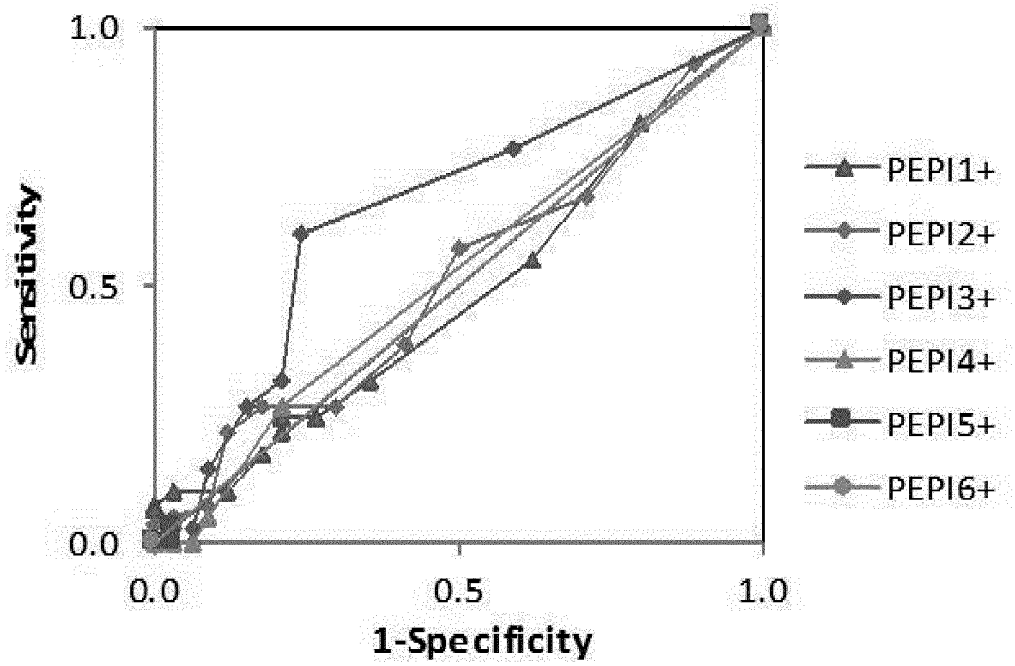
1/25
Figure 1


1.0
0.5
0.0
Sensitivity
0.0
0.5
1.0
1-Specificity
PEPI1+
PEPI2+
PEPI3+
PEPI4+
PEPI5+
PEPI6+

2/25
Figure 2

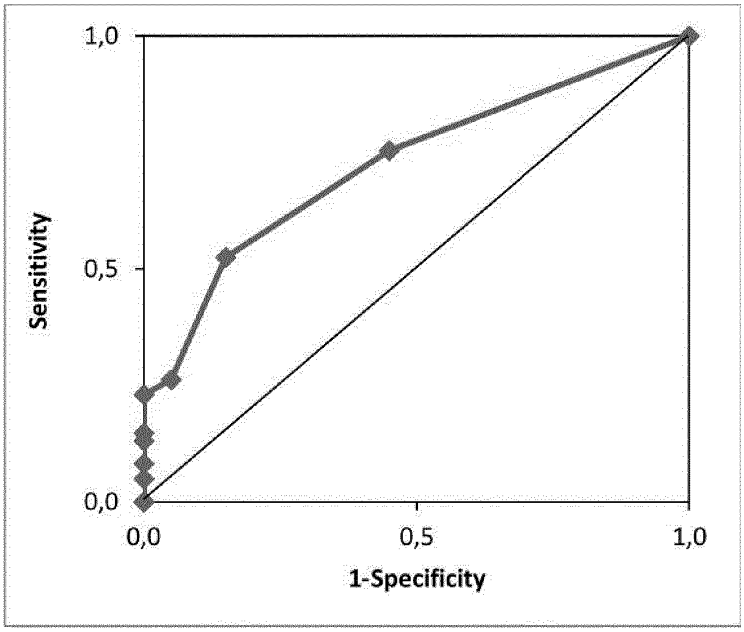


Fig. 3A

Patient ID	#epitope / HPV-16 E6 Pools																#epitope / HPV-16 E17 Pools									
	1-19	11-29	21-39	31-49	41-59	51-69	61-79	71-89	81-99	91-109	101-119	111-129	121-139	131-149	141-158	1-19	11-29	21-39	31-49	41-59	51-69	61-79	71-89	81-98
1	TN	TN	TN	FN	TN	FP	TN	TN	TN	TN	FN	TN	TN	TN	TN	FP	TN	TN	TN	FP	TN	TN	TN	TN
2	FN	FN	TN	TN	TN	FP	TN	TN	TN	TN	TN	TN	TN	TN	TN	FP	TN	TN	TN	FP	TN	TN	TN	TN
3	TN	TN	TN	TN	TN	TP	TN	TN	TN	TN	TN	FN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
6	TN	TN	TN	FN	TN	FP	TN	TN	TN	TN	FN	TN	TN	TN	TN	FP	TN	TN	TN	TN	TN	TN	TN	FP
7	TN	TN	TN	TN	FN	FN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
8	TN	FN	TN	FN	TN	FN	TN	FP	TN	TN	FN	TN	TN	TN	FN	TN	TN	TN	TN	TP	TN	TN	TN	TN
9	TN	TN	TN	TN	FN	FN	TN	FP	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
10	TN	TN	TN	TN	TN	TP	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	FP	TN	TN	FP	TN
11	TN	FN	TN	TN	TN	TN	TN	TN	FP	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
13	TN	TN	TN	TN	TN	FN	TN	TN	TN	FN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
16	TN	TN	TN	TN	TN	TP	TN	TN	TN	FN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
18	TN	TN	TN	TN	TN	FP	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TP	TN	TN	TN	TN
22	TN	FN	TN	TN	TN	TP	TN	TN	TN	TN	TN	TN	TN	TN	TN	FP	TN	TN	TN	FP	TN	TN	TN	TN
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103	TN	FN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN
105	TN	TN	TN	TN	TN	TP	FN	TN	TN	TN	TN	TN	TN	TN	TN	FP	TN	TN	TN	FP	TN	TN	TN	TN
107	TN	TN	TN	TN	TN	TN	TN	TN	TN	FN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN	TN

Fig. 3B

Patient ID	#epitope / HPV-16 E6 Pools																#epitope / HPV-16 E17 Pools									
	1-19	11-29	21-39	31-49	41-59	51-69	61-79	71-89	81-99	91-109	101-119	111-129	121-139	131-149	141-158	1-19	11-29	21-39	31-49	41-59	51-69	61-79	71-89	81-98
1	TN	FP	FP	TP	FP	FP	FP	FP	FP	FP	TP	FP	TN	TN	FP	FP	FP	TN	TN	FP	FP	FP	FP	FP
2	TP	TP	FP	FP	FP	FP	FP	FP	FP	FP	TN	TN	TN	FP	FP	FP	FP	TN	TN	FP	TN	FP	FP	FP
3	FP	FP	TN	FP	FP	TP	TN	FP	FP	FP	FP	TP	TN	FP	FP	FP	TN	TN	TN	FP	TN	TN	FP	FP
6	FP	FP	FP	FN	FP	FP	FP	FP	FP	FP	FN	TN	TN	TN	TN	FP	TN	TN	FP	FP	TN	FP	FP	FP
7	FP	FP	FP	FP	FP	TP	TN	FP	FP	FP	FP	FP	TN	FP	FP	FP	TN	TN	TN	FP	TN	TN	FP	FP
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9	FP	FP	TN	FP	TP	TP	TN	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	TN	TN	FP	TN	FP	FP	TN
10	FP	FP	TN	FP	FP	TP	FP	FP	FP	FP	FP	FP	TN	FP	FP	FP	TN	TN	TN	FP	TN	TN	FP	FP
11	FP	TP	FP	FP	FP	FP	TN	TN	FP	FP	FP	FP	TN	FP	FP	FP	FP	TN	TN	FP	TN	TN	FP	FP
13	FP	FP	FP	FP	FP	TP	FP	FP	FP	TP	FP	TN	TN	FP	FP	FP	FP	TN	TN	FP	FP	TN	FP	FP
16	FP	FP	FP	FP	TN	TP	TN	FP	FP	TP	TP	TN	TN	FP	FP	FP	FP	TN	FP	FP	TN	FP	FP	FP
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22	FP	TP	FP	FP	FP	TP	FP	FP	FP	FP	FP	FP	TN	FP	FP	FP	FP	TN	TN	FP	TN	FP	FP	FP
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100	FP	FP	FP	FP	FP	TP	FP	FP	FP	FP	TN	TN	FP	FP	FP	FP	FP	FP	FP	FP	TN	FP	FP	TN
102	FP	FP	FP	FP	FP	TP	FP	FP	FP	FP	TN	FP	FP	FP	FP	FP	FP	TN	FP	FP	FN	TN	FP	TN
103	FP	TP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	TN	FP	FP	FP	FP	TN	TN	FP	TN	TN	FP	FP
105	FP	FP	FP	FP	FP	TP	TP	FP	FP	FP	TN	FP	TN	FP	FP	FP	FP	TN	TN	FP	TN	FP	FP	FP
107	FP	FP	FP	FP	FP	FP	FP	FP	FP	TP	TN	FP	FP	FP	FP	FP	FP	TN	FP	FP	TN	FP	TP	FP

Fig. 4A

	#PEPI / HPV-16 E6				E7	
Patient ID	E6.1	E6.2	E6.3	E6.4	E7.1	E7.2
1	FP	TP	TP	FN	TN	FN
2	FP	TP	TP	TN	TN	TP
3	TP	TP	TP	TP	TN	TP
6	TP	TP	TP	FN	TP	TP
7	TP	TP	TP	TP	TN	TP
8	TP	TP	TP	FN	FP	TP
9	TP	TP	TP	FN	FP	TP
10	FP	TP	TP	FN	TN	TP
11	TP	TP	FN	FN	TN	TP
13	TP	TP	FN	FN	TN	FN
16	TP	TP	TP	FN	FN	TP
18	FP	TP	FN	FN	FN	TP
22	TP	TP	TP	FN	FN	FN
23	FP	TP	TP	FN	TN	TN
27	TP	TP	TP	FN	FN	FN
28	TP	TP	TP	FN	TN	FN
29	FP	TP	TP	FN	FP	TP
30	FP	FP	TN	TN	FN	FN
100	TP	TP	TP	FN	TN	TP
102	TP	TP	TP	FN	FN	TP
103	TP	TP	TP	FN	TN	TN
105	TP	TP	TP	TP	TN	TN
107	TP	TP	FP	FN	TN	FN

Fig. 4B

	#epitope / HPV-16 E6&E7 Pools					
Patient ID	E6.1	E6.2	E6.3	E6.4	E7.1	E7.2
1	FP	TP	TP	FN	FP	TP
2	FP	TP	TP	TN	TN	TP
3	TP	TP	TP	FN	FP	TP
6	TP	TP	TP	FN	TP	TP
7	TP	TP	TP	FN	FP	TP
8	TP	TP	TP	FN	FP	TP
9	TP	TP	TP	FN	FP	TP
10	FP	TP	TP	FN	FP	TP
11	TP	TP	TP	FN	FP	TP
13	TP	TP	TP	FN	TN	TP
16	TP	TP	TP	FN	TN	TP
18	FP	TP	TP	FN	FN	TP
22	TP	TP	TP	FN	TP	TP
23	FP	TP	TP	FN	FP	FP
27	TP	TP	TP	FN	TP	TP
28	TP	TP	TP	FN	FP	TP
29	FP	TP	TP	FN	FP	TP
30	FP	FP	FP	TN	FN	TP
100	TP	TP	TP	FN	FP	TP
102	TP	TP	TP	FN	TP	TP
103	TP	TP	TP	FN	TN	FP
105	TP	TP	TP	FN	TN	FP
107	TP	TP	TP	FN	FP	TP

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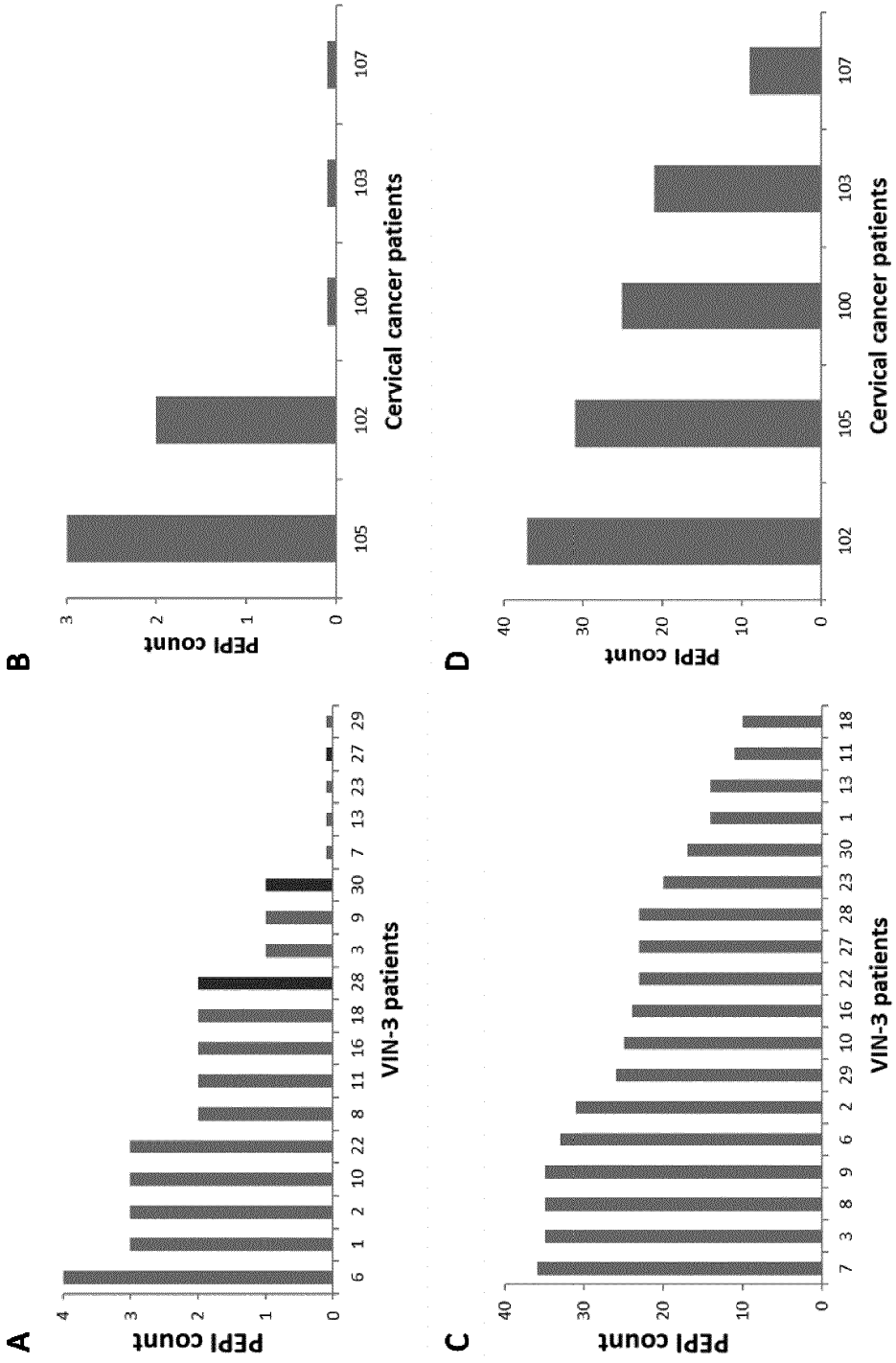
Figure 5


A
PEPI count
VIN-3 patients
B
PEPI count
Cervical cancer patients
C
PEPI count
VIN-3 patients
D
PEPI count
Cervical cancer patients

7/25

Figure 6

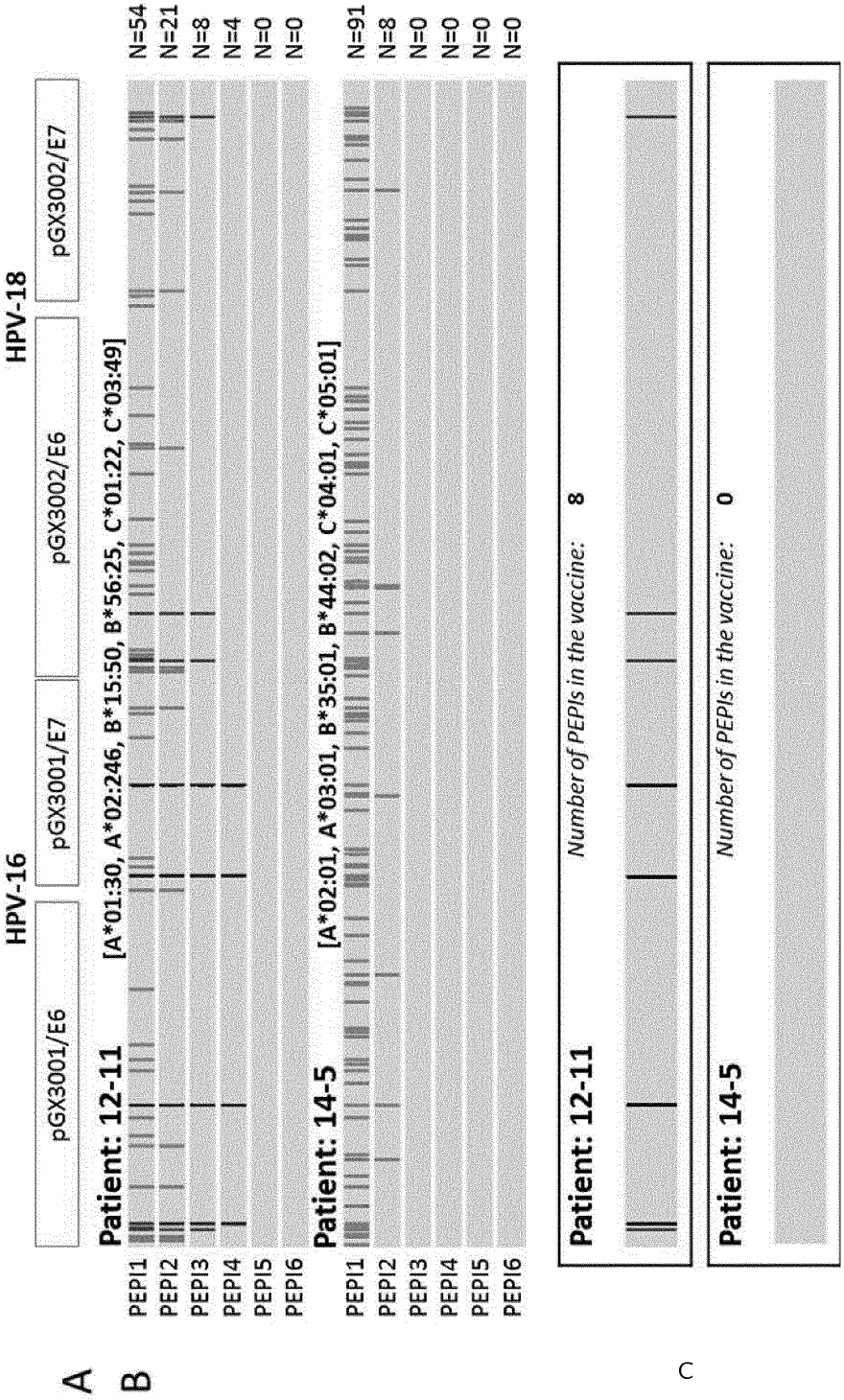

A
B
C
HPV-16
HPV-18
pGX3001/E6
pGX3001/E7
pGX3002/E6
pGX3002/E7
Patient: 12-11
[A*01:30, A*02:246, B*15:50, B*56:25, C*01:22, C*03:49]
Patient: 14-5
[A*02:01, A*03:01, B*35:01, B*44:02, C*04:01, C*05:01]
PEPI1
PEPI2
PEPI3
PEPI4
PEPI5
PEPI6
N=54
N=21
N=8
N=4
N=0
N=0
N=91
N=8
N=0
N=0
N=0
N=0
Patient: 12-11
Number of PEPIs in the vaccine: 8
Patient: 14-5
Number of PEPIs in the vaccine: 0

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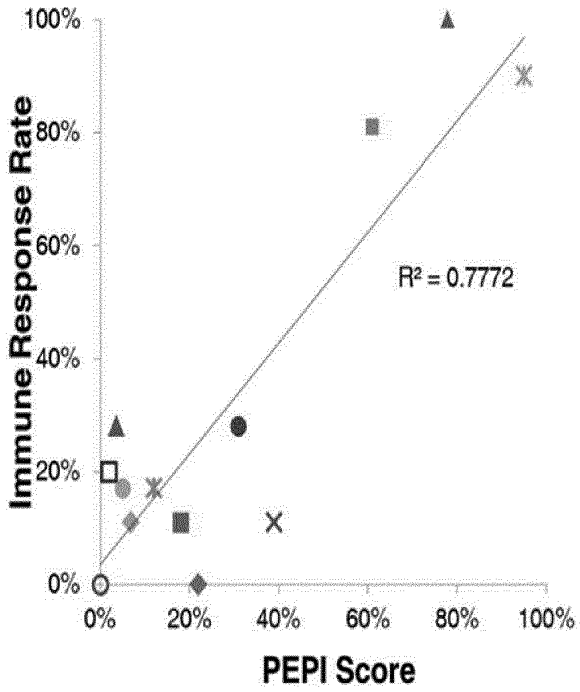
Figure 7



- MMNLMQPKTQQTYTYD (JUP)
- GRGSTTTNYLLDRDDYRNTSD (ADA17)
- LKKGAADGGKLDGNAKLNRSLK (BAP31)
- FPPKDDHTLKFLYDDNQRPYPP (TOP2A)
- QRPPFSQLHRFLADALNT (DDR1)
- RYRKPDYTLDDGHGLLRFKST (Abl-2)
- ALDQCKTSCALMQQHYDQTSCFSSP (ITGB8)
- STAPPAHGVTSAPDTRPAPGSTAPP (Muc-1)
- YLEPGPVTA (gp-100)
- MTPGTQSPFFLLLLLTVLTVV (Muc-1)
- SSKALQRPV (Bcr-abl)
- RMFPNAPYL (WT1)
- RMFPNAPYL (WT1, HLA-A*0201)

Fig. 8

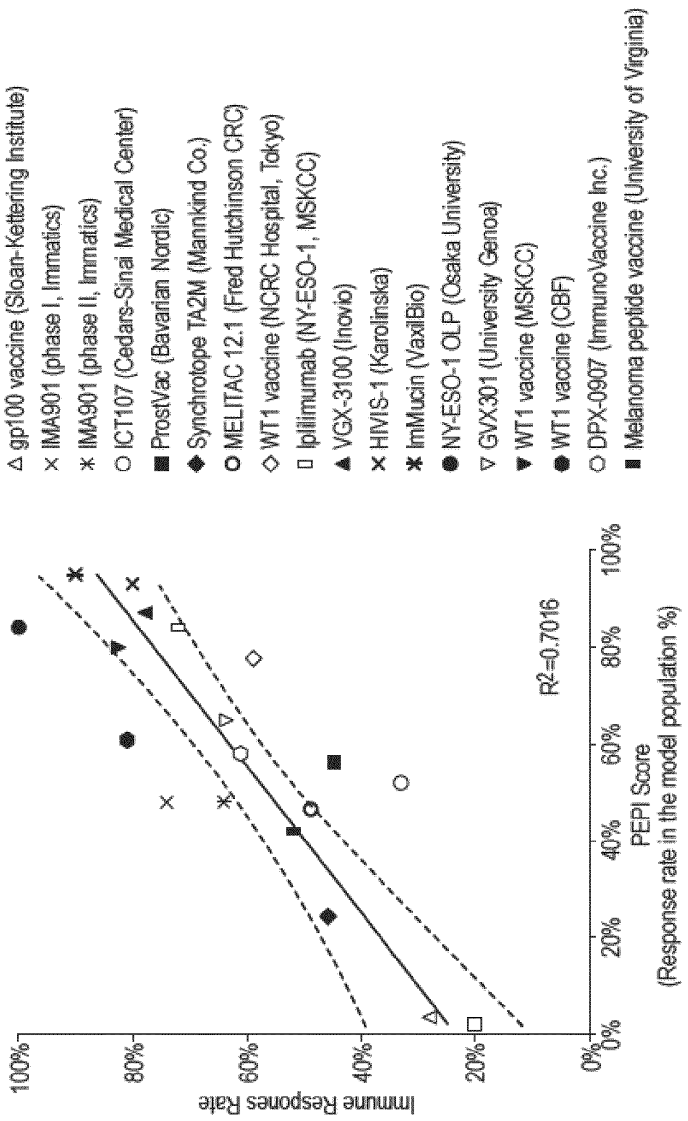

□ StimuVax (Merck)
△ gp100 vaccine (Sloan-Kettering Institute)
× IMA901 (phase I, Immatics)
✳ IMA901 (phase II, Immatics)
○ ICT107 (Cedars-Sinai Medical Center)
■ ProstVac (Bavarian Nordic)
◆ Synchrotope TA2M (Mannkind Co.)
O MELITAC 12.1 (Fred Hutchinson CRC)
◇ WT1 vaccine (NCRC Hospital, Tokyo)
▯ Ipilimumab (NY-ESO-1, MSKCC)
▲ VGX-3100 (Inovio)
✕ HIVIS-1 (Karolinska)
✱ ImMucin (VaxilBio)
● NY-ESO-1 OLP (Osaka University)
▽ GVX301 (University Genoa)
▼ WT1 vaccine (MSKCC)
● WT1 vaccine (CBF)
○ DPX-0907 (ImmunoVaccine Inc.)
■ Melanoma peptide vaccine (University of Virginia)
Immune Responses Rate
100%
80%
60%
40%
20%
0%
0%
20%
40%
60%
80%
100%
PEPI Score
(Response rate in the model population %)
R2=0.7016

Fig. 9

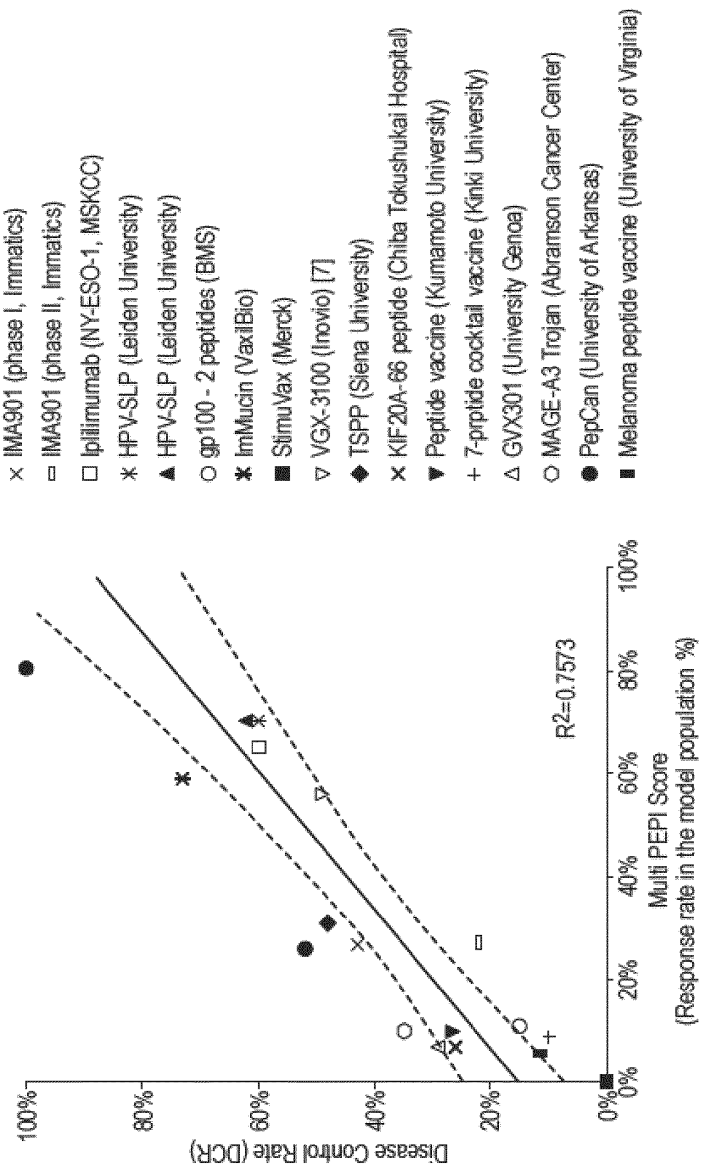

IMA901 (phase I, Immatics)
IMA901 (phase II, Immatics)
Ipilimumab (NY-ESO-1, MSKCC)
HPV-SLP (Leiden University)
HPV-SLP (Leiden University)
gp100 - 2 peptides (BMS)
ImMucin (VaxilBio)
StimuVax (Merck)
VGX-3100 (Inovio) [7]
TSPP (Siena University)
KIF20A-66 peptide (Chiba Tokushukai Hospital)
Peptide vaccine (Kumamoto University)
7-prptide cocktail vaccine (Kinki University)
GVX301 (University Genoa)
MAGE-A3 Trojan (Abramson Cancer Center)
PepCan (University of Arkansas)
Melanoma peptide vaccine (University of Virginia)
Disease Control Rate (DCR)
100%
80%
60%
40%
20%
0%
0%
20%
40%
60%
80%
100%
R2=0.7573
Multi PEPI Score
(Response rate in the model population %)

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Figure 10

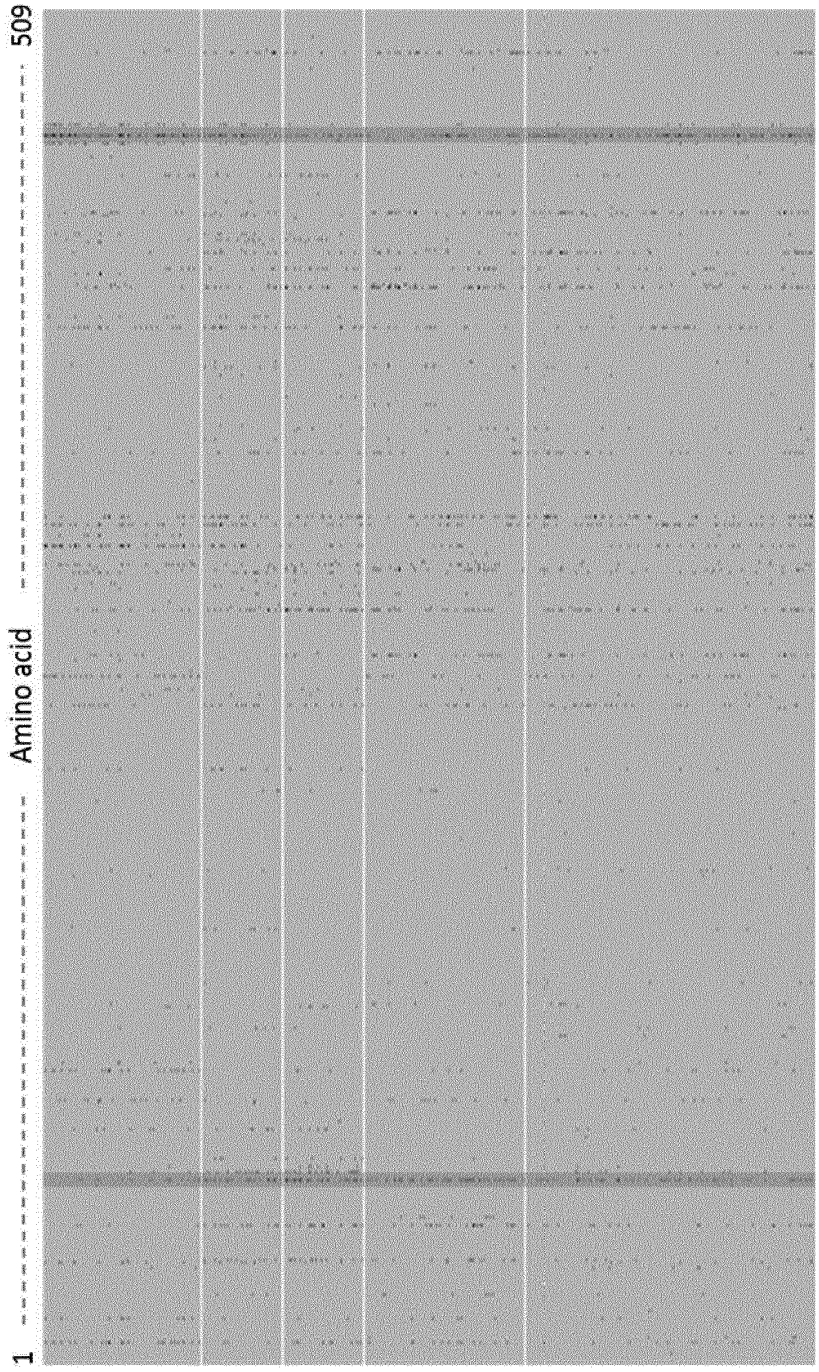
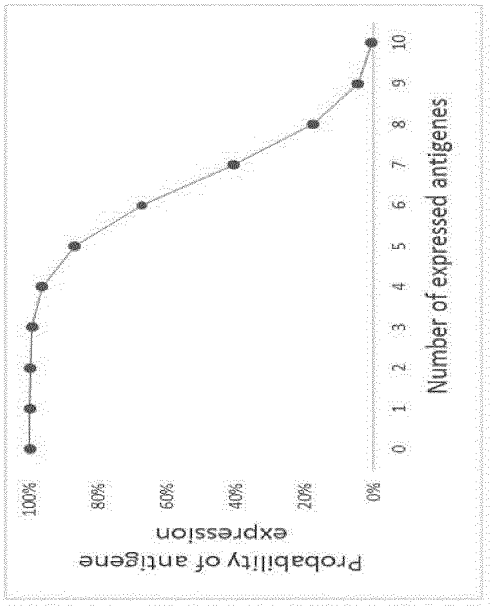


Figure 11



Antigens	Expression rate
Cancer testis antigens	Determined from 1053 tumor samples
AKAP-4	85%
BORIS	71%
SPAG9	88%
PRAME	55%
NY-SAR-35	48%
MAGE-A9	44%
NY-BR-1	47%
SURVIVIN	71%
MAGE-A11	59%
HOM-TES-85	47%

Conclusion

1. 99% of breast tumors express ≥3 antigens
2. No biopsy is needed

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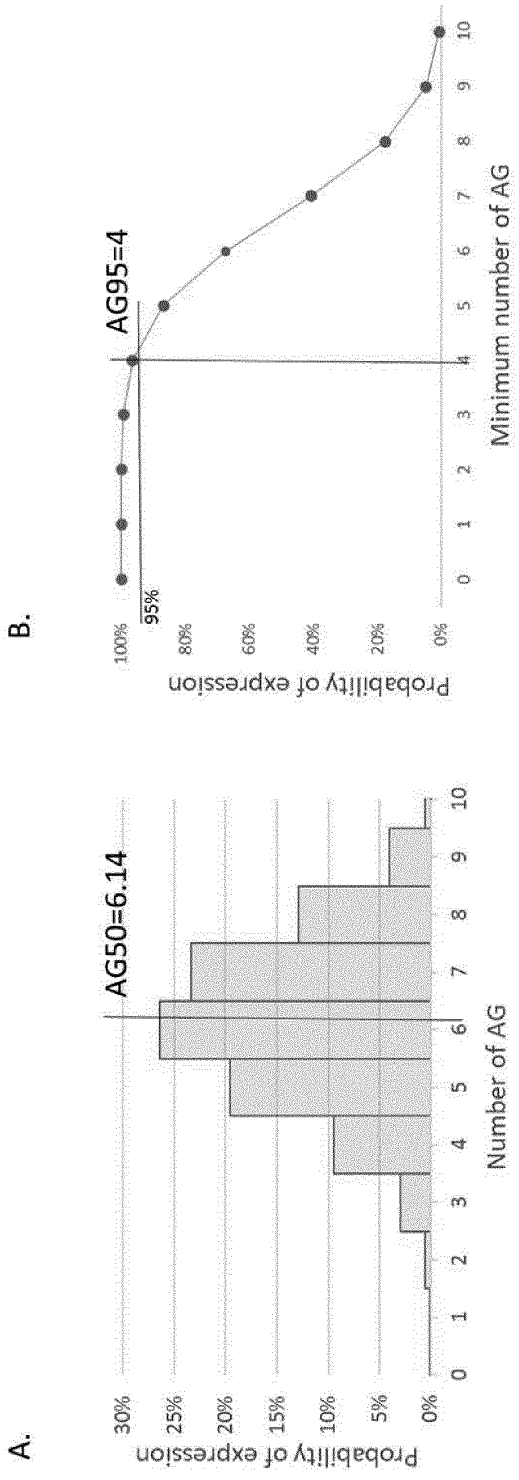
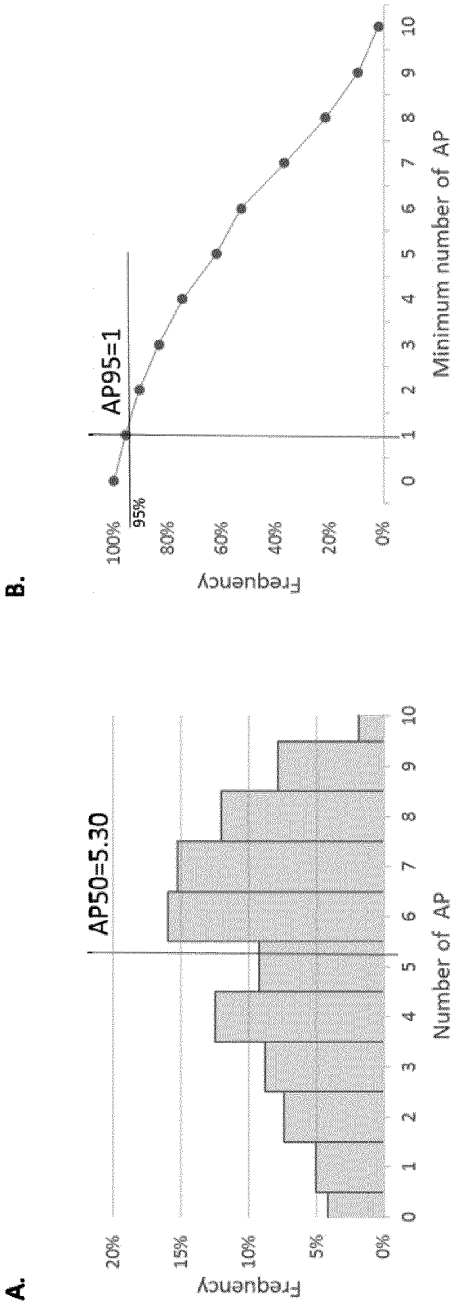
Figure 12

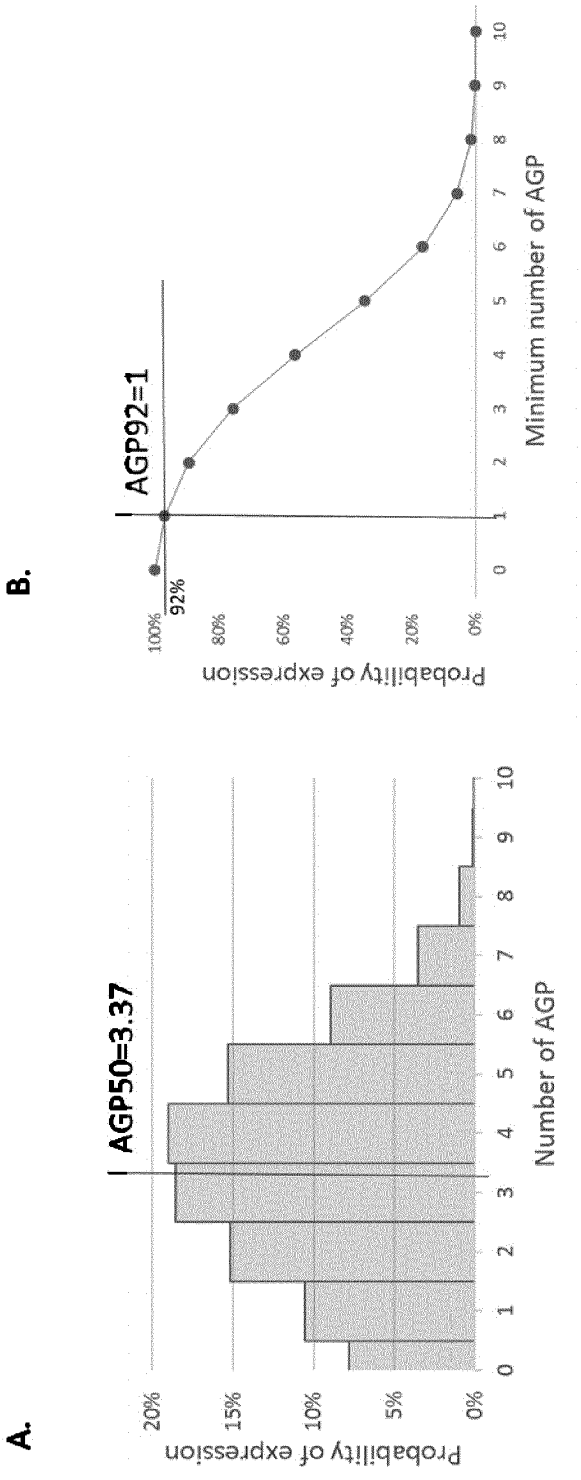


14/25
Figure 13



15/25

Figure 14

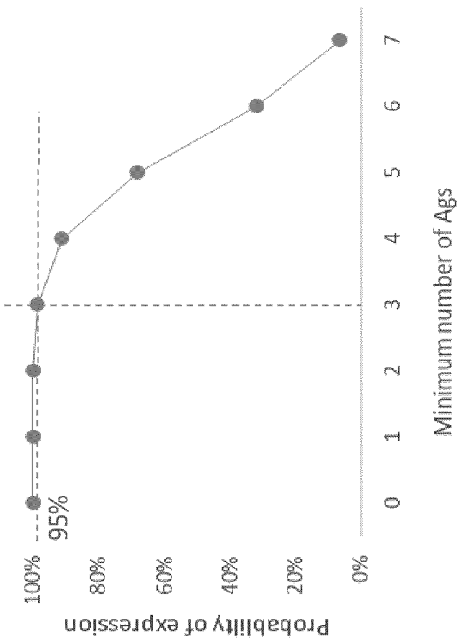


16/25
Figure 15

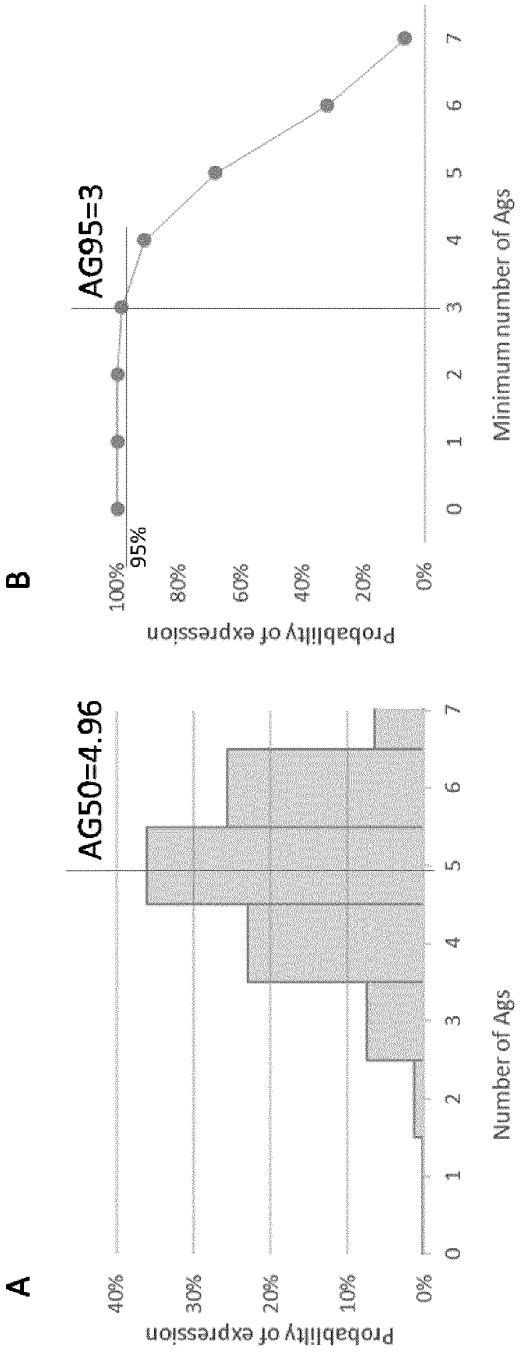
EXPRESSION RATES OF POLYPEPI1018 TARGET ANTIGENS IN CRC

TSP50	89.47%
EpCAM	88.35%
Survivin	87.28%
CAGE1	74.47%
SPAG9	74.36%
FBXO39	38.60%
MAGE-A8	43.75%

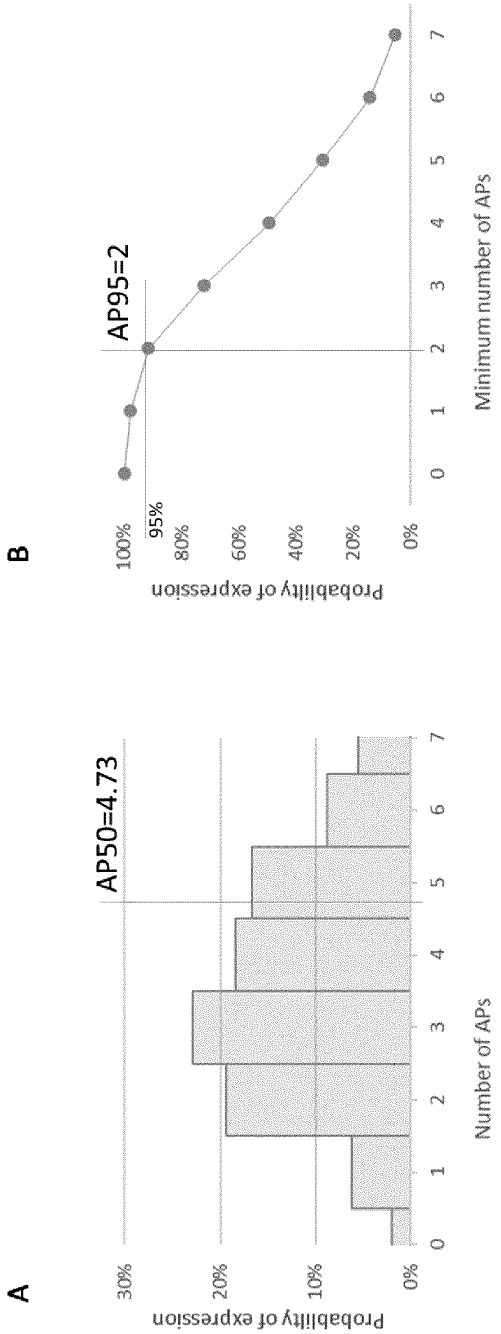
EXPRESSION PROBABILITY OF POLYPEPI1018 TARGET ANTIGENS IN CRC



17/25
Figure 16



18/25
Figure 17



19/25
Figure 18

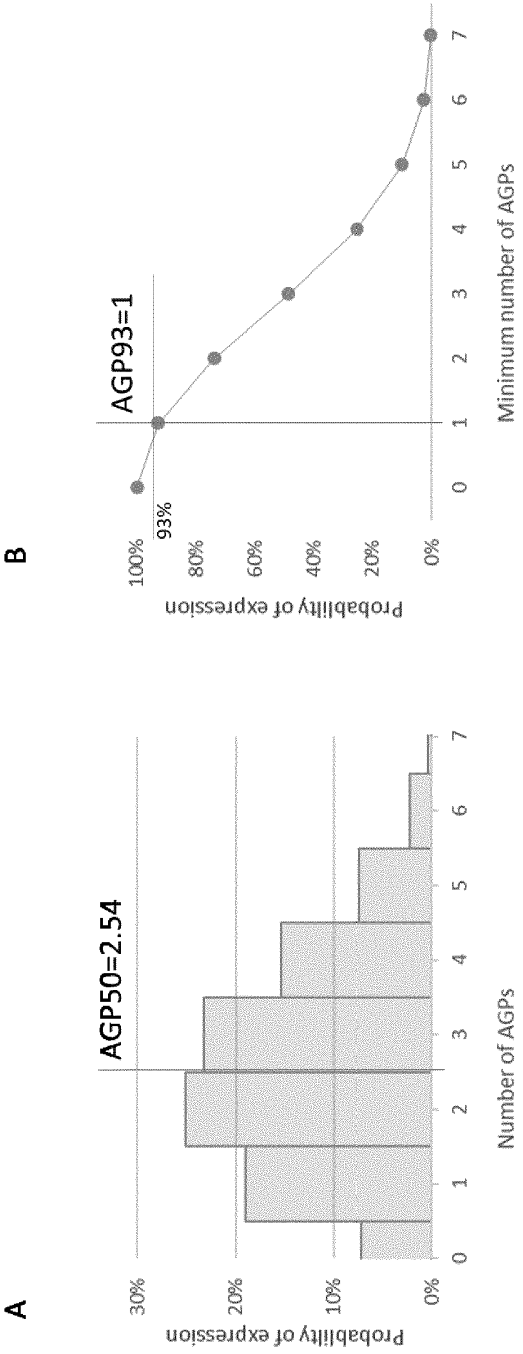
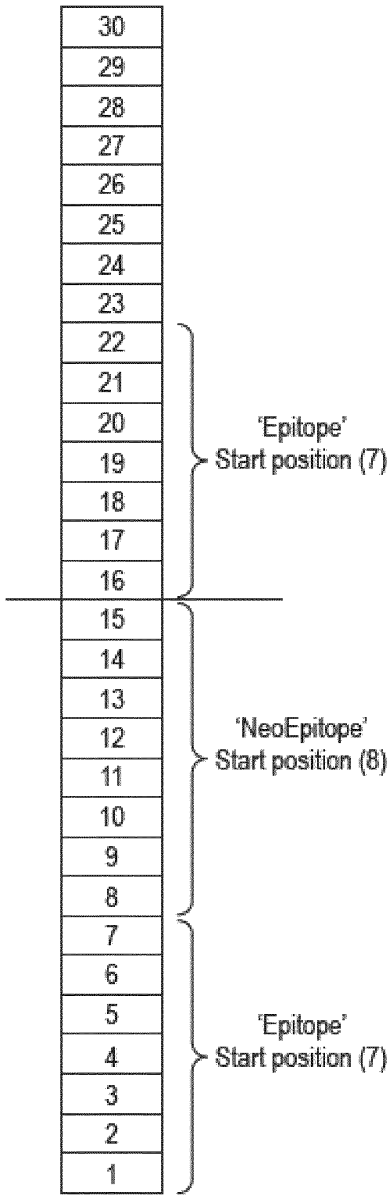


Fig. 19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21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
'Epitope'
Start position (7)
'NeoEpitope'
Start position (8)
'Epitope'
Start position (7)

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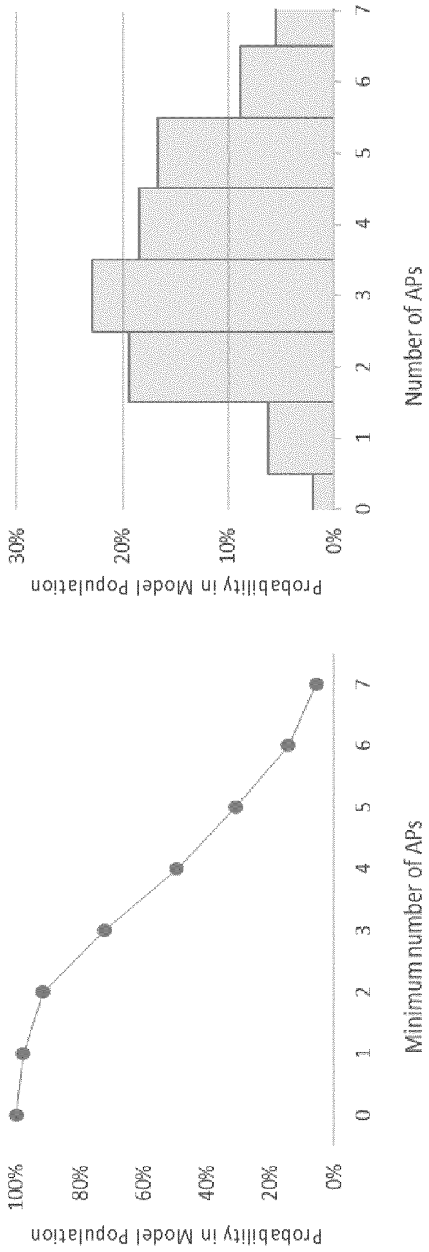
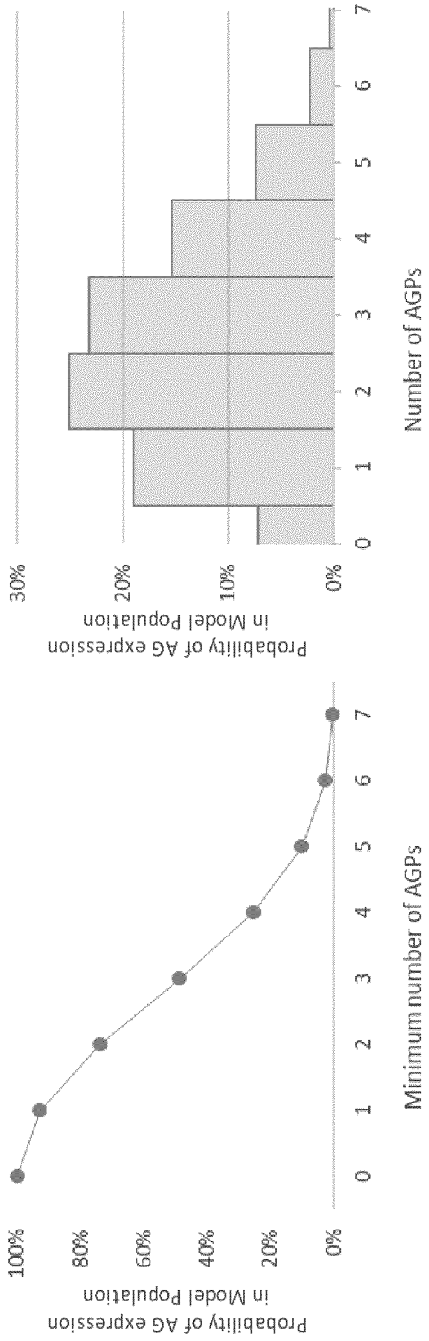
Figure 20



22/25

Figure 21



23/25
Figure 22

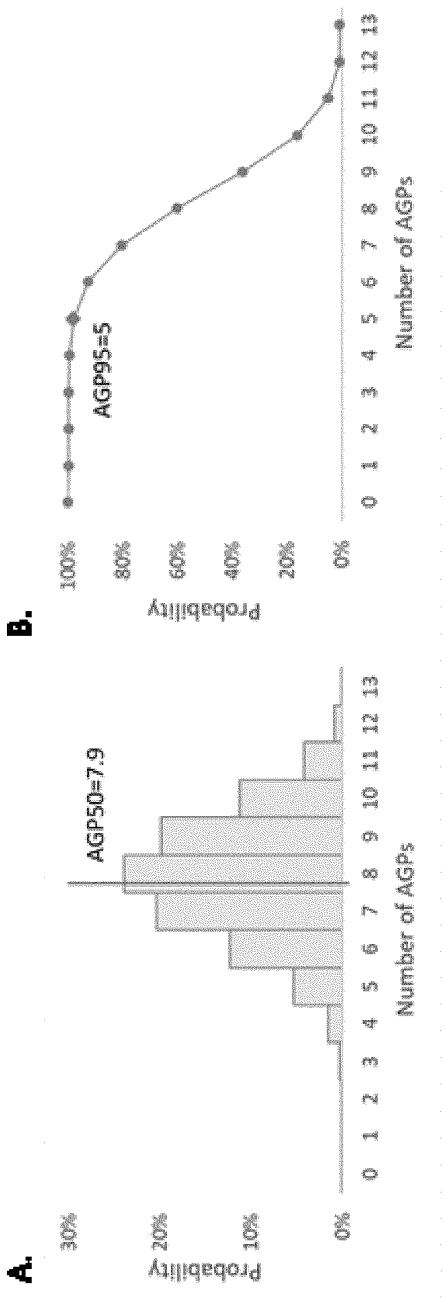
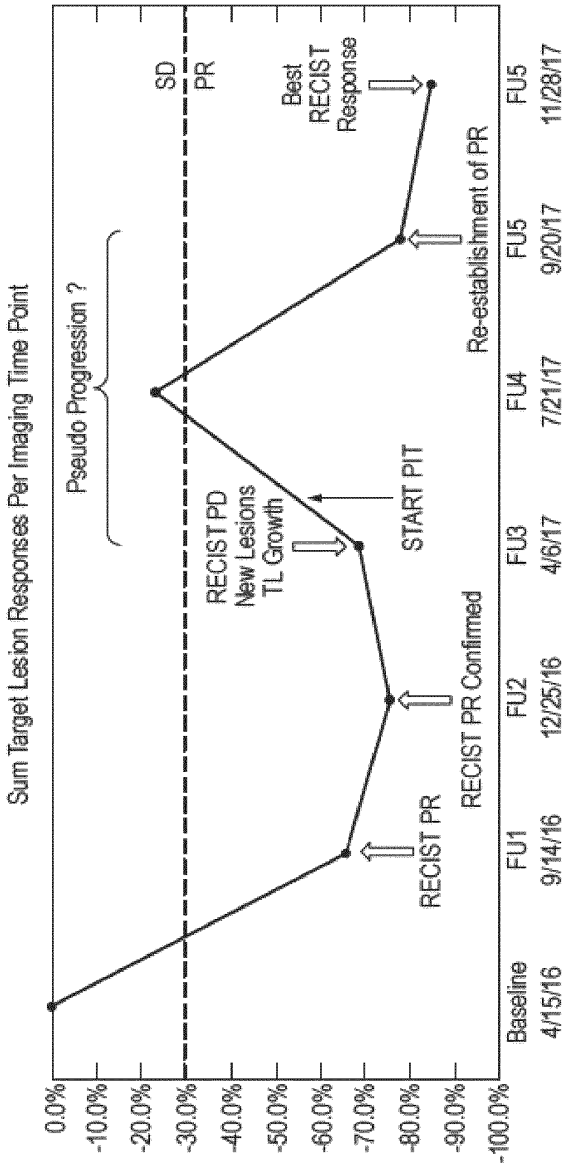
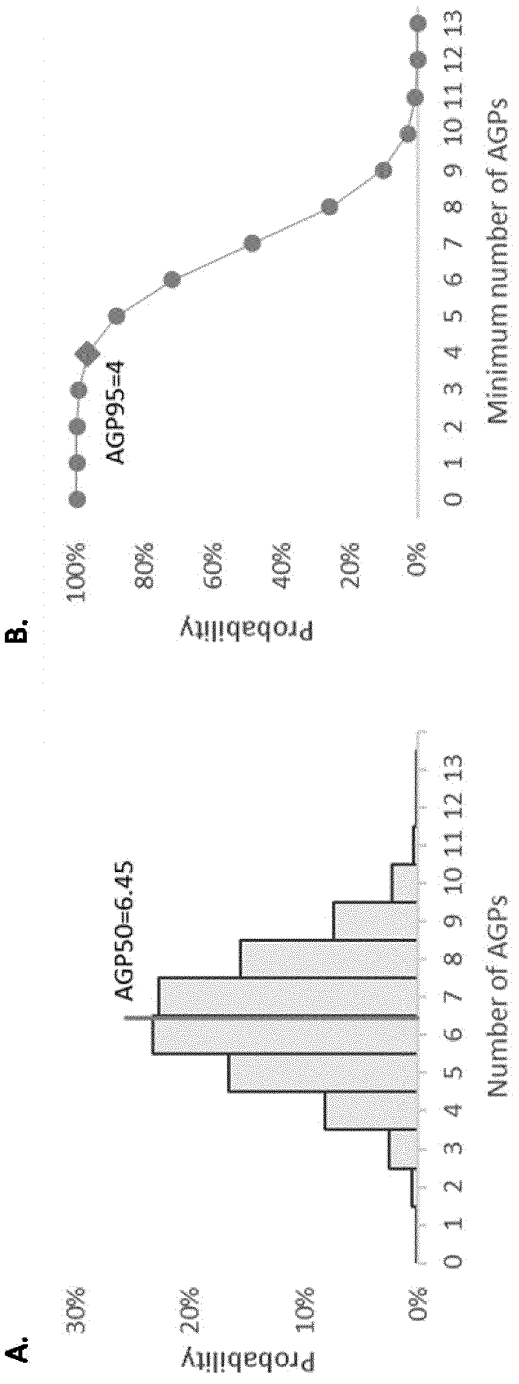


Fig. 23


Sum Target Lesion Responses Per Imaging Time Point
0.0%
-10.0%
-20.0%
-30.0%
-40.0%
-50.0%
-60.0%
-70.0%
-80.0%
-90.0%
-100.0%
SD
PR
Pseudo Progression ?
RECIST PD
New Lesions
TL Growth
START PIT
Best
RECIST
Response
RECIST PR
RECIST PR Confirmed
Re-establishment of PR
Baseline
4/15/16
FU1
9/14/16
FU2
12/25/16
FU3
4/6/17
FU4
7/21/17
FU5
9/20/17
FU5
11/28/17

25/25
Figure 24