

Supplementary Information

Table S1. Phage titer of each round.

Round	Input phage (pfu)	Eluted phage (pfu)	Amplified phage (pfu)
1st round	4×10^{11}	4×10^4	3×10^{18}
2nd round	3×10^{15}	5×10^6	5×10^{22}
3rd round (DEE-His)	2×10^{11}	7×10^3	5×10^{16}
3rd round (HI)	2×10^{11}	1×10^5	2×10^{18}
4th round (DEE-His)	5×10^{14}	2×10^7	3×10^{22}
4th round (HI)	2×10^{16}	1×10^8	6×10^{23}

Table S2. Amino acid sequences of the eluted phages from the second selection round.

Clone No.	Amino acid sequence
2-1	LDTHASHACSTG
2-2	GPIPGLLATVAV
2-3	SVVTSHQRYGTS
2-4	SNSPTFVCHRMV
2-5	GPIPGLLATVAV
2-6	VQFPIEAMFWST
2-7	MATQPKLVGSPY

Table S3. Amino acid sequences of the eluted phages from the third selection round.

Clone name	Antagonistic template	Amino acid sequence
DEE 3-1	DEE-His	WPYNHHHRTSPS
DEE 3-2	DEE-His	LPHSAVMAQLTY
DEE 3-3	DEE-His	YSHHHMHTPHTR
DEE 3-4	DEE-His	LGDSNSQVSLN
DEE 3-5	DEE-His	WMNGPVSIRTWS
DEE 3-6	DEE-His	TLHAHQHHQPST
DEE 3-7	DEE-His	STSHHHHPSAPS
HI 3-1	HI	TMQPGQNSHPIL
HI 3-2	HI	ELITNSETTQWF
HI 3-3	HI	APLSQHHLHRLP
HI 3-4	HI	TSHIHTTPHSHH
HI 3-5	HI	YNHHGHHLDKHR
HI 3-6	HI	YHPANHSFQHFF
HI 3-7	HI	MHDLTAALSLPP

Table S4. Amino acid sequences of the eluted phages from the fourth selection round.

Clone name	Antagonistic template used at 3rd round	Amino acid sequence
DEE 4-1	DEE-His	APYAHHHHPVTP
DEE 4-2	DEE-His	EELWHHHPPSHH
DEE 4-3	DEE-His	TSLHQHHPTAAF
DEE 4-4	DEE-His	QPHKYPHSHHGP
DEE 4-5	DEE-His	LGDSSNSQVSLN
DEE 4-6	DEE-His	SDLSPIQSLSAI
DEE 4-7	DEE-His	APLFTQTWGPWR
DEE 4-8	DEE-His	VAQSHHHHVTPS
DEE 4-9	DEE-His	SDLSPIQSLSAI
DEE 4-10	DEE-His	NSTHHHHFATIW
HI 4-1	HI	SPSHHMMSPSEY
HI 4-2	HI	QPHKQAVSFAFA
HI 4-3	HI	VHTHHLGHQPVR
HI 4-4	HI	QTSHYHHHRAHT
HI 4-5	HI	ANPLHHHHLWEL
HI 4-6	HI	NSTHHHHFATIW
HI 4-7	HI	LSPHHHHLDGHI
HI 4-8	HI	SPSHHMMSPSEY
HI 4-9	HI	LSPHHHHLDGHI
HI 4-10	HI	TPTFPYWYGSLT