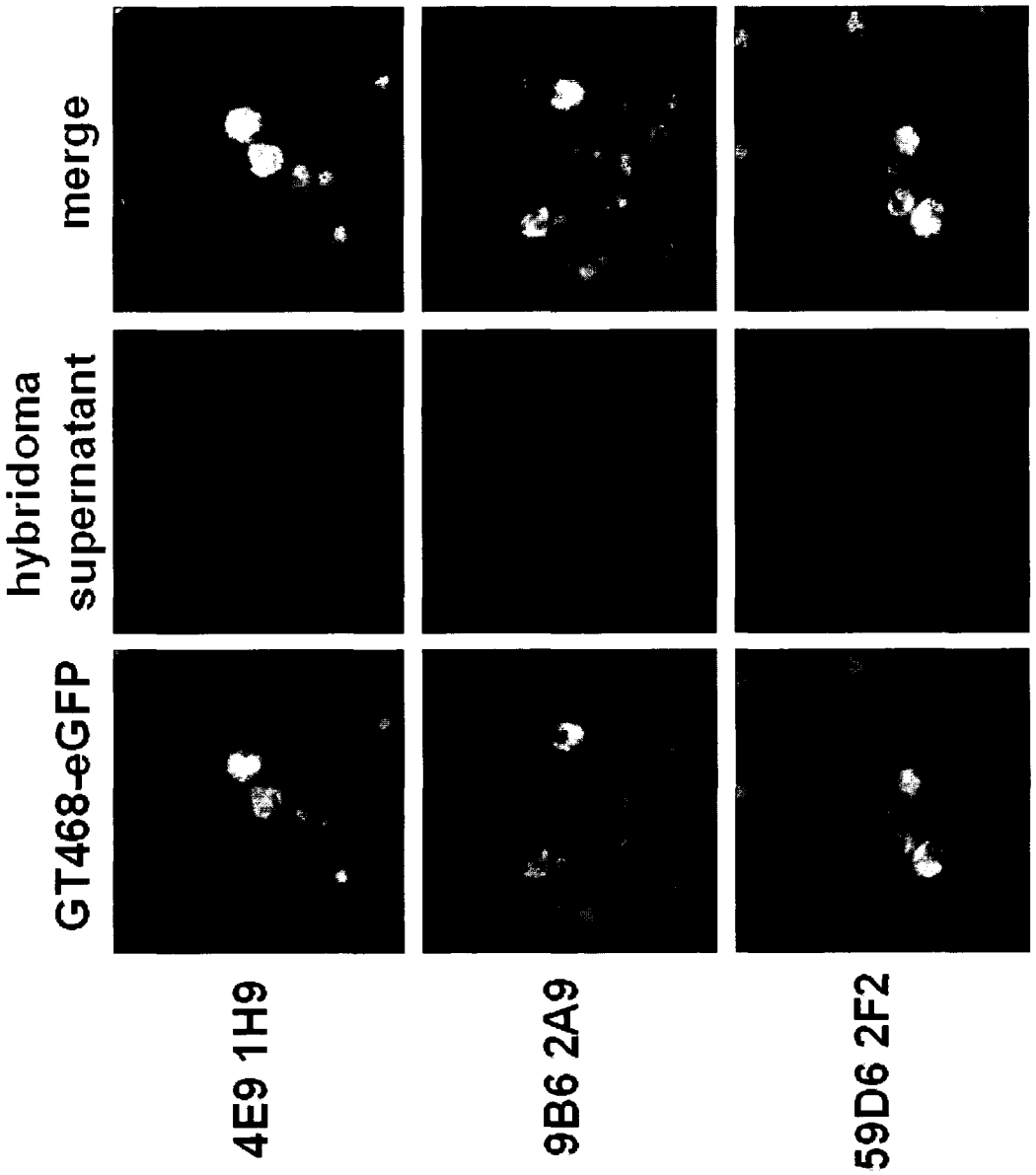

merge
hybridoma supernatant
GT468-eGFP
4E9 1H9
9B6 2A9
59D6 2F2

Fig. 9

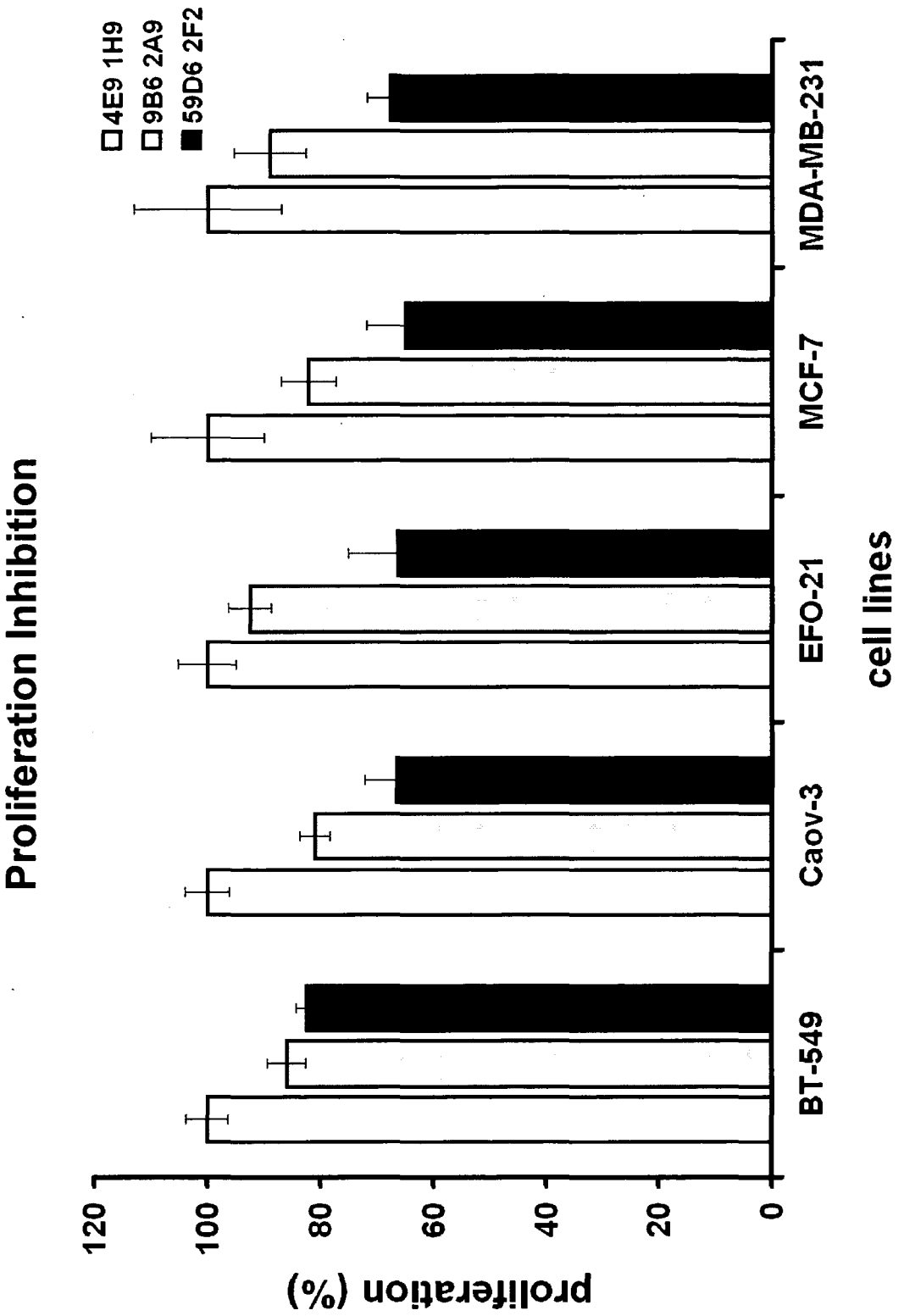

Proliferation Inhibition
4E9 1H9
9B6 2A9
59D6 2F2
proliferation (%)
120
100
80
60
40
20
0
BT-549
Caov-3
EFO-21
MCF-7
MDA-MB-231
cell lines

Fig. 10

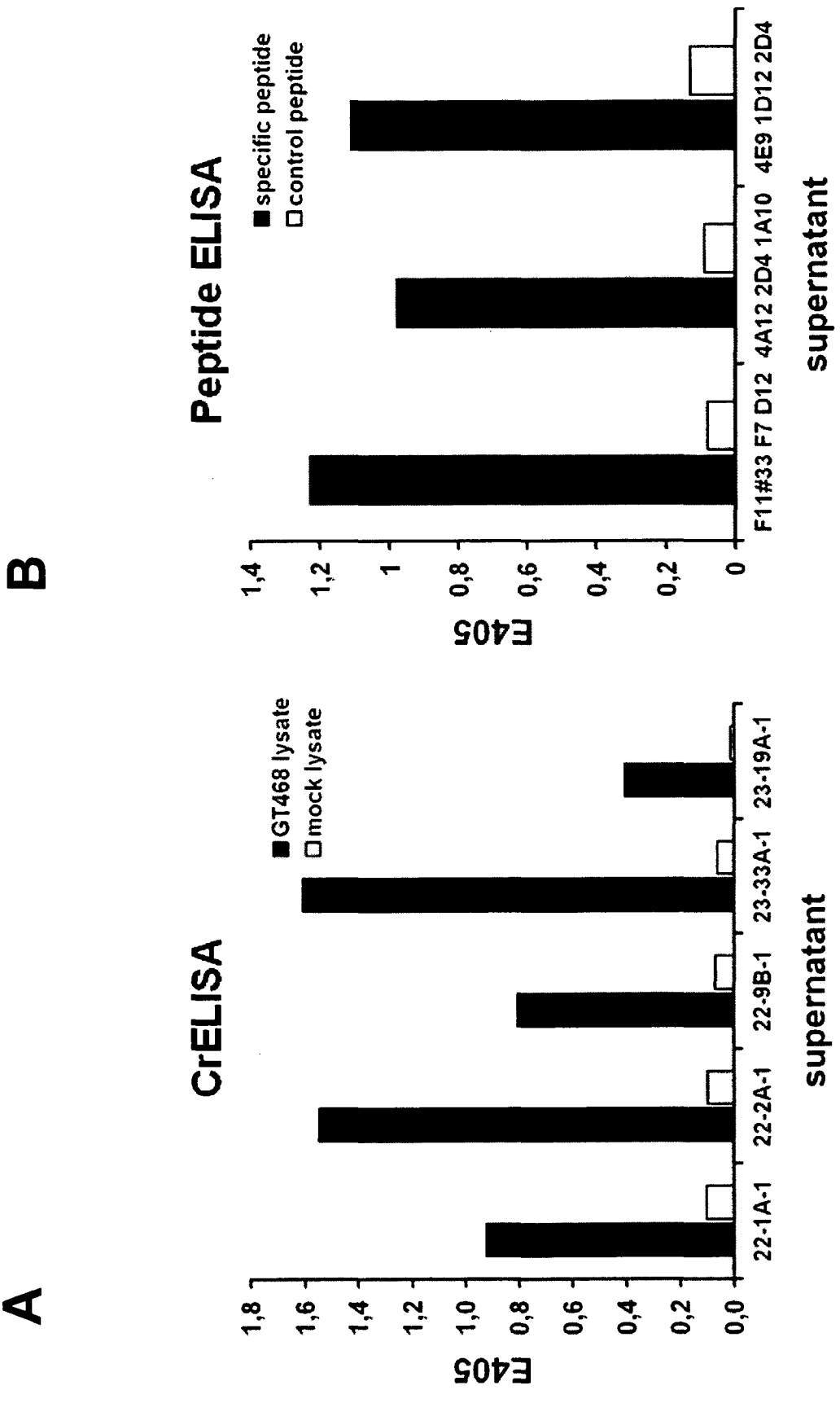

A
CrELISA
GT468 lysate
mock lysate
E405
1,8
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
22-1A-1
22-2A-1
22-9B-1
23-33A-1
23-19A-1
supernatant
B
Peptide ELISA
specific peptide
control peptide
E405
1,4
1,2
1
0,8
0,6
0,4
0,2
0
F11#33 F7 D12
4A12 2D4 1A10
4E9 1D12 2D4
supernatant

Fig. 11

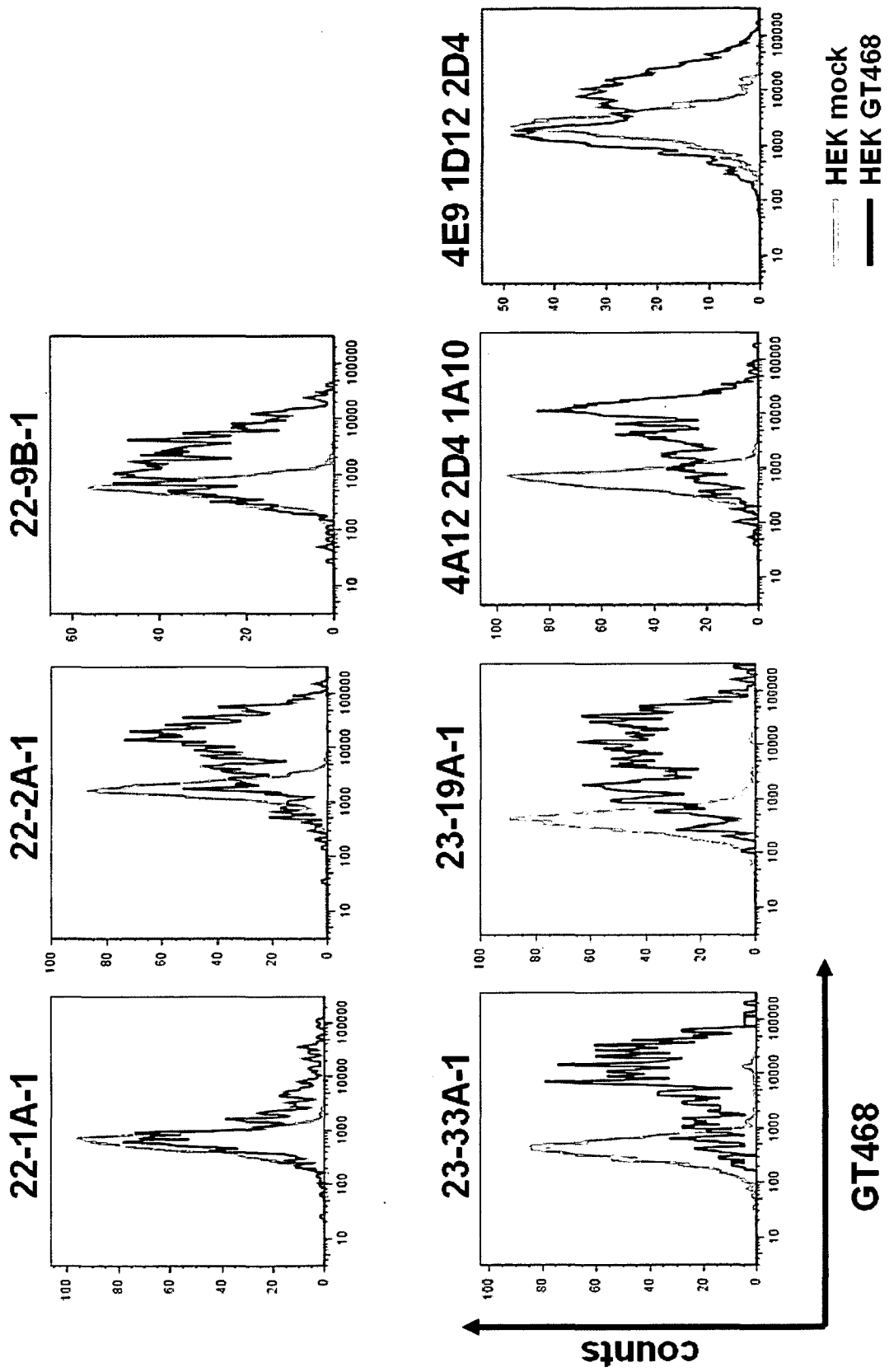

22-1A-1
22-2A-1
22-9B-1
23-33A-1
23-19A-1
4A12 2D4 1A10
4E9 1D12 2D4
counts
GT468
HEK mock
HEK GT468

Fig. 12

- HEK mock
+ HEK GT468
GT468
22-1A-1
22-2A-1
22-9B-1
23-33A-1
23-19A-1
4A12 2D4 1A10
4E9 1D12 2D4

Fig. 13

Peptide	Sequence
1	MKVFKFIGLMILLTS
2	KFIGLMILLTSAFSA
3	LMILLTSAFSAGSGQ
4	LTSAFSAGSGQSPMT
5	FSAGSGQSPMTVLCS
6	SGQSPMTVLCSIDWF
7	PMTVLCSIDWFMVTV
8	LCSIDWFMVTVHPFM
9	DWFMVTVHPFMLNND
10	VTVHPFMLNNDVCVH
11	PFMLNNDVCVHFHEL
12	NNDVCVHFHELHLGL
13	CVHFHELHLGLGCPP
14	HELHLGLGCPPNHVQ
15	LGLGCPPNHVQPHAY
16	CPPNHVQPHAYQFTY
17	HVQPHAYQFTYRVTE
18	HAYQFTYRVTECGIR
19	FTYRVTECGIRAKAV
20	VTECGIRAKAVSQDM
21	GIRAKAVSQDMVIYS
22	KAVSQDMVIYSTEIH
23	QDMVIYSTEIHYSSK
24	IYSTEIHYSSKGTPS
25	EIHYSSKGTPSKFVI

Peptide	Sequence
26	SSKGTPSKFVIPVSC
27	TPSKFVIPVSCAAPQ
28	FVIPVSCAAPQKSPW
29	VSCAAPQKSPWLTKP
30	APQKSPWLTKPCSMR
31	SPWLTKPCSMRVASK
32	TKPCSMRVASKSRAT
33	SMRVASKSRATAQKD
34	ASKSRATAQKDEKCY
35	RATAQKDEKCYEVFS
36	QKDEKCYEVFSLSQS
37	KCYEVFSLSQSSQRP
38	VFSLSQSSQRPNCDC
39	SQSSQRPNCDCPPCV
40	QRPNCDCPPCVFSEE
41	CDCPPCVFSEEEHTQ
42	PCVFSEEEHTQVPCH
43	SEEEHTQVPCHQAGA
44	HTQVPCHQAGAQEAQ
45	PCHQAGAQEAQPLQP
46	AGAQEAQPLQPSHFL
47	EAQPLQPSHFLDISE
48	LQPSHFLDISEDWSL
49	HFLDISEDWSLHTDD
50	ISEDWSLHTDDMIGS
51	SEDWSLHTDDMIGSM

Hybridoma	Reactivity (Peptide)
22-1A-1	50+51
22-2A-1	18, 26-31, 42
22-9B-1	27, 29-31
23-33A-1	47+48
23-19A-1	48+49

Hybridoma	Reactivity (Sequence)
F11#33 F7 D12	VFSLSQSSQRPNC
4A12 2D4 1A10	APQKSPWLTKPC
4A9 1D12 2D4	APQKSPWLTKPC

Fig. 14

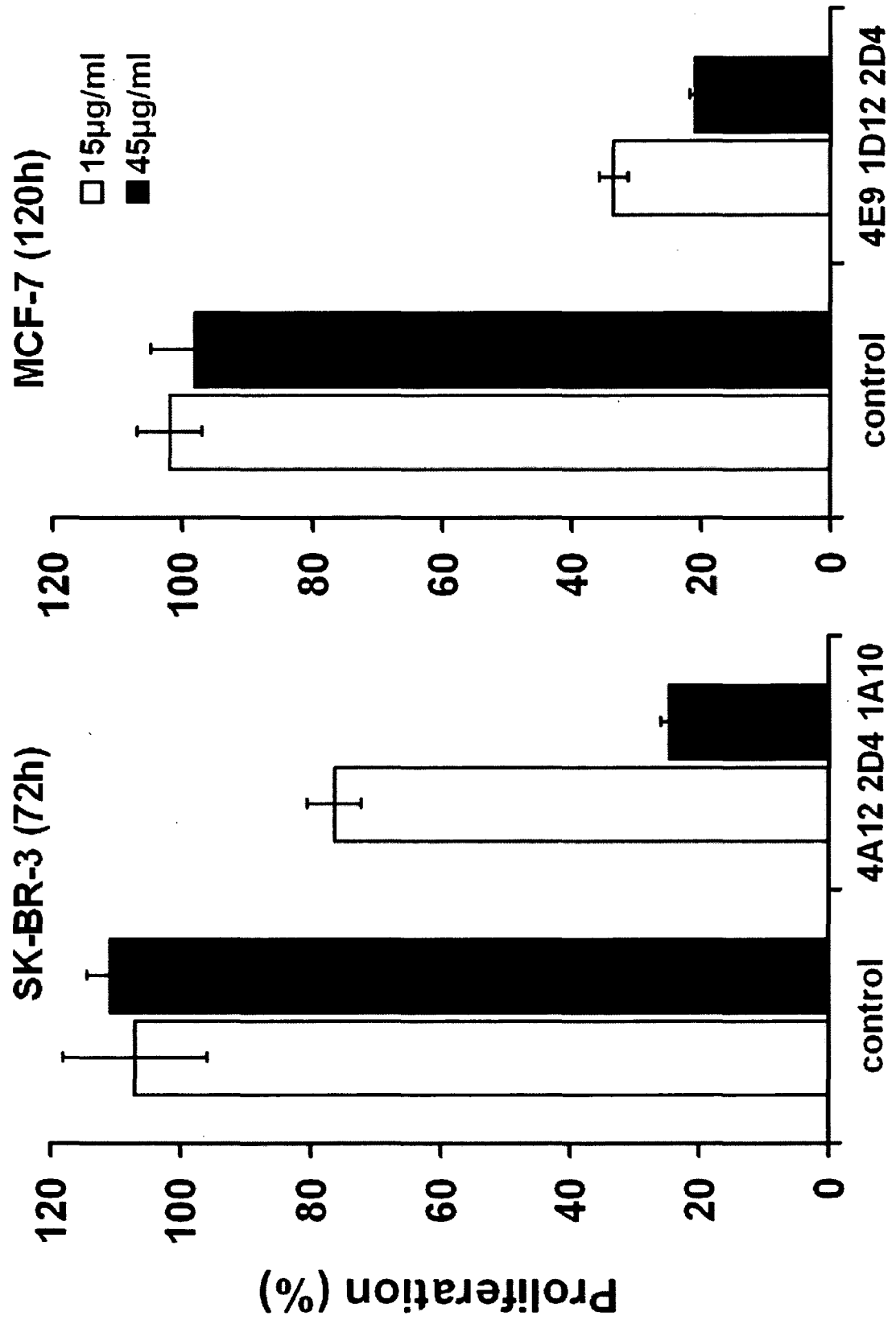

SK-BR-3 (72h)
MCF-7 (120h)
15µg/ml
45µg/ml
Proliferation (%)
0
20
40
60
80
100
120
control
4A12 2D4 1A10
4E9 1D12 2D4

Fig. 15

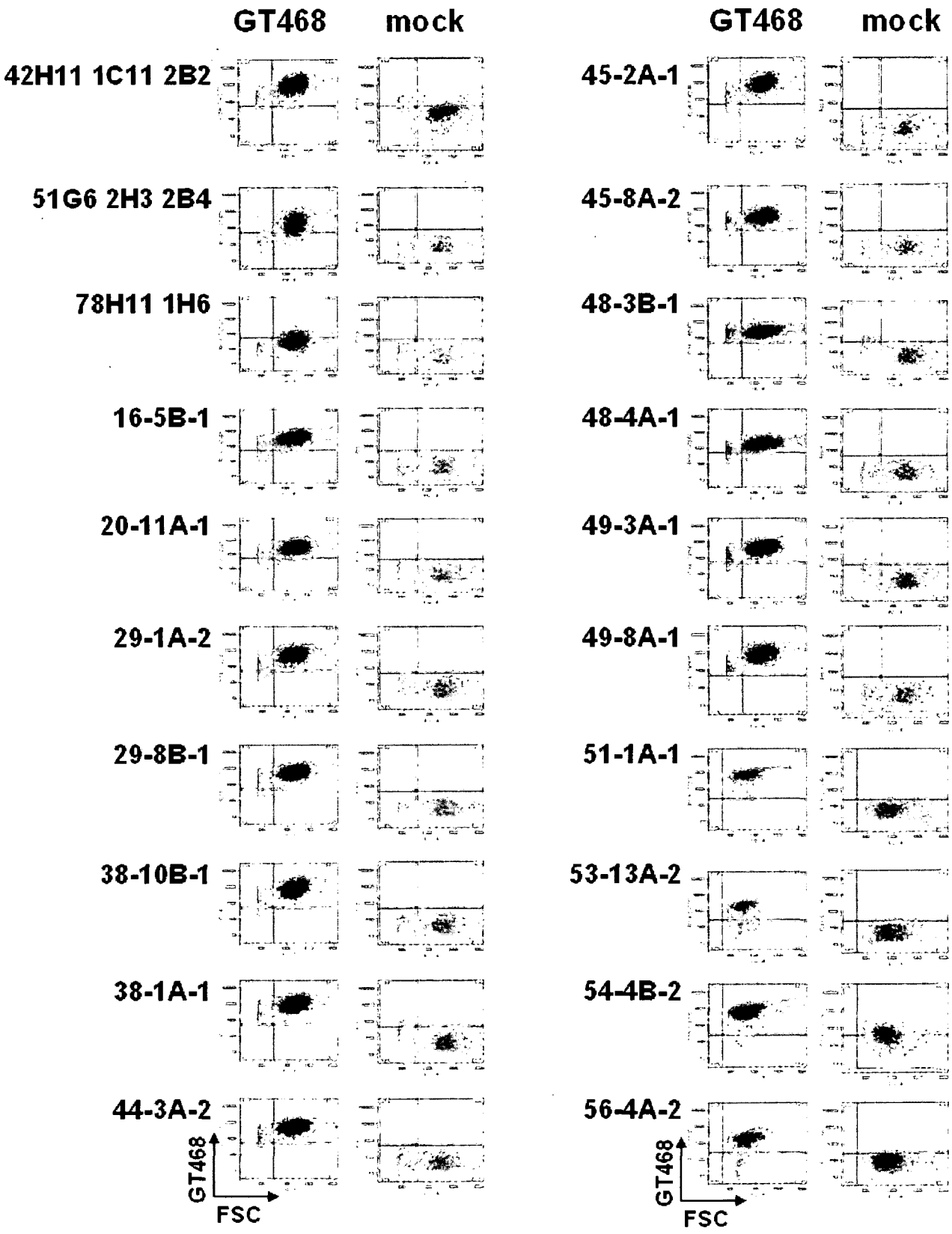

GT468
mock
42H11 1C11 2B2
51G6 2H3 2B4
78H11 1H6
16-5B-1
20-11A-1
29-1A-2
29-8B-1
38-10B-1
38-1A-1
44-3A-2
GT468
FSC
GT468
mock
45-2A-1
45-8A-2
48-3B-1
48-4A-1
49-3A-1
49-8A-1
51-1A-1
53-13A-2
54-4B-2
56-4A-2
GT468
FSC

Fig. 16A

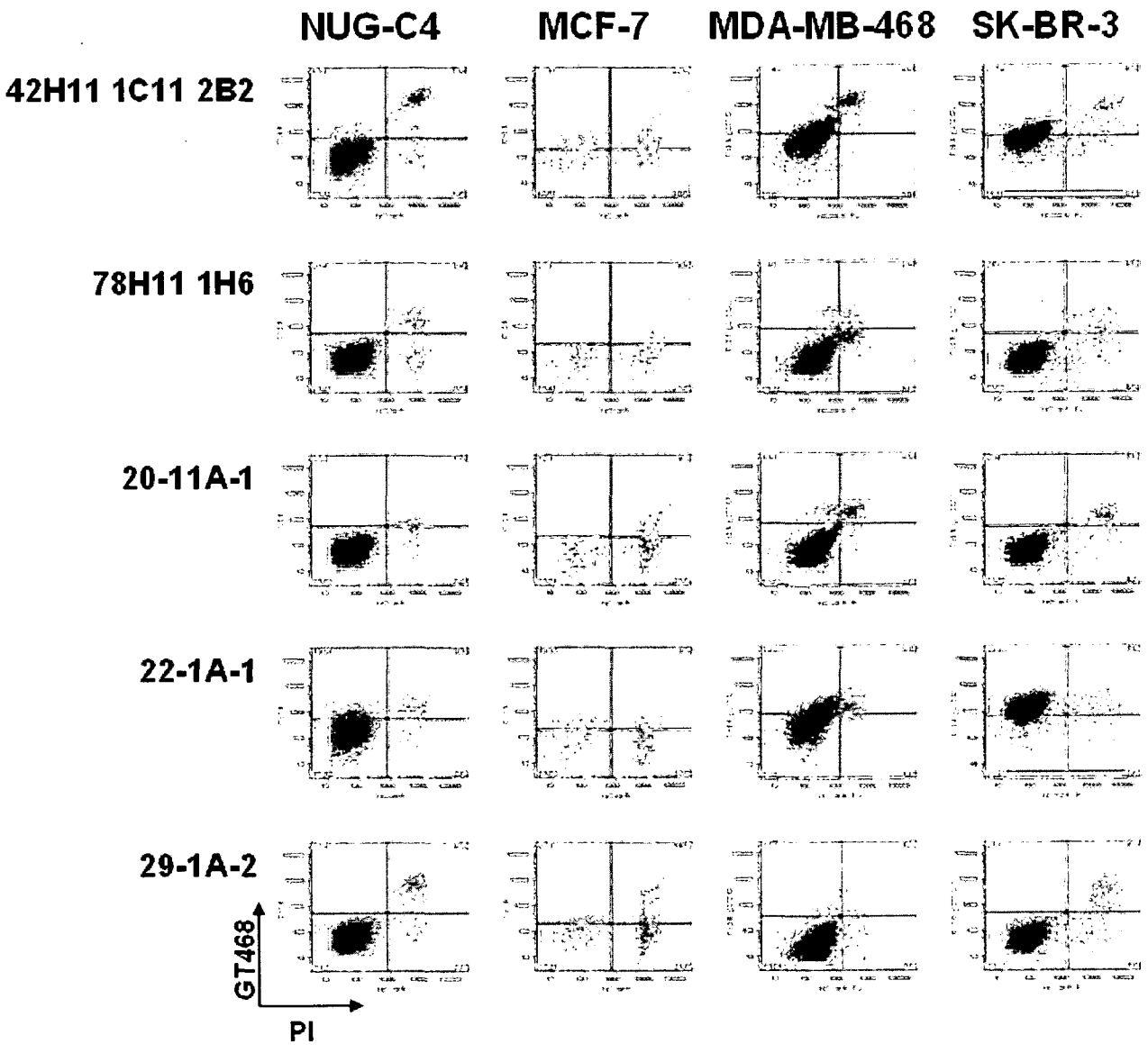

NUG-C4
MCF-7
MDA-MB-468
SK-BR-3
42H11 1C11 2B2
78H11 1H6
20-11A-1
22-1A-1
29-1A-2
GT468
PI

Fig. 16B

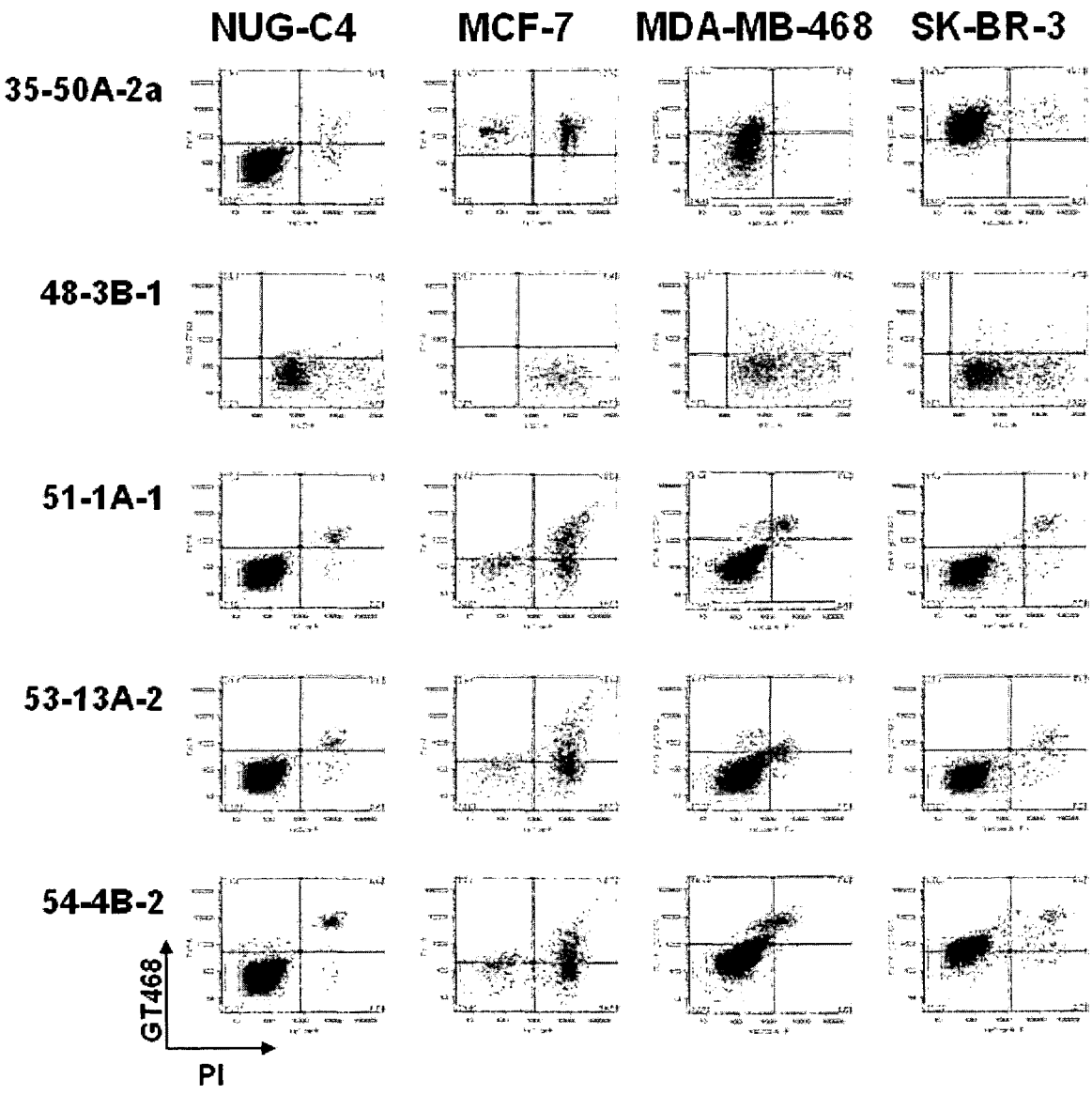

NUG-C4
MCF-7
MDA-MB-468
SK-BR-3
35-50A-2a
48-3B-1
51-1A-1
53-13A-2
54-4B-2
GT468
PI

Fig. 17

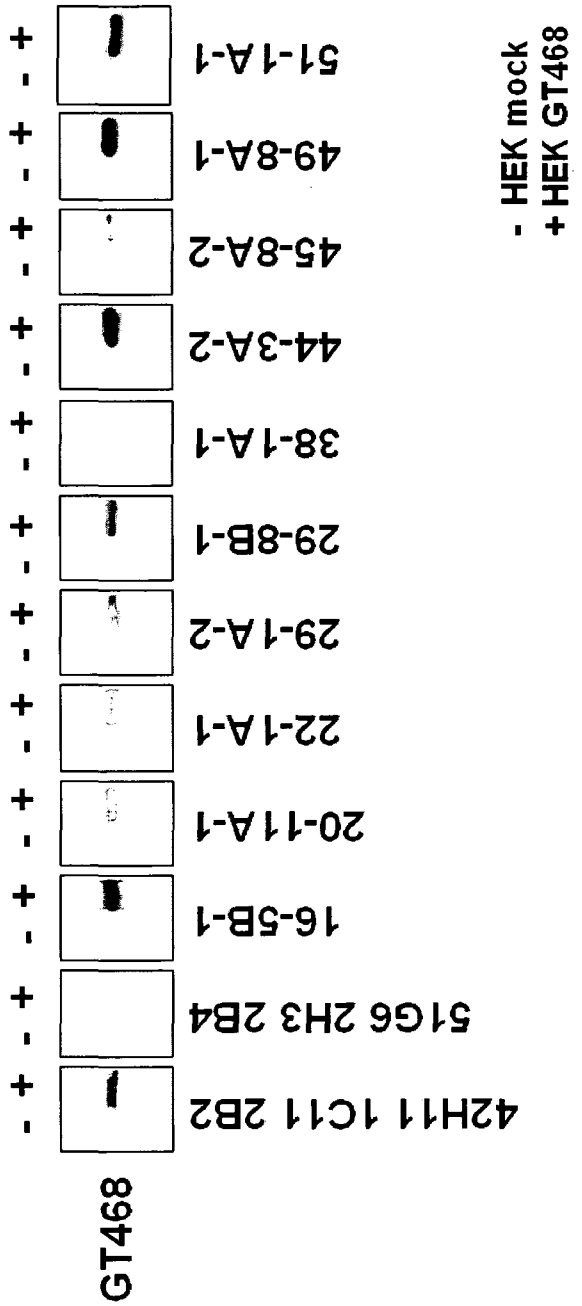

GT468
42H11 1C11 2B2
51G6 2H3 2B4
16-5B-1
20-11A-1
22-1A-1
29-1A-2
29-8B-1
38-1A-1
44-3A-2
45-8A-2
49-8A-1
51-1A-1
+
-
- HEK mock
+ HEK GT468

Fig. 18

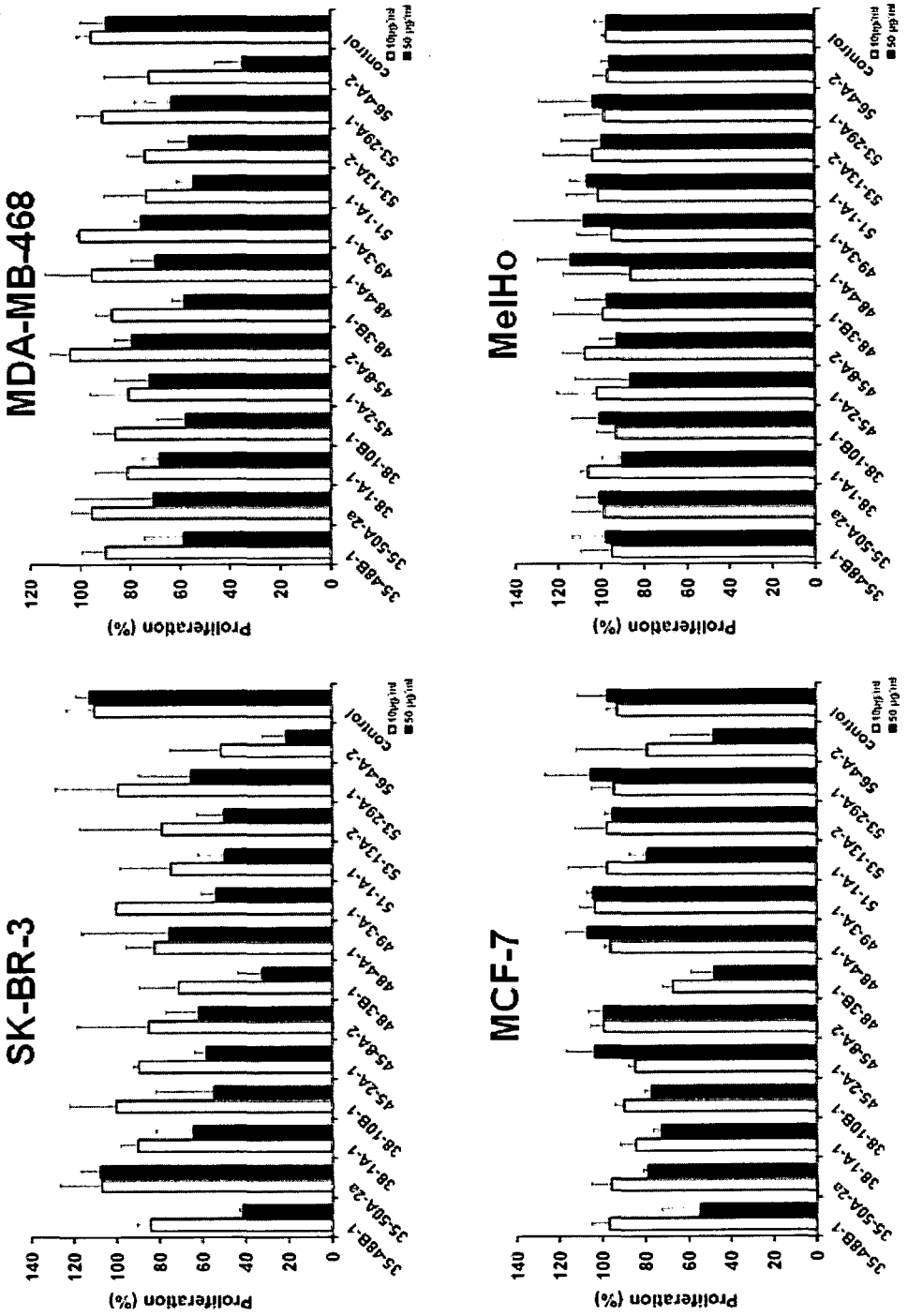

MDA-MB-468
MelHo
SK-BR-3
MCF-7
Proliferation (%)
control
56-4A-2
53-29A-1
53-13A-2
51-1A-1
49-3A-1
48-4A-1
48-3B-1
45-8A-2
45-2A-1
38-10B-1
38-1A-1
35-50A-2a
35-48B-1
10 µg/ml
50 µg/ml

Fig. 19

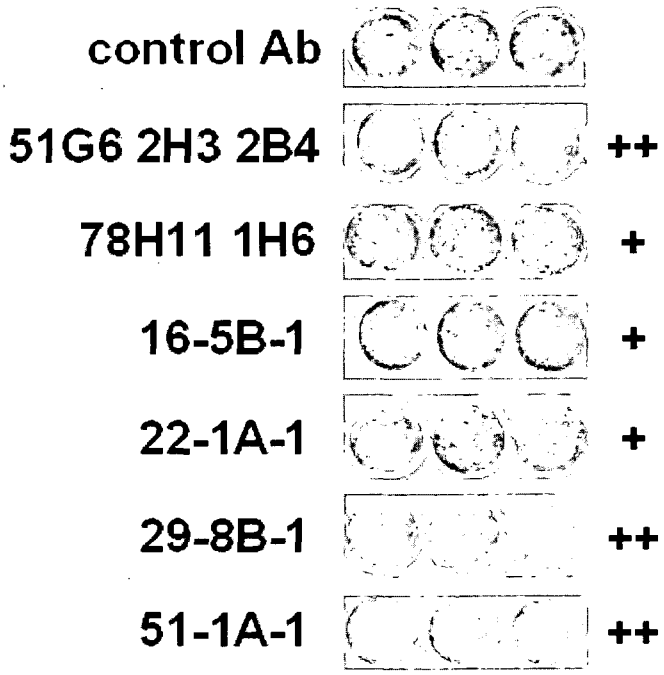


Fig. 20A

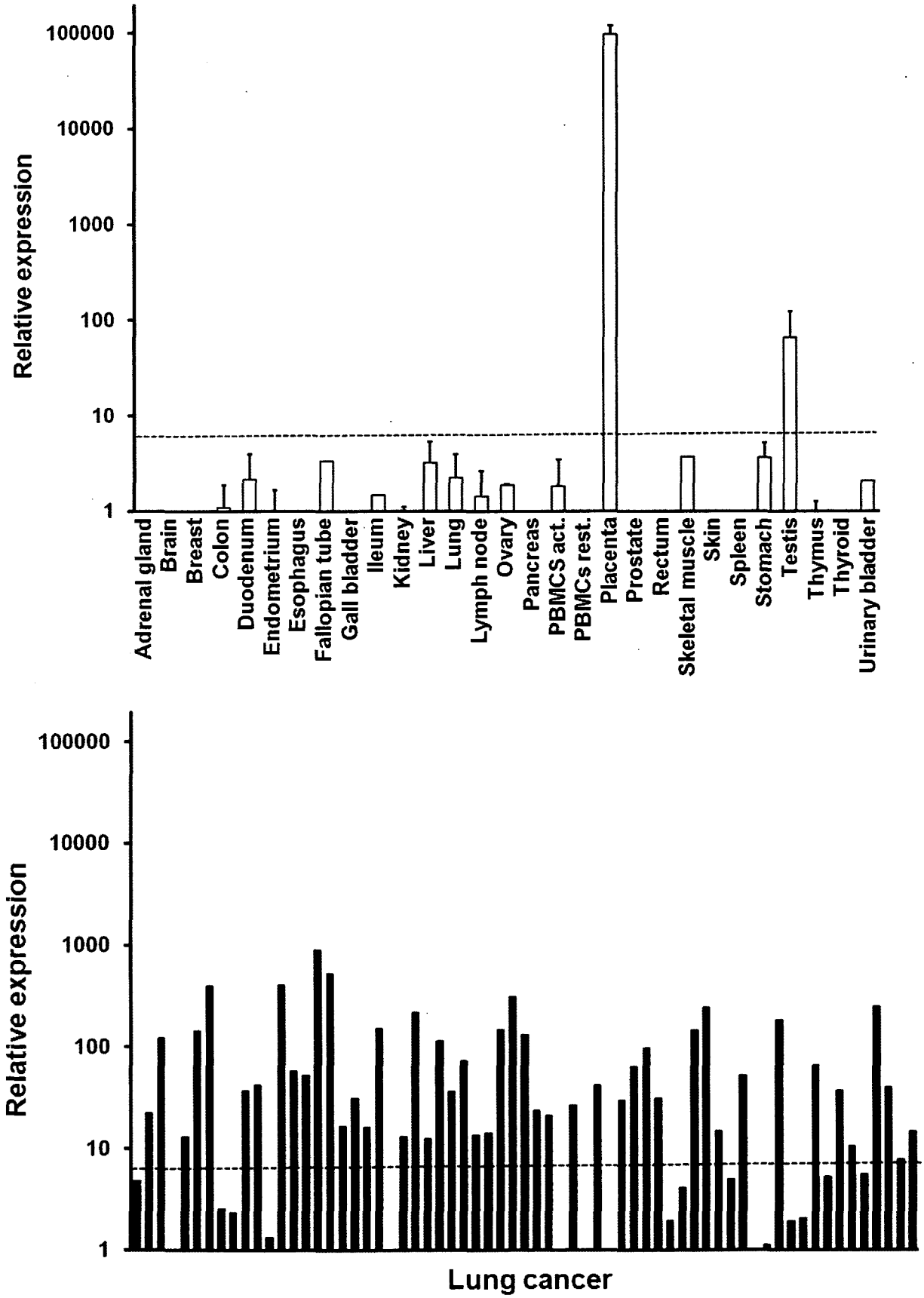

Relative expression
100000
10000
1000
100
10
1
Adrenal gland
Brain
Breast
Colon
Duodenum
Endometrium
Esophagus
Fallopian tube
Gall bladder
Ileum
Kidney
Liver
Lung
Lymph node
Ovary
Pancreas
PBMCS act.
PBMCs rest.
Placenta
Prostate
Rectum
Skeletal muscle
Skin
Spleen
Stomach
Testis
Thymus
Thyroid
Urinary bladder
Relative expression
100000
10000
1000
100
10
1
Lung cancer

Fig. 20B

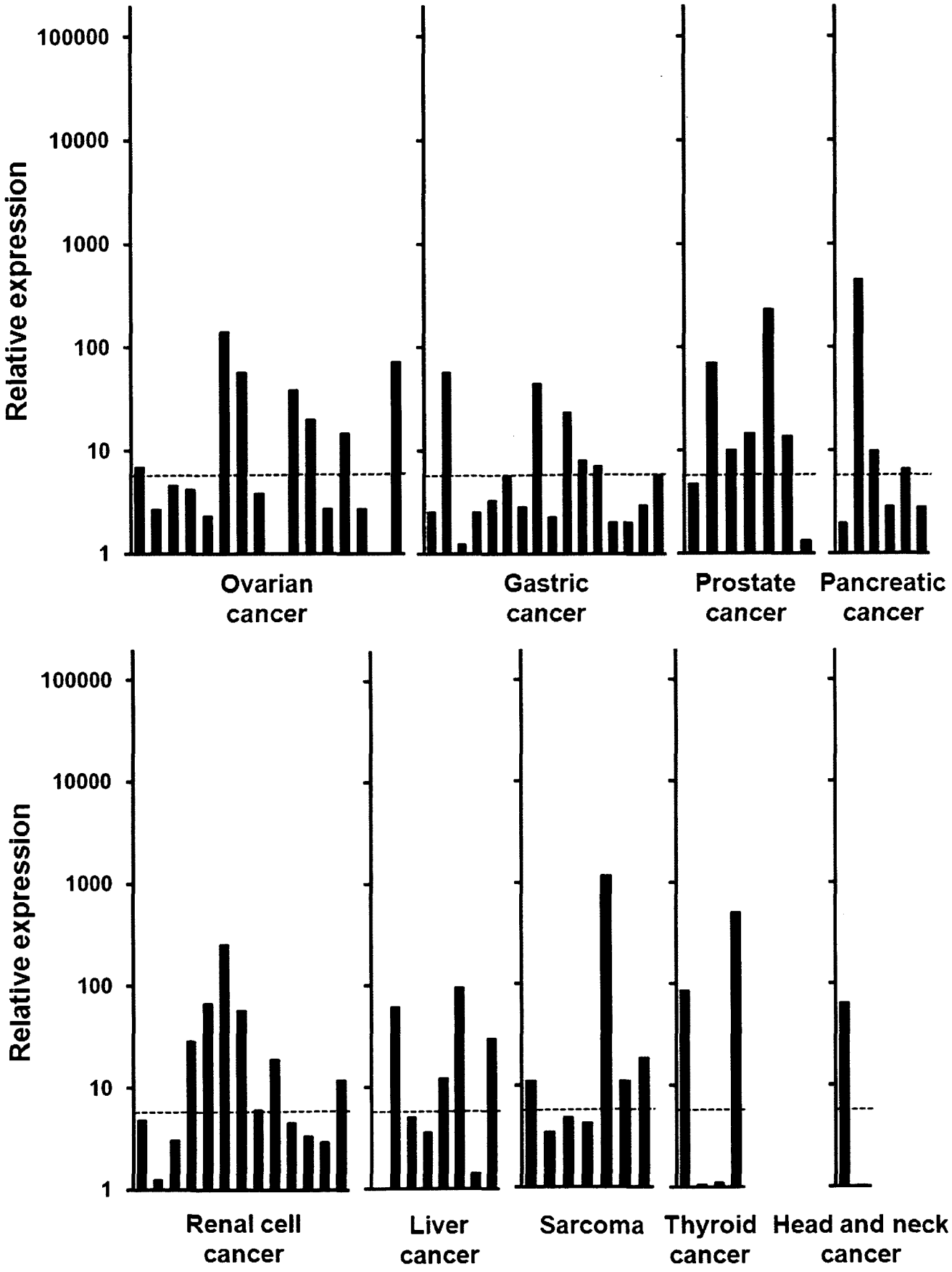

Relative expression
100000
10000
1000
100
10
1
Ovarian cancer
Gastric cancer
Prostate cancer
Pancreatic cancer
Relative expression
100000
10000
1000
100
10
1
Renal cell cancer
Liver cancer
Sarcoma
Thyroid cancer
Head and neck cancer

Fig. 21

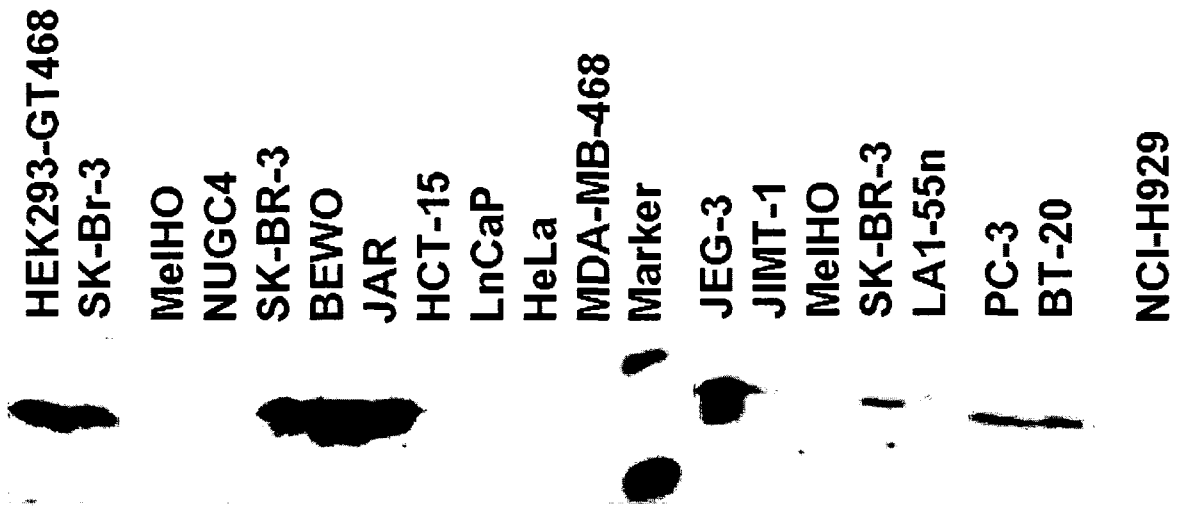

HEK293-GT468
SK-Br-3
MelHO
NUGC4
SK-BR-3
BEWO
JAR
HCT-15
LnCaP
HeLa
MDA-MB-468
Marker
JEG-3
JIMT-1
MelHO
SK-BR-3
LA1-55n
PC-3
BT-20
NCI-H929

Fig. 22

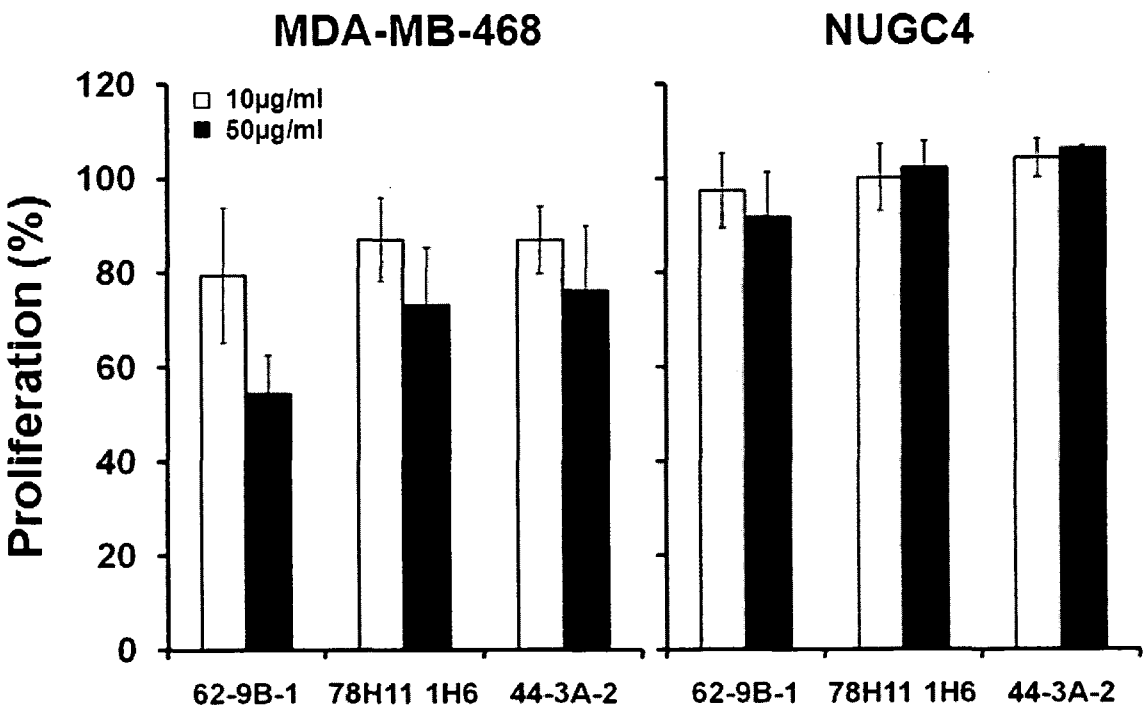

MDA-MB-468
NUGC4
10μg/ml
50μg/ml
Proliferation (%)
120
100
80
60
40
20
0
62-9B-1
78H11 1H6
44-3A-2
62-9B-1
78H11 1H6
44-3A-2

Fig. 23

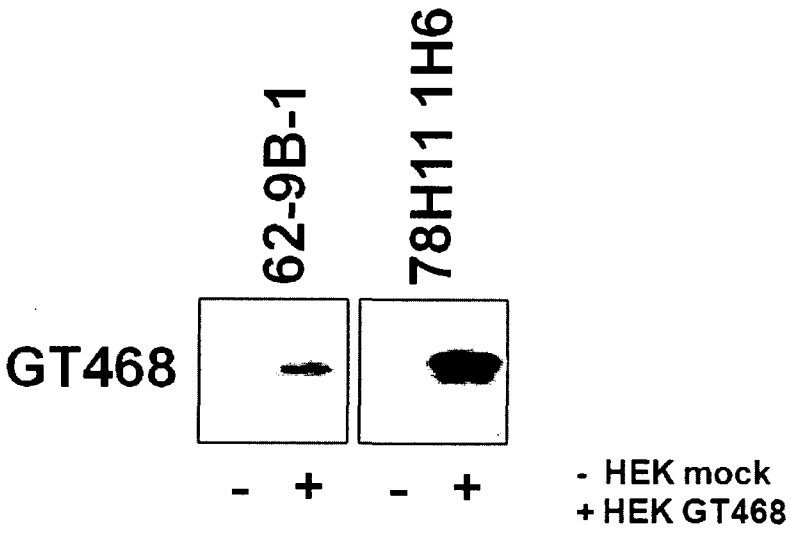


Fig. 24

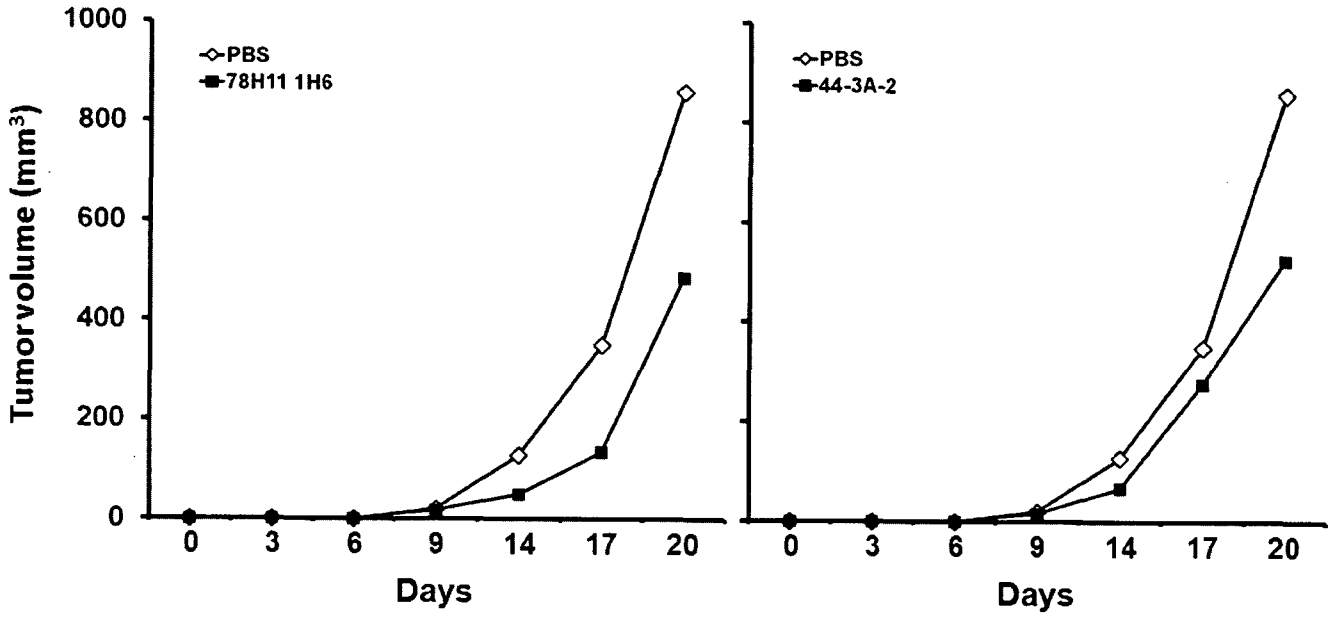

1000
800
600
400
200
0
Tumor volume (mm³)
PBS
78H11 1H6
0
3
6
9
14
17
20
Days
PBS
44-3A-2
0
3
6
9
14
17
20
Days

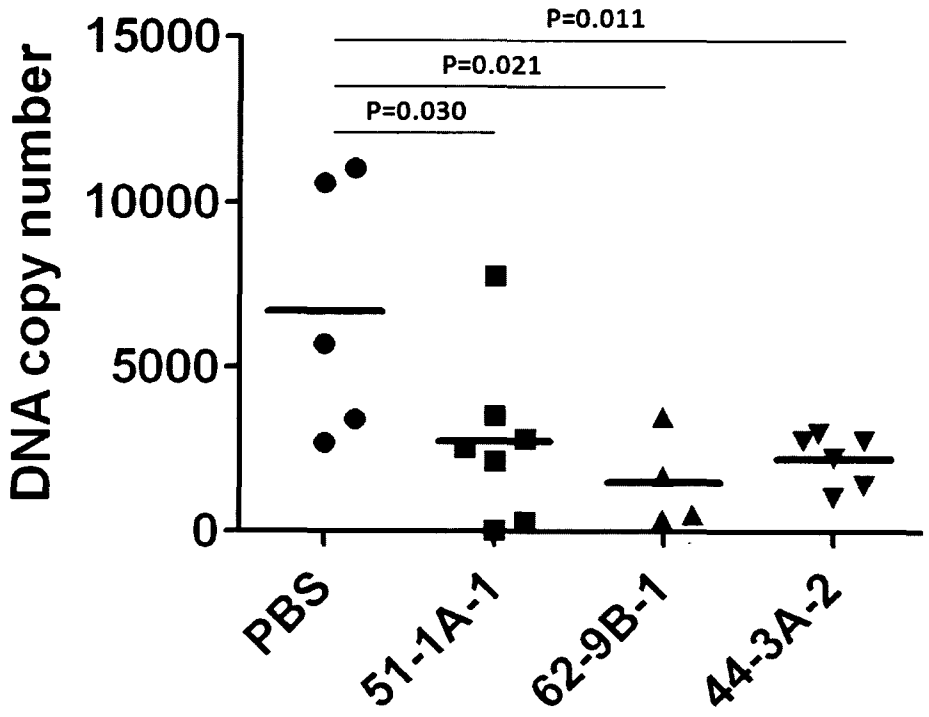
Fig. 25

Peptide	Sequence
1	MKVFKFIGLMILLTS
2	KFIGLMILLTSAFSA
3	LMILLTSAFSAGSGQ
4	LTSAFSAGSGQSPMT
5	FSAGSGQSPMTVLCS
6	SGQSPMTVLCSIDWF
7	PMTVLCSIDWFMVTV
8	LCSIDWFMVTVHPFM
9	DWFMVTVHPFMLNND
10	VTVHPFMLNNDVCVH
11	PFMLNNDVCVHFHEL
12	NNDVCVHFHELHLGL
13	CVHFHELHLGLGCPP
14	HELHLGLGCPPNHVQ
15	LGLGCPPNHVQPHAY
16	CPPNHVQPHAYQFTY
17	HVQPHAYQFTYRVTE
18	HAYQFTYRVTECGIR
19	FTYRVTECGIRAKAV
20	VTECGIRAKAVSQDM
21	GIRAKAVSQDMVIYS
22	KAVSQDMVIYSTEIH
23	QDMVIYSTEIHYSSK
24	IYSTEIHYSSKGTPS
25	EIHYSSKGTPSKFVI
26	SSKGTPSKFVIPVSC
27	TPSKFVIPVSCAAPQ
28	FVIPVSCAAPQKSPW
29	VSCAAPQKSPWLTKP
30	APQKSPWLTKPCSMR
31	SPWLTKPCSMRVASK
32	TKPCSMRVASKSRAT
33	SMRVASKSRATAQKD
34	ASKSRATAQKDEKCY
35	RATAQKDEKCYEVFS
36	QKDEKCYEVFSLSQS
37	KCYEVFSLSQSSQRP
38	VFSLSQSSQRPNCDC
39	SQSSQRPNCDCPPCV
40	QRPNCDCPPCVFSEE
41	CDCPPCVFSEEEHTQ
42	PCVFSEEEHTQVPCH
43	SEEEHTQVPCHQAGA
44	HTQVPCHQAGAQEAQ
45	PCHQAGAQEAQPLQP
46	AGAQEAQPLQPSHFL
47	EAQPLQPSHFLDISE
48	LQPSHFLDISEDWSL
49	HFLDISEDWSLHTDD
50	ISEDWSLHTDDMIGS
51	SEDWSLHTDDMIGSM

Hybridoma	Reactivity (Peptide)
29-1A-2	27, 29, 30
29-8B-1	49-51
35-48B-1	13
44-3A-2	31, 32
49-3A-1	29-31
49-8A-1	37, 38
51-1A-1	36-37
53-13A-2	33, 34
54-4B-2	34, 37
62-9B-1	36, 37

Hybridoma	Reactivity (Sequence)
78H11 1H6	WSLHTDDMIGSM

Fig. 26


DNA copy number
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10000
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P=0.011
P=0.021
P=0.030
PBS
51-1A-1
62-9B-1
44-3A-2

SEQUENCE LISTING

<110> Ganymed Pharmaceuticals AG
Johannes Gutenberg-Universität Mainz

<120> MONOCLONAL ANTIBODIES FOR TREATMENT OF CANCER

<130> SG2205A

<150> EP 08016277.9
<151> 2008-09-16

<150> US 61/097,453
<151> 2008-09-16

<160> 89

<170> PatentIn version 3.3

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<213> Homo sapiens

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acagcaagtt ccttcttccc tttggaaatt tggcagctgc cttcaccagt gagcacaaag 180

ccacatttca aaggaaactg acaaattatc cccagctgcc agaagaagaa atcctcactg 240

gacggcttcc tgtttcctgt ggttcattat ctgattggct gcagggatga aagttttaa 300

gttcatagga ctgatgatcc tcctcacctc tgcgttttca gccggttcag gacaaagtcc 360

aatgactgtg ctgtgctcca tagactggtt catggtcaca gtgcacccct tcatgctaaa 420

caacgatgtg tgtgtacact ttcatgaact acacttgggc ctgggttgcc ccccaaacca 480

tgttcagcca cacgcctacc agttcaccta ccgtgttact gaatgtggca tcagggccaa 540

agctgtctct caggacatgg ttatctacag cactgagata cactactctt ctaagggcac 600

gccatctaag tttgtgatcc cagtgtcatg tgctgccccc caaaagtccc catggctcac 660

caagccctgc tccatgagag tagccagcaa gagcagggcc acagcccaga aggatgagaa 720

atgctacgag gtgttcagct tgtcacagtc cagtcaaagg cccaactgcg attgtccacc 780

ttgtgtcttc agtgaagaag agcataccca ggtcccttgt caccaagcag gggctcagga 840

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agatgatatg attgggtcca tgtgatcctc aggtttgggg tctcctgaag atgctatttc 960

tagaattagt atatagtgta caaatgtctg acaaataagt gctcttgtga ccctcatgtg 1020

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ttatattcat gtgtaaacaa aaaataaaat aaaattctga tcgcat 1126

<210> 2

<211> 212
<212> PRT
<213> Homo sapiens

<400> 2

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Met Lys Val Phe Lys Phe Ile Gly Leu Met Ile Leu Leu Thr Ser Ala
1               5                  10                  15

Phe Ser Ala Gly Ser Gly Gln Ser Pro Met Thr Val Leu Cys Ser Ile
            20                  25                  30

Asp Trp Phe Met Val Thr Val His Pro Phe Met Leu Asn Asn Asp Val
        35                  40                  45

Cys Val His Phe His Glu Leu His Leu Gly Leu Gly Cys Pro Pro Asn
    50                  55                  60

His Val Gln Pro His Ala Tyr Gln Phe Thr Tyr Arg Val Thr Glu Cys
65                  70                  75                  80

Gly Ile Arg Ala Lys Ala Val Ser Gln Asp Met Val Ile Tyr Ser Thr
                85                  90                  95

Glu Ile His Tyr Ser Ser Lys Gly Thr Pro Ser Lys Phe Val Ile Pro
            100                 105                 110

Val Ser Cys Ala Ala Pro Gln Lys Ser Pro Trp Leu Thr Lys Pro Cys
        115                 120                 125

Ser Met Arg Val Ala Ser Lys Ser Arg Ala Thr Ala Gln Lys Asp Glu
    130                 135                 140

Lys Cys Tyr Glu Val Phe Ser Leu Ser Gln Ser Ser Gln Arg Pro Asn
145                 150                 155                 160

Cys Asp Cys Pro Pro Cys Val Phe Ser Glu Glu Glu His Thr Gln Val
                165                 170                 175

Pro Cys His Gln Ala Gly Ala Gln Glu Ala Gln Pro Leu Gln Pro Ser
            180                 185                 190

His Phe Leu Asp Ile Ser Glu Asp Trp Ser Leu His Thr Asp Asp Met
        195                 200                 205

Ile Gly Ser Met
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<210> 3
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<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 3

Ala Pro Gln Lys Ser Pro Trp Leu Thr Lys Pro Cys
1 5 10

<210> 4
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 4

Pro Leu Gln Pro Ser His Phe Leu Asp Ile Ser Glu Asp
1 5 10

<210> 5
<211> 11
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 5

Ile Tyr Ser Thr Glu Ile His Tyr Ser Ser Lys
1 5 10

<210> 6
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

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Trp Ser Leu His Thr Asp Asp Met Ile Gly Ser Met
1 5 10

<210> 7
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 7

Cys Ser Ile Asp Trp Phe Met Val Thr Val His Pro Phe Met Leu
1 5 10 15

<210> 8
<211> 12
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 8

Cys Val His Phe His Glu Leu His Leu Gly Leu Gly
1 5 10

<210> 9
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 9

Ser Ser Lys Gly Thr Pro Ser Lys Phe Val Ile Pro Val Ser Cys
1 5 10 15

<210> 10
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 10

Val Phe Ser Leu Ser Gln Ser Ser Gln Arg Pro Asn Cys
1 5 10

<210> 11
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: siRNA

<400> 11
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<210> 12
<211> 21
<212> DNA
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<220>

<223> Description of artificial sequence: siRNA

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uugcuggcua cucucaugga g 21

<210> 13
<211> 21
<212> DNA
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<220>
<223> Description of artificial sequence: siRNA

<400> 13
gguucaggac aaaguccaat t 21

<210> 14
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: siRNA

<400> 14
uuggacuuug uccugaaccg g 21

<210> 15
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: Oligonucleotide

<400> 15
aaatttggca gctgccttca c 21

<210> 16
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: Oligonucleotide

<400> 16
tgatgccaca ttcagtaaca c 21

<210> 17
<211> 326
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Translation of PCR product

<400> 17

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Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly
1               5                  10                  15

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
            20                  25                  30

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
        35                  40                  45

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
    50                  55                  60

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
65                  70                  75                  80

Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys Val Glu Pro
                85                  90                  95

Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu
            100                 105                 110

Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
        115                 120                 125

Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
    130                 135                 140

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly
145                 150                 155                 160

Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
                165                 170                 175

Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp
            180                 185                 190

Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro
        195                 200                 205

Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu
    210                 215                 220

Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn
225                 230                 235                 240

Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
                245                 250                 255
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Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
            260                 265                 270

Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
        275                 280                 285

Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
    290                 295                 300

Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
305                 310                 315                 320

Ser Leu Ser Pro Gly Lys
                325
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<210> 18
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Translation of PCR product

<400> 18

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Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
1               5                   10                  15

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
            20                  25                  30

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
        35                  40                  45

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
    50                  55                  60

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
65                  70                  75                  80

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
                85                  90                  95

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
            100                 105
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<210> 19
<211> 324
<212> DNA
<213> Artificial

<220>

<223> Description of artificial sequence: PCR product

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ggaactgcct ctgttgtgtg cctgctgaat aacttctatc ccagagaggc caaagtacag 120

tggaaggtgg ataacgccct ccaatcgggt aactcccagg agagtgtcac agagcaggac 180

agcaaggaca gcacctacag cctcagcagc accctgacgc tgagcaaagc agactacgag 240

aaacacaaag tctacgcctg cgaagtcacc catcagggcc tgagctcgcc cgtcacaaag 300

agcttcaaca ggggagagtg ttag 324

<210> 20
<211> 981
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: PCR product

<400> 20
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ctgggctgcc tggtcaagga ctacttcccc gaaccggtga cggtgtcgtg gaactcaggc 120

gccctgacca gcggcgtgca caccttcccg gctgtcctac agtcctcagg actctactcc 180

ctcagcagcg tggtgaccgt gccctccagc agcttgggca cccagaccta catctgcaac 240

gtgaatcaca agcccagcaa caccaaggtg gacaagaaag ttgagcccaa atcttgtgac 300

aaaactcaca catgcccacc gtgcccagca cctgaactcc tgggggggacc gtcagtcttc 360

ctcttccccc caaaacccaa ggacaccctc atgatctccc ggacccctga ggtcacatgc 420

gtggtggtgg acgtgagcca cgaagaccct gaggtcaagt tcaactggta cgtggacggc 480

gtggaggtgc ataatgccaa gacaaagccg cgggaggagc agtacaacag cacgtaccgt 540

gtggtcagcg tcctcaccgt cctgcaccag gactggctga atggcaagga gtacaagtgc 600

aaggtctcca acaaagccct cccagccccc atcgagaaaa ccatctccaa agccaaaggg 660

cagccccgag aaccacaggt gtacaccctg cccccatccc gggatgagct gaccaagaac 720

caggtcagcc tgacctgcct ggtcaaaggc ttctatccca gcgacatcgc cgtggagtgg 780

gagagcaatg ggcagccgga gaacaactac aagaccacgc ctcccgtgct ggactccgac 840

ggctccttct tcctctatag caagctcacc gtggacaaga gcaggtggca gcaggggaac 900

gtcttctcat gctccgtgat gcatgaggct ctgcacaacc actacacgca gaagagcctc 960

tccctgtctc cgggtaaatg a 981

<210> 21
<211> 324
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: codon optimized nucleic acid

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ggcaccgcca gcgtggtgtg cctgctgaac aacttctacc cccgggaggc caaggtgcag 120

tggaaggtgg acaacgccct gcagagcggc aacagccagg agagcgtcac cgagcaggac 180

agcaaggact ccacctacag cctgagcagc accctgaccc tgagcaaggc cgactacgag 240

aagcacaagg tgtacgcctg cgaggtgacc caccagggcc tgtccagccc cgtgaccaag 300

agcttcaaca ggggcgagtg ctag 324

<210> 22
<211> 107
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: codon optimized protein

<400> 22

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
1 5 10 15

Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
20 25 30

Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
35 40 45

Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
50 55 60

Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
65 70 75 80

Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
85 90 95

Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 23
<211> 981
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: codon optimized nucleic acid

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gtgaaccaca agcccagcaa caccaaggtg gacaagagag tggagcccaa gagctgcgac 300

aagacccaca cctgcccccc ctgcccagcc ccagagctgc tgggcggacc cagcgtgttc 360

ctgttccccc ccaagcccaa ggacaccctg atgatcagca ggacccccga ggtgacctgc 420

gtggtggtgg acgtgagcca cgaggaccca gaggtgaagt tcaactggta cgtggacggc 480

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gtggtgtccg tgctgaccgt gctgcaccag gactggctga acggcaagga atacaagtgc 600

aaggtctcca acaaggccct gccagccccc atcgaaaaga ccatcagcaa ggccaagggc 660

cagccacggg agccccaggt gtacaccctg ccccccagcc gggaggagat gaccaagaac 720

caggtgtccc tgacctgtct ggtgaagggc ttctacccca gcgacatcgc cgtggagtgg 780

gagagcaacg gccagcccga gaacaactac aagaccaccc ccccagtgct ggacagcgac 840

ggcagcttct tcctgtacag caagctgacc gtggacaagt ccaggtggca gcagggcaac 900

gtgttcagct gcagcgtgat gcacgaggcc ctgcacaacc actacaccca gaagtccctg 960

agcctgagcc ccggcaagta g 981

<210> 24
<211> 326
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: codon optimized protein

<400> 24

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1 5 10 15

Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu Pro
20 25 30

Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val His Thr
35 40 45

Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser Val
50 55 60

Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile Cys Asn
65 70 75 80

```
Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Arg Val Glu Pro
                85                  90                  95

Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu
            100                 105                 110

Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
        115                 120                 125

Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
    130                 135                 140

Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly
145                 150                 155                 160

Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
                165                 170                 175

Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp
            180                 185                 190

Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro
        195                 200                 205

Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu
    210                 215                 220

Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn
225                 230                 235                 240

Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
                245                 250                 255

Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
            260                 265                 270

Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
        275                 280                 285

Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
    290                 295                 300

Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
305                 310                 315                 320

Ser Leu Ser Pro Gly Lys
                325
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<210> 25
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<213> Artificial

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<210> 26
<211> 21
<212> DNA
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<220>
<223> Description of artificial sequence: Oligonucleotide

<400> 26
ggtccttttc accagcaagc t 21

<210> 27
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: siRNA

<400> 27
uaacuguaua aucgacuagt t 21

<210> 28
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: siRNA

<400> 28
cuagucgauu auacaguuag a 21

<210> 29
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 29

Met Lys Val Phe Lys Phe Ile Gly Leu Met Ile Leu Leu Thr Ser
1 5 10 15

<210> 30
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 30

Lys Phe Ile Gly Leu Met Ile Leu Leu Thr Ser Ala Phe Ser Ala
1 5 10 15

<210> 31
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 31

Leu Met Ile Leu Leu Thr Ser Ala Phe Ser Ala Gly Ser Gly Gln
1 5 10 15

<210> 32
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 32

Leu Thr Ser Ala Phe Ser Ala Gly Ser Gly Gln Ser Pro Met Thr
1 5 10 15

<210> 33
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 33

Phe Ser Ala Gly Ser Gly Gln Ser Pro Met Thr Val Leu Cys Ser
1 5 10 15

<210> 34
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 34

Ser Gly Gln Ser Pro Met Thr Val Leu Cys Ser Ile Asp Trp Phe
1 5 10 15

<210> 35
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 35

Pro Met Thr Val Leu Cys Ser Ile Asp Trp Phe Met Val Thr Val
1 5 10 15

<210> 36
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 36

Leu Cys Ser Ile Asp Trp Phe Met Val Thr Val His Pro Phe Met
1 5 10 15

<210> 37
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 37

Asp Trp Phe Met Val Thr Val His Pro Phe Met Leu Asn Asn Asp
1 5 10 15

<210> 38
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 38

Val Thr Val His Pro Phe Met Leu Asn Asn Asp Val Cys Val His
1 5 10 15

<210> 39
<211> 15

<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 39

Pro Phe Met Leu Asn Asn Asp Val Cys Val His Phe His Glu Leu
1 5 10 15

<210> 40
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 40

Asn Asn Asp Val Cys Val His Phe His Glu Leu His Leu Gly Leu
1 5 10 15

<210> 41
<211> 15
<212> PRT
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<223> Description of artificial sequence: Peptide for Screening

<400> 41

Cys Val His Phe His Glu Leu His Leu Gly Leu Gly Cys Pro Pro
1 5 10 15

<210> 42
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 42

His Glu Leu His Leu Gly Leu Gly Cys Pro Pro Asn His Val Gln
1 5 10 15

<210> 43
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 43

Leu Gly Leu Gly Cys Pro Pro Asn His Val Gln Pro His Ala Tyr
1 5 10 15

<210> 44
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 44

Cys Pro Pro Asn His Val Gln Pro His Ala Tyr Gln Phe Thr Tyr
1 5 10 15

<210> 45
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 45

His Val Gln Pro His Ala Tyr Gln Phe Thr Tyr Arg Val Thr Glu
1 5 10 15

<210> 46
<211> 15
<212> PRT
<213> Artificial

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<223> Description of artificial sequence: Peptide for Screening

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His Ala Tyr Gln Phe Thr Tyr Arg Val Thr Glu Cys Gly Ile Arg
1 5 10 15

<210> 47
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

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Phe Thr Tyr Arg Val Thr Glu Cys Gly Ile Arg Ala Lys Ala Val
1 5 10 15

<210> 48
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

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Val Thr Glu Cys Gly Ile Arg Ala Lys Ala Val Ser Gln Asp Met
1 5 10 15

<210> 49
<211> 15
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<223> Description of artificial sequence: Peptide for Screening

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Gly Ile Arg Ala Lys Ala Val Ser Gln Asp Met Val Ile Tyr Ser
1 5 10 15

<210> 50
<211> 15
<212> PRT
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<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 50

Lys Ala Val Ser Gln Asp Met Val Ile Tyr Ser Thr Glu Ile His
1 5 10 15

<210> 51
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 51

Gln Asp Met Val Ile Tyr Ser Thr Glu Ile His Tyr Ser Ser Lys
1 5 10 15

<210> 52
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 52

Ile Tyr Ser Thr Glu Ile His Tyr Ser Ser Lys Gly Thr Pro Ser
1 5 10 15

<210> 53
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 53

Glu Ile His Tyr Ser Ser Lys Gly Thr Pro Ser Lys Phe Val Ile
1 5 10 15

<210> 54
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 54

Ser Ser Lys Gly Thr Pro Ser Lys Phe Val Ile Pro Val Ser Cys
1 5 10 15

<210> 55
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 55

Thr Pro Ser Lys Phe Val Ile Pro Val Ser Cys Ala Ala Pro Gln
1 5 10 15

<210> 56
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 56

Phe Val Ile Pro Val Ser Cys Ala Ala Pro Gln Lys Ser Pro Trp
1 5 10 15

<210> 57
<211> 15
<212> PRT
<213> Artificial

<220>

<223> Description of artificial sequence: Peptide for Screening

<400> 57

Val Ser Cys Ala Ala Pro Gln Lys Ser Pro Trp Leu Thr Lys Pro
1 5 10 15

<210> 58
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 58

Ala Pro Gln Lys Ser Pro Trp Leu Thr Lys Pro Cys Ser Met Arg
1 5 10 15

<210> 59
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 59

Ser Pro Trp Leu Thr Lys Pro Cys Ser Met Arg Val Ala Ser Lys
1 5 10 15

<210> 60
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 60

Thr Lys Pro Cys Ser Met Arg Val Ala Ser Lys Ser Arg Ala Thr
1 5 10 15

<210> 61
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 61

Ser Met Arg Val Ala Ser Lys Ser Arg Ala Thr Ala Gln Lys Asp
1 5 10 15

<210> 62
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 62

Ala Ser Lys Ser Arg Ala Thr Ala Gln Lys Asp Glu Lys Cys Tyr
1 5 10 15

<210> 63
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 63

Arg Ala Thr Ala Gln Lys Asp Glu Lys Cys Tyr Glu Val Phe Ser
1 5 10 15

<210> 64
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 64

Gln Lys Asp Glu Lys Cys Tyr Glu Val Phe Ser Leu Ser Gln Ser
1 5 10 15

<210> 65
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 65

Lys Cys Tyr Glu Val Phe Ser Leu Ser Gln Ser Ser Gln Arg Pro
1 5 10 15

<210> 66
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 66

Val Phe Ser Leu Ser Gln Ser Ser Gln Arg Pro Asn Cys Asp Cys
1 5 10 15

<210> 67
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 67

Ser Gln Ser Ser Gln Arg Pro Asn Cys Asp Cys Pro Pro Cys Val
1 5 10 15

<210> 68
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 68

Gln Arg Pro Asn Cys Asp Cys Pro Pro Cys Val Phe Ser Glu Glu
1 5 10 15

<210> 69
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 69

Cys Asp Cys Pro Pro Cys Val Phe Ser Glu Glu Glu His Thr Gln
1 5 10 15

<210> 70
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 70

Pro Cys Val Phe Ser Glu Glu Glu His Thr Gln Val Pro Cys His
1 5 10 15

<210> 71
<211> 15

<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 71

Ser Glu Glu Glu His Thr Gln Val Pro Cys His Gln Ala Gly Ala
1 5 10 15

<210> 72
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 72

His Thr Gln Val Pro Cys His Gln Ala Gly Ala Gln Glu Ala Gln
1 5 10 15

<210> 73
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 73

Pro Cys His Gln Ala Gly Ala Gln Glu Ala Gln Pro Leu Gln Pro
1 5 10 15

<210> 74
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 74

Ala Gly Ala Gln Glu Ala Gln Pro Leu Gln Pro Ser His Phe Leu
1 5 10 15

<210> 75
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 75

Glu Ala Gln Pro Leu Gln Pro Ser His Phe Leu Asp Ile Ser Glu
1 5 10 15

<210> 76
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 76

Leu Gln Pro Ser His Phe Leu Asp Ile Ser Glu Asp Trp Ser Leu
1 5 10 15

<210> 77
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 77

His Phe Leu Asp Ile Ser Glu Asp Trp Ser Leu His Thr Asp Asp
1 5 10 15

<210> 78
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 78

Ile Ser Glu Asp Trp Ser Leu His Thr Asp Asp Met Ile Gly Ser
1 5 10 15

<210> 79
<211> 15
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Screening

<400> 79

Ser Glu Asp Trp Ser Leu His Thr Asp Asp Met Ile Gly Ser Met
1 5 10 15

<210> 80
<211> 14
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 80

Cys Pro Leu Gln Pro Ser His Phe Leu Asp Ile Ser Glu Asp
1 5 10

<210> 81
<211> 13
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 81

Cys Trp Ser Leu His Thr Asp Asp Met Ile Gly Ser Met
1 5 10

<210> 82
<211> 25
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: Peptide for Immunization

<400> 82

Cys Tyr Glu Val Phe Ser Leu Ser Gln Ser Ser Gln Arg Pro Asn Cys
1 5 10 15

Asp Gly Gly Gly Ser Gly Gly Gly Cys
20 25

<210> 83
<211> 20
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: Oligonucleotide for Immunization

<400> 83
tccatgacgt tcctgacgtt 20

<210> 84
<211> 639
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: optimized Plasmid Insert

<400> 84

atgaaggtgt tcaagttcat cggcctgatg atcctgctga ccagcgcctt cagcgccggc 60

agcggccaga gccccatgac cgtgctgtgc agcatcgact ggttcatggt gaccgtgcac 120

cccttcatgc tgaacaacga cgtgtgcgtg cacttccacg agctgcacct gggcctgggc 180

tgccctccca accacgtgca gccccacgcc taccagttca cctaccgggt gaccgagtgc 240

ggcatccggg ccaaggccgt gagccaggac atggtgatct acagcaccga gatccactac 300

agcagcaagg gcaccccccag caagttcgtg atccccgtga gctgtgccgc ccctcagaag 360

agcccctggc tgaccaagcc ctgcagcatg cgggtggcca gcaagagccg ggccaccgcc 420

cagaaagacg agaagtgcta cgaggtgttc agcctgagcc agagcagcca gcggcccaac 480

tgcgactgcc ccccctgcgt gttcagcgag gaagagcaca cccaggtgcc ctgccaccag 540

gccggagccc aggaagccca gcccctgcag cccagccact tcctggacat cagcgaggac 600

tggtccctgc acaccgacga catgatcggc agcatgtga 639

<210> 85
<211> 495
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: optimized Plasmid Insert

<400> 85
atggagacag acacactcct gctatgggta ctgctgctct gggttccagg ttccactggt 60

gactatccat atgatgttcc agattatgct ggggcccagc cggccagatc tgccgccccct 120

cagaagagcc cctggctgac caagccctgc agcatgcggg tggccagcaa gagccgggcc 180

accgcccaga aagacgagaa gtgctacgag gtgttcagcc tgagccagag cagccagcgg 240

cccaactgcg actgcccccc ctgcgtgttc agcgaggaag agcacaccca ggtgccctgc 300

caccaggtcg acgaacaaaa actcatctca gaagaggatc tgaatgctgt gggccaggac 360

acgcaggagg tcatcgtggt gccacactcc ttgcccttta aggtggtggt gatctcagcc 420

atcctggccc tggtggtgct caccatcatc tcccttatca tcctcatcat gctttggcag 480

aagaagccac gttag 495

<210> 86
<211> 588
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: optimized Plasmid Insert

<400> 86
atggagacag acacactcct gctatgggta ctgctgctct gggttccagg ttccactggt 60

gactatccat atgatgttcc agattatgct ggggcccagc cggccagatc tgccgccccct 120

cagaagagcc cctggctgac caagccctgc agcatgcggg tggccagcaa gagccgggcc 180

accgcccaga aagacgagaa gtgctacgag gtgttcagcc tgagccagag cagccagcgg 240

cccaactgcg actgcccccc ctgcgtgttc agcgaggaag agcacaccca ggtgccctgc 300

caccaggccg gagcccagga agcccagccc ctgcagccca gccacttcct ggacatcagc 360

gaggactggt ccctgcacac cgacgacatg atcggcagca tggtcgacga acaaaaactc 420

atctcagaag aggatctgaa tgctgtgggc caggacacgc aggaggtcat cgtggtgcca 480

cactccttgc cctttaaggt ggtggtgatc tcagccatcc tggccctggt ggtgctcacc 540

atcatctccc ttatcatcct catcatgctt tggcagaaga agccacgtta g 591

<210> 87
<211> 579
<212> PRT
<213> Artificial

<220>
<223> Description of artificial sequence: recombinant Protein for Immunization

<400> 87

Met Ser Gly Ser His His His His His His Ser Ser Gly Met His Lys
1 5 10 15

Ile Glu Glu Gly Lys Leu Val Ile Trp Ile Asn Gly Asp Lys Gly Tyr
20 25 30

Asn Gly Leu Ala Glu Val Gly Lys Lys Phe Glu Lys Asp Thr Gly Ile
35 40 45

Lys Val Thr Val Glu His Pro Asp Lys Leu Glu Glu Lys Phe Pro Gln
50 55 60

Val Ala Ala Thr Gly Asp Gly Pro Asp Ile Ile Phe Trp Ala His Gly
65 70 75 80

Arg Phe Gly Gly Tyr Ala Gln Ser Gly Leu Leu Ala Glu Ile Thr Pro
85 90 95

Asp Lys Ala Phe Gln Asp Lys Leu Tyr Pro Phe Thr Trp Asp Ala Val
100 105 110

Arg Tyr Asn Gly Lys Leu Ile Ala Tyr Pro Ile Ala Val Glu Ala Leu
115 120 125

Ser Leu Ile Tyr Asn Lys Asp Leu Leu Pro Asn Pro Pro Lys Thr Trp
130 135 140

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Glu Glu Ile Pro Ala Leu Asp Lys Glu Leu Lys Ala Lys Gly Lys Ser
145                 150                 155                 160

Ala Leu Met Phe Asn Leu Gln Glu Pro Tyr Phe Thr Trp Pro Leu Ile
                165                 170                 175

Ala Ala Asp Gly Gly Tyr Ala Phe Lys Tyr Glu Asn Gly Lys Tyr Asp
            180                 185                 190

Ile Lys Asp Val Gly Val Asp Asn Ala Gly Ala Lys Ala Gly Leu Thr
        195                 200                 205

Phe Leu Val Asp Leu Ile Lys Asn Lys His Met Asn Ala Asp Thr Asp
    210                 215                 220

Tyr Ser Ile Ala Glu Ala Ala Phe Asn Lys Gly Glu Thr Ala Met Thr
225                 230                 235                 240

Ile Asn Gly Pro Trp Ala Trp Ser Asn Ile Asp Thr Ser Lys Val Asn
                245                 250                 255

Tyr Gly Val Thr Val Leu Pro Thr Phe Lys Gly Gln Pro Ser Lys Pro
            260                 265                 270

Phe Val Gly Val Leu Ser Ala Gly Ile Asn Ala Ala Ser Pro Asn Lys
        275                 280                 285

Glu Leu Ala Lys Glu Phe Leu Glu Asn Tyr Leu Leu Thr Asp Glu Gly
    290                 295                 300

Leu Glu Ala Val Asn Lys Asp Lys Pro Leu Gly Ala Val Ala Leu Lys
305                 310                 315                 320

Ser Tyr Glu Glu Glu Leu Ala Lys Asp Pro Arg Ile Ala Ala Thr Met
                325                 330                 335

Glu Asn Ala Gln Lys Gly Glu Ile Met Pro Asn Ile Pro Gln Met Ser
            340                 345                 350

Ala Phe Trp Tyr Ala Val Arg Thr Ala Val Ile Asn Ala Ala Ser Gly
        355                 360                 365

Arg Gln Thr Val Asp Glu Ala Leu Lys Asp Ala Gln Thr Asn Ala Ala
    370                 375                 380

Ala Met His Ser Ser Ser Asn Asn Asn Asn Asn Asn Asn Asn Asn Asn
385                 390                 395                 400
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Leu Gly Ile Glu Gly Arg Pro Gly Arg Gly Arg Asn Asn Asp Val Cys
                405                 410                 415

Val His Phe His Glu Leu His Leu Gly Leu Gly Cys Pro Pro Asn His
            420                 425                 430

Val Gln Pro His Ala Tyr Gln Phe Thr Tyr Arg Val Thr Glu Cys Gly
        435                 440                 445

Ile Arg Ala Lys Ala Val Ser Gln Asp Met Val Ile Tyr Ser Thr Glu
    450                 455                 460

Ile His Tyr Ser Ser Lys Gly Thr Pro Ser Lys Phe Val Ile Pro Val
465                 470                 475                 480

Ser Cys Ala Ala Pro Gln Lys Ser Pro Trp Leu Thr Lys Pro Cys Ser
                485                 490                 495

Met Arg Val Ala Ser Lys Ser Arg Ala Thr Ala Gln Lys Asp Glu Lys
            500                 505                 510

Cys Tyr Glu Val Phe Ser Leu Ser Gln Ser Ser Gln Arg Pro Asn Cys
        515                 520                 525

Asp Cys Pro Pro Cys Val Phe Ser Glu Glu Glu His Thr Gln Val Pro
    530                 535                 540

Cys His Gln Ala Gly Ala Gln Glu Ala Gln Pro Leu Gln Pro Ser His
545                 550                 555                 560

Phe Leu Asp Ile Ser Glu Asp Trp Ser Leu His Thr Asp Asp Met Ile
                565                 570                 575

Gly Ser Met
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<210> 88
<211> 21
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: Oligonucleotide

<400> 88
cagctgacta aacagaagca g 21

<210> 89
<211> 22
<212> DNA
<213> Artificial

<220>
<223> Description of artificial sequence: Oligonucleotide

<400> 89
gagttgaatg cagtcatcac ag 22