Figure S1：

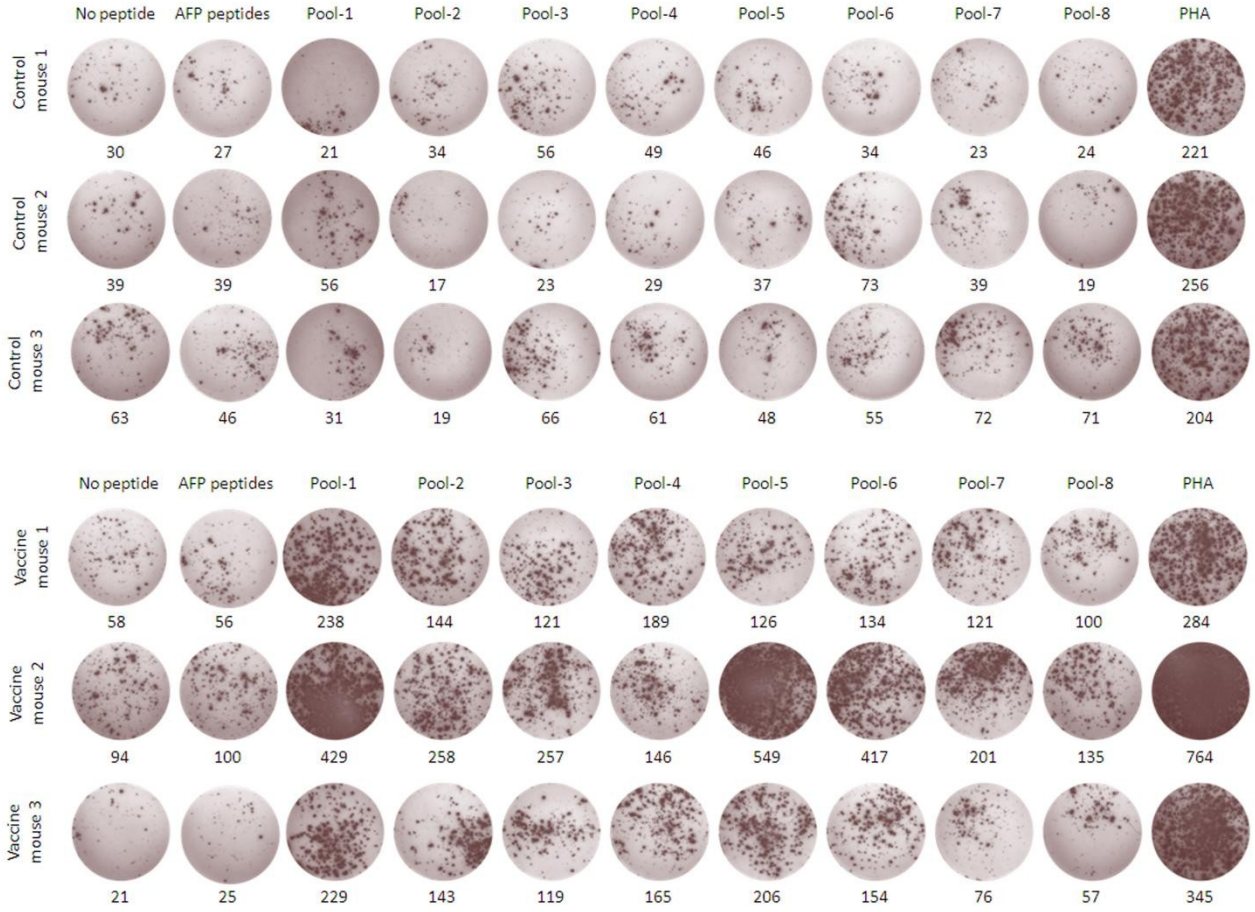

Figure S1: IFN-γ ELISPOT spot plots against the individual peptide pools in hybrid mice. Splenocytes from each primed mouse were harvested 7 days after the final booster and *ex vivo* stimulated with 8 different peptide pools covering the 31 VEPs, AFP peptides ($AFP_{158-166}$, $AFP_{424-432}$) as non-specific control, PBS without peptide as a negative control, or PHA as a positive control, followed by IFN-γ ELISPOT. Control group: poly(I:C) plus normal saline; Vaccine group: peptides-PEG-lipid-exosomes plus poly(I:C). Three mice were tested in each group.

Figure S2：

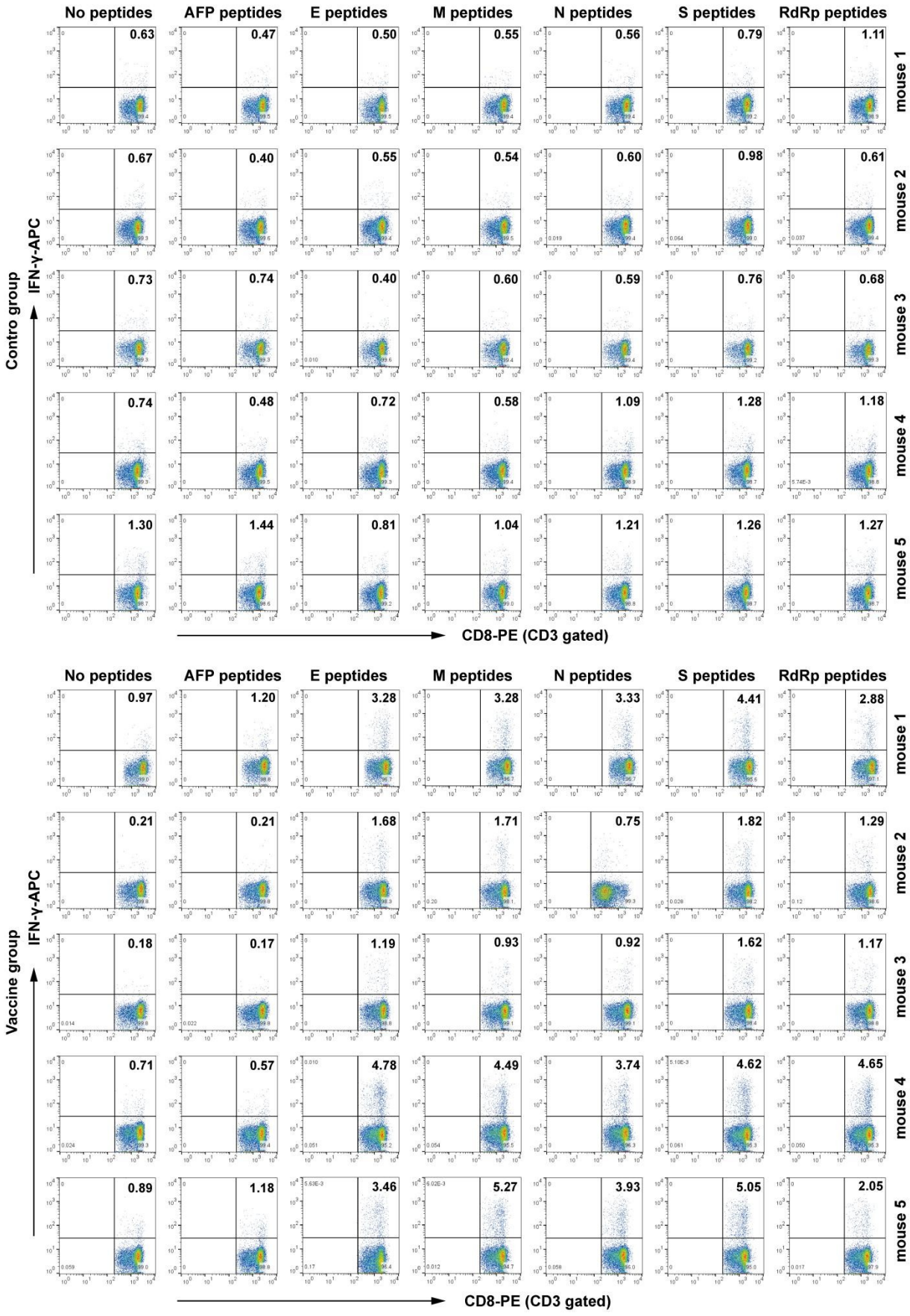
No peptides
AFP peptides
E peptides
M peptides
N peptides
S peptides
RdRp peptides
mouse 1
mouse 2
mouse 3
mouse 4
mouse 5
Contro group
IFN-γ-APC
CD8-PE (CD3 gated)
0.63 0.47 0.50 0.55 0.56 0.79 1.11
0.67 0.40 0.55 0.54 0.60 0.98 0.61
0.73 0.74 0.40 0.60 0.59 0.76 0.68
0.74 0.48 0.72 0.58 1.09 1.28 1.18
1.30 1.44 0.81 1.04 1.21 1.26 1.27
Vaccine group
IFN-γ-APC
CD8-PE (CD3 gated)
0.97 1.20 3.28 3.28 3.33 4.41 2.88
0.21 0.21 1.68 1.71 0.75 1.82 1.29
0.18 0.17 1.19 0.93 0.92 1.62 1.17
0.71 0.57 4.78 4.49 3.74 4.62 4.65
0.89 1.18 3.46 5.27 3.93 5.05 2.05

Figure S2: Flow plots of IFN-γ ICS responding to the individual peptide pools in hybrid mice. Splenocytes from each primed mouse were harvested 7 days after the last booster and *ex vivo* stimulated with 5 different peptide pools, AFP peptides ($AFP_{158-166}$, $AFP_{424-432}$) as irrelevant control, PBS without peptide as a negative control, or PHA as a positive control, and followed by IFN-γ ICS. The data in right upper quadrant indicate the percentages of IFN-γ^+ T cells in $CD3^+/CD8^+$ cell populations. Control group: poly(I:C) plus normal saline; Vaccine group: peptides-PEG-lipid-exosomes plus adjuvant poly(I:C). Five mice were tested in each group.

Figure S3：


Vaccine mouse 3
PBS:12 AFP:8 A1:26 A3:37 A4:17 A5:99 B1:49 B2:40 B4:40
B6:42 B3:14 C1:28 C2:65 C3:15 D2:28 D7:33 D12:53 D13:43
D5:17 D6:32 D11:72 R5:39 R6:87 R8:26 R11:16 R12:17 R14:33
R15:45 R3:11 R10:25 R4:34 R9:54 R13:28 PHA:313
Vaccine mouse 4
PBS:16 AFP:22 A1:82 A3:71 A4:109 A5:119 B1:16 B2:71 B4:131
B6:54 B3:63 C1:107 C2:78 C3:66 D2:81 D7:110 D12:77 D13:52
D5:100 D6:79 D11:120 R5:48 R6:121 R8:80 R11:29 R12:22 R14:44
R15:49 R3:9 R10:58 R4:18 R9:38 R13:23 PHA:193
Vaccine mouse 5
PBS:17 AFP:21 A1:79 A3:84 A4:69 A5:158 B1:150 B2:87 B4:74
B6:53 B3:85 C1:65 C2:100 C3:42 D2:39 D7:48 D12:67 D13:71
D5:57 D6:111 D11:122 R5:97 R6:91 R8:66 R11:30 R12:29 R14:62
R15:58 R3:30 R10:58 R4:37 R9:65 R13:36 PHA:350

Figure S3（continued)

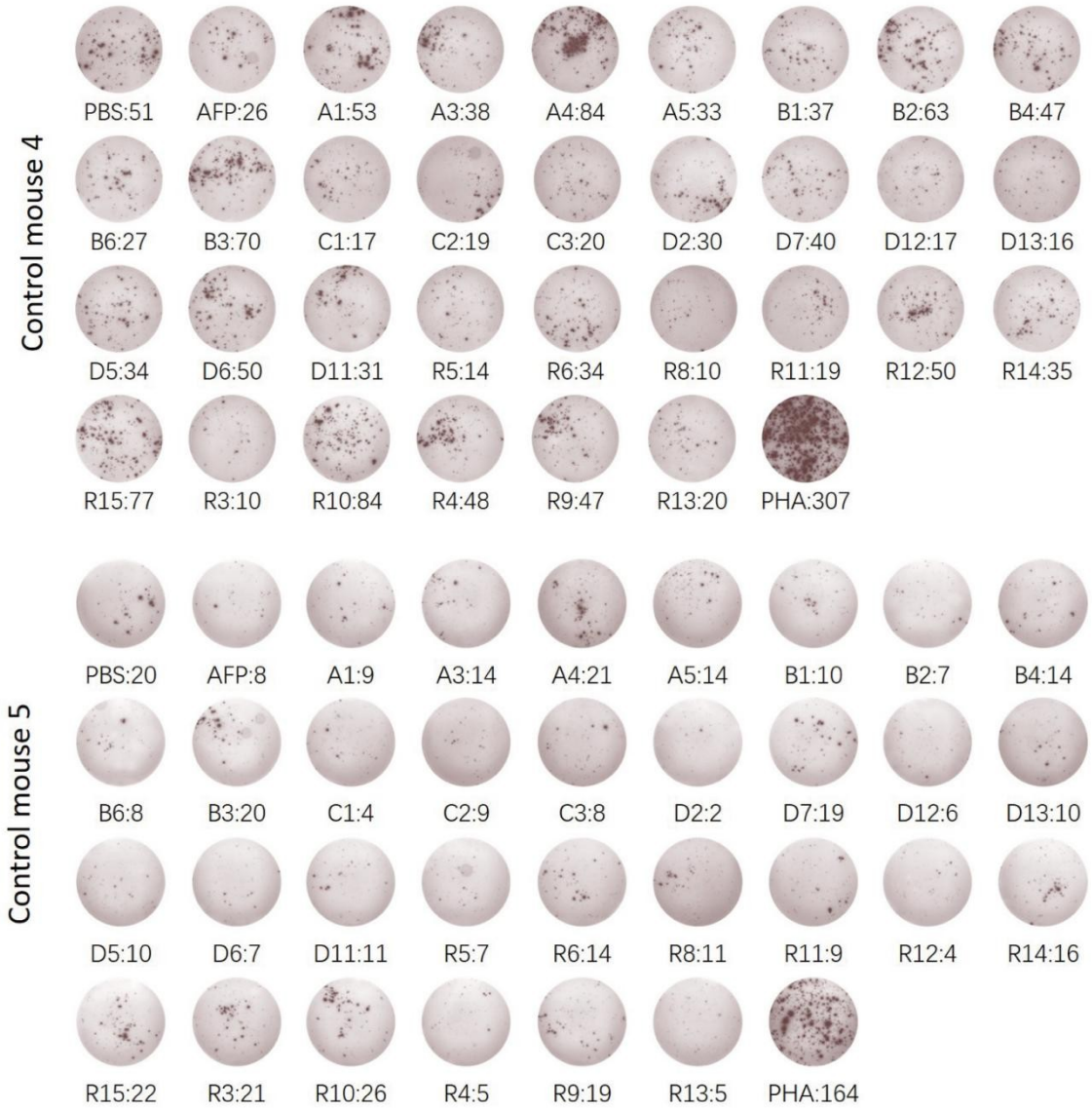

Figure S3: IFN-γ ELISPOT spot plots against each peptide in hybrid mice. Splenocytes from each primed hybrid mouse were harvested 7 days after the last booster and *ex vivo* stimulated with 8 different peptide pools covering the 31 VEPs or with AFP peptides ($AFP_{158\text{-}166}$, $AFP_{424\text{-}432}$), PBS as a negative control, or PHA as a positive control, and followed by IFN-γ ELISPOT. Control group: poly(I:C) in normal saline; Vaccine group: peptides-PEG-lipid-exosomes with poly(I:C). Three mice in Vaccine group and two mice from Control group were tested.