

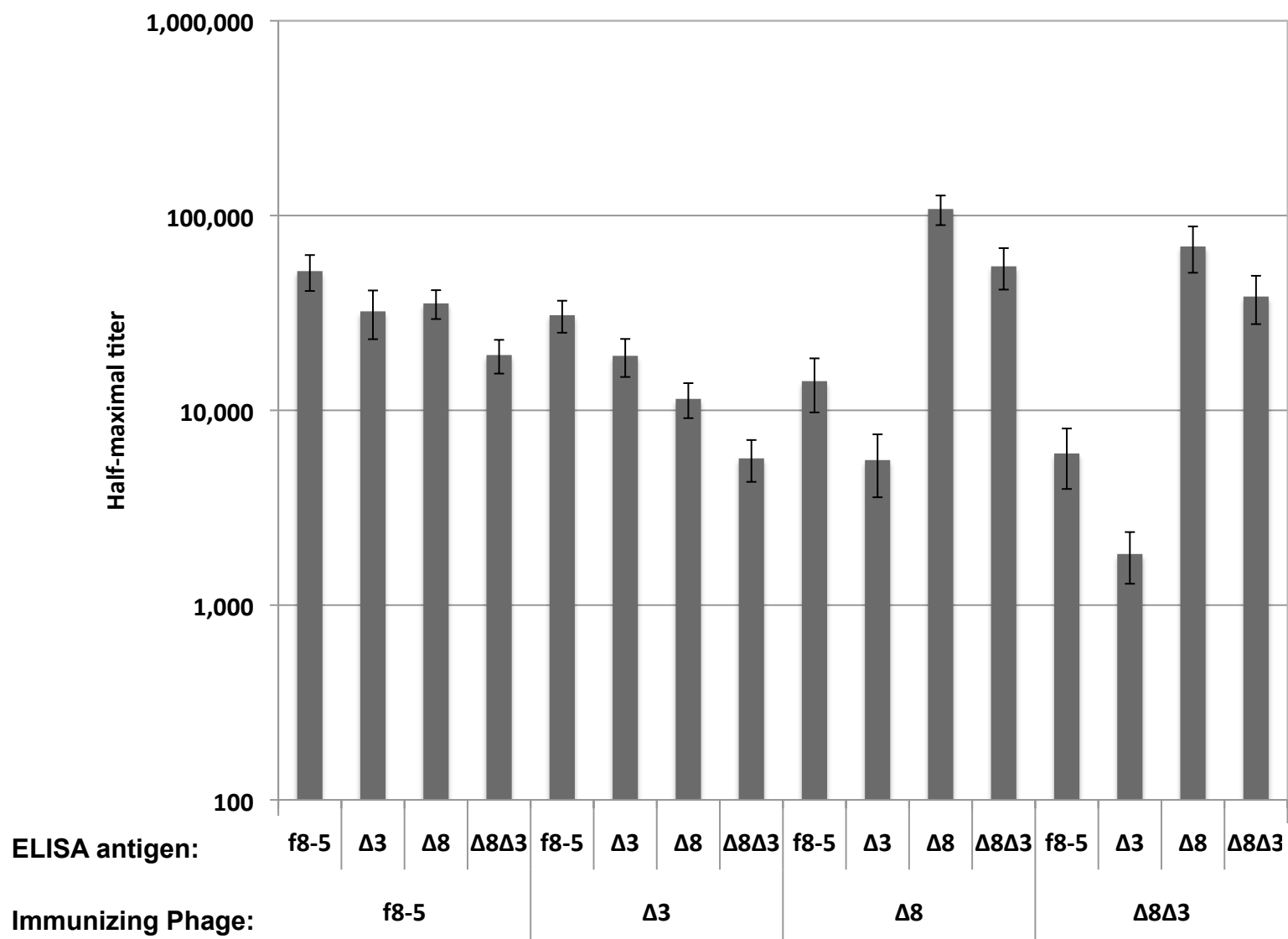
Table S1. Immunogen composition and immunization schedule.

Immunogen ^a	Description	Peptide	Dose used (μg)	Immunizations tested by ELISA ^b
f8-5	WT phage	-	10	1 st , 3 rd , 5 th
Δ3	Truncated pIII N-terminus	-	10	1 st , 3 rd , 5 th
Δ8	Altered pVIII ID residues	-	10	1 st , 3 rd , 5 th
Δ8Δ3	pIII truncation and pVIII alteration	-	10	1 st , 3 rd , 5 th
f8-5/MD10rec	-	MD10	10	2 nd , 4 th
Δ3/MD10rec	-	MD10	10	2 nd , 4 th
f8-5/MD10conj	-	MD10	2	2 nd , 4 th
Δ3/MD10conj	-	MD10	2	2 nd , 4 th
f8-5/4E10 _L ^A rec	-	4E10 _L ^A	10	2 nd , 4 th
Δ3/4E10 _L ^A rec	-	4E10 _L ^A	10	2 nd , 4 th
f8-5/4E10 _L ^B conj	-	4E10 _L ^B	2	2 nd , 4 th
Δ3/4E10 _L ^B conj	-	4E10 _L ^B	2	2 nd , 4 th
f8-5/SPDP	-	-	2	2 nd , 4 th
Δ3/SPDP	-	-	2	2 nd , 4 th

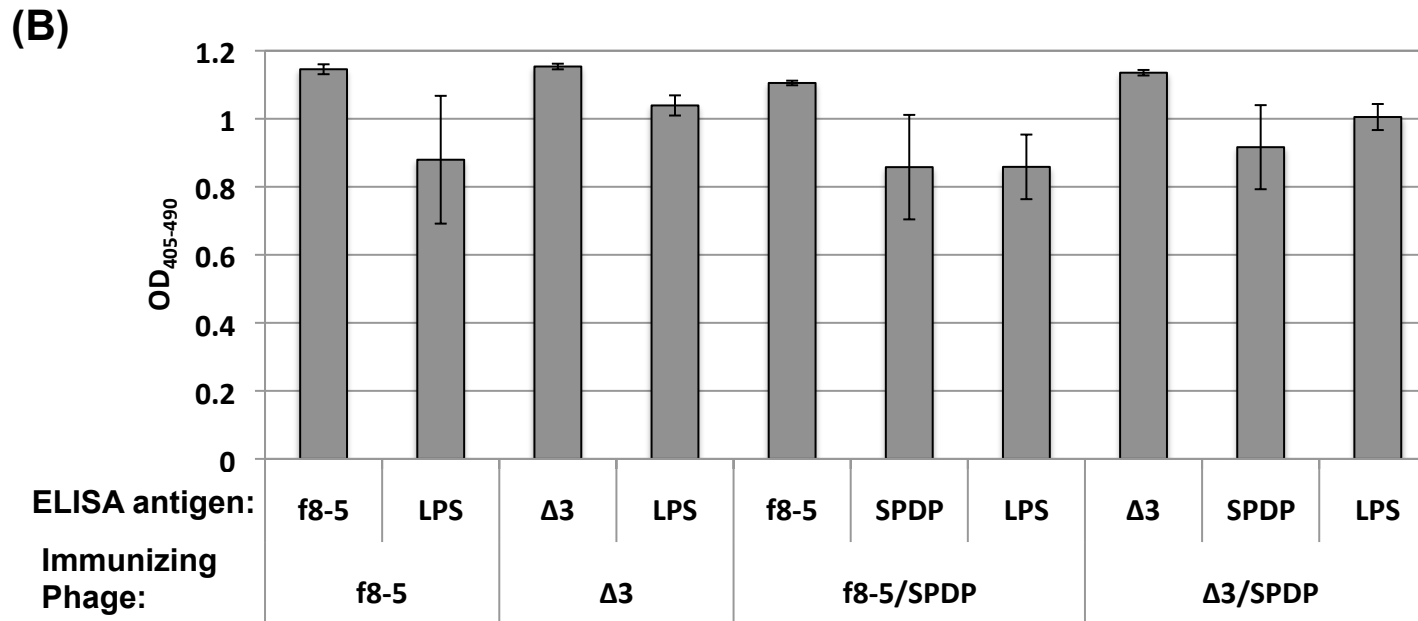
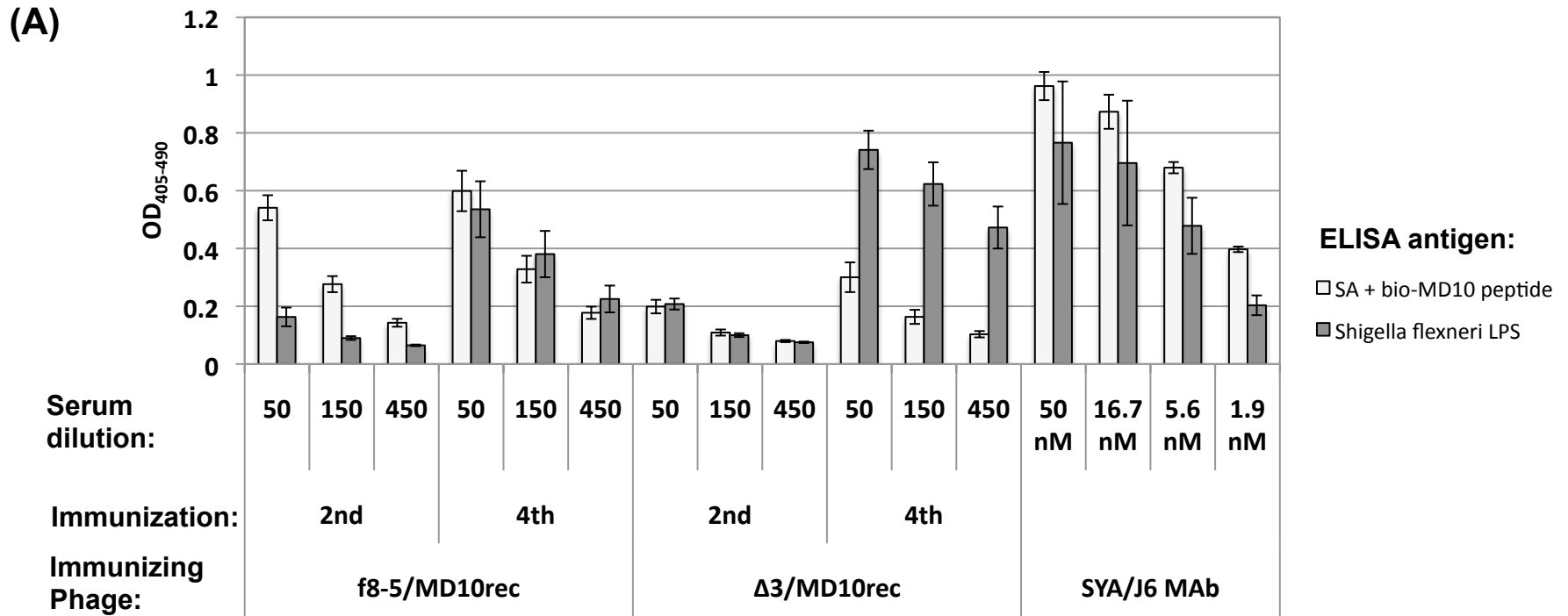
^a All immunogens were administered in 100 μl PBS, *via* subcutaneous route, without adjuvant, every two weeks. Suffix “rec” indicates that the peptide was recombinantly fused to pVIII and “conj” indicates that a synthetic version of the peptide was chemically conjugated to the phage coat.

^b Bleeds were taken two weeks after each immunization.

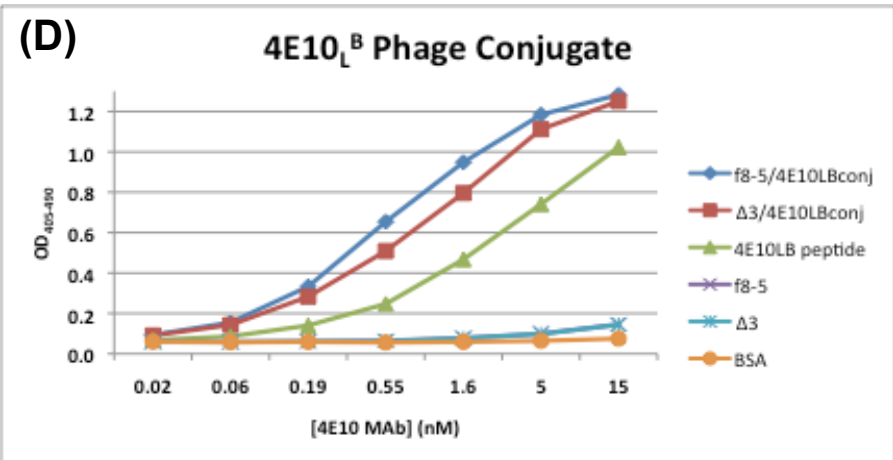
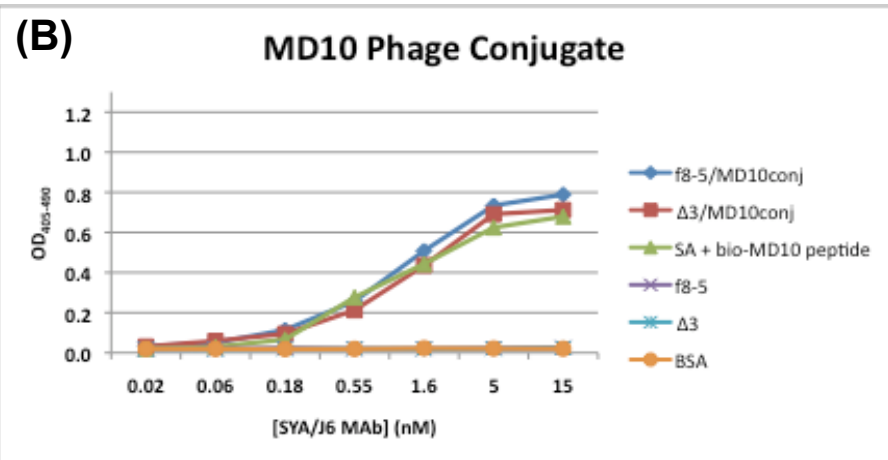
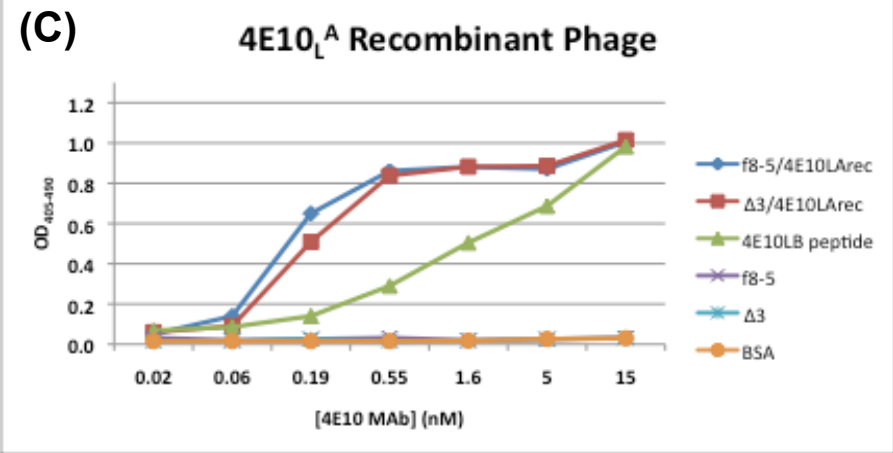
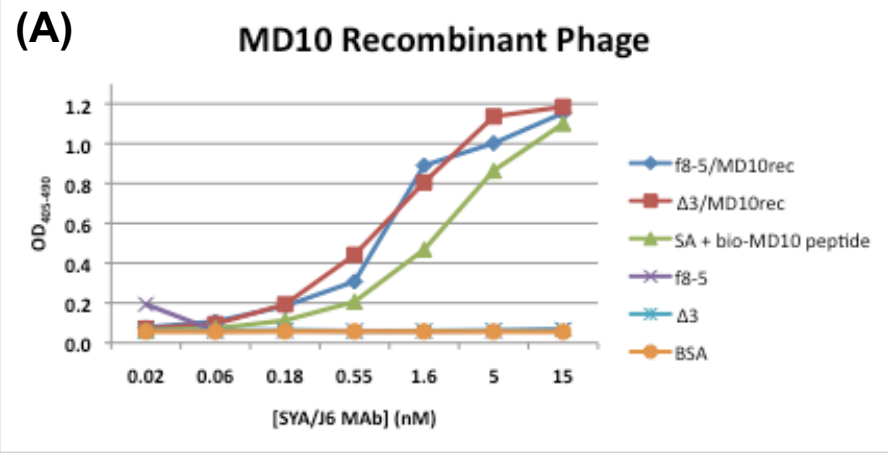
- **Supplemental Figure S1** Average half-maximal Ab titers against each phage variant (f8-5, $\Delta 3$, $\Delta 8$, and $\Delta 8\Delta 3$) produced by mice immunized five times with a single variant (f8-5, $\Delta 3$, $\Delta 8$, or $\Delta 8\Delta 3$). Error bars show standard error of the arithmetic mean. Note that the Y-axis is log scaled.
- **Supplemental Figure S2** Serum Ab reactivity with MD10 peptide and *S. flexneri* LPS after immunization with phage displaying recombinant MD10 peptide, phage treated with SPDP crosslinker alone, or unmodified phage. **(A)** Average anti-MD10 peptide and anti-*S. flexneri* LPS ELISA OD₄₀₅₋₄₉₀ signals at 1:50 serum dilutions after two and four immunizations with f8-5/MD10rec or $\Delta 3$ /MD10rec recombinant phage. **(B)** Average anti-phage (f8-5 or $\Delta 3$), anti-SPDP, and anti-*S. flexneri* LPS ELISA OD₄₀₅₋₄₉₀ signals at 1:50 serum dilutions after five immunizations with f8-5 phage, $\Delta 3$ phage, f8-5/SPDP phage or $\Delta 3$ /SPDP phage. Error bars show standard error of the arithmetic mean. All anti-phage signals, and possibly the highest anti-LPS signals, are at saturation.
- **Supplemental Figure S3** Titration ELISA of MAbs SYA/J6 or 4E10 on: **(A)** f8-5 and $\Delta 3$ phage displaying recombinant MD10 peptide; **(B)** MD10 synthetic peptide conjugated to f8-5 and $\Delta 3$ phage *via* the SPDP crosslinker; **(C)** f8-5 and $\Delta 3$ phage displaying recombinant 4E10_{L^A} peptide; **(D)** 4E10_{L^B} synthetic peptide conjugated to f8-5 and $\Delta 3$ phage *via* the SPDP crosslinker.
- **Supplemental Figure S4** SDS-PAGE analysis of **(A)** MD10 synthetic peptide conjugated to phage *via* the f8-5 and $\Delta 3$ SPDP crosslinker or **(B)** 4E10_{L^B} synthetic peptide conjugated to f8-5 and $\Delta 3$ phage *via* the SPDP crosslinker. **(A)** Lane 1: f8-5, lane 2: $\Delta 3$, lane 3: f8-5/MD10conj, lane 4: $\Delta 3$ /MD10conj, lane 5: $\Delta 3$ /SPDP-Cys, lane 6: f8-5/MD10 no SPDP crosslinker control; **(B)** Lane 1: f8-5, lane 2: $\Delta 3$, lane 3: f8-5/4E10_{L^B}conj, lane 4: $\Delta 3$ /4E10_{L^B}conj, lane 5: f8-5/4E10_{L^B} no SPDP crosslinker control, lane 6: $\Delta 3$ /SPDP-Cys.

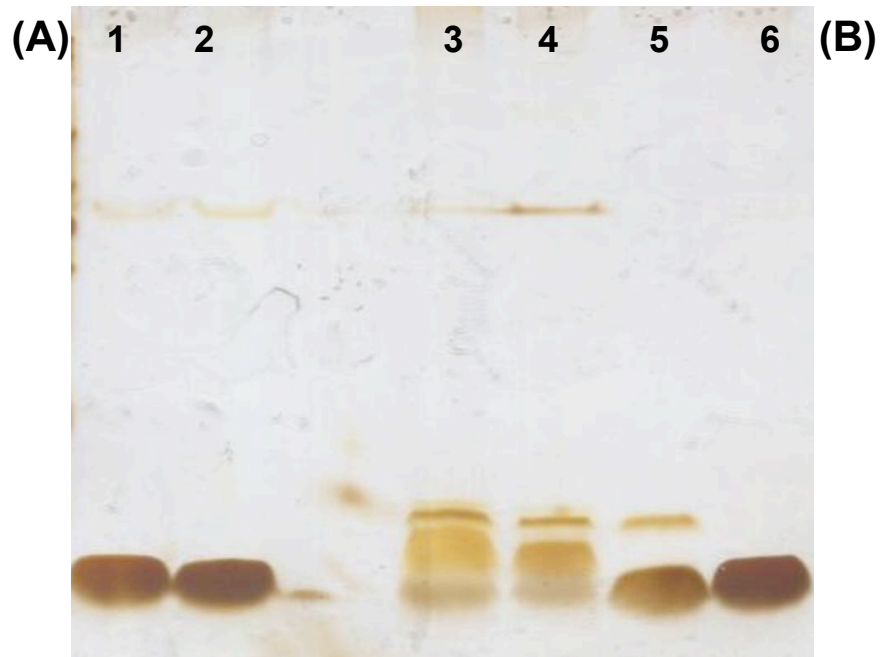


Supplemental Figure S1

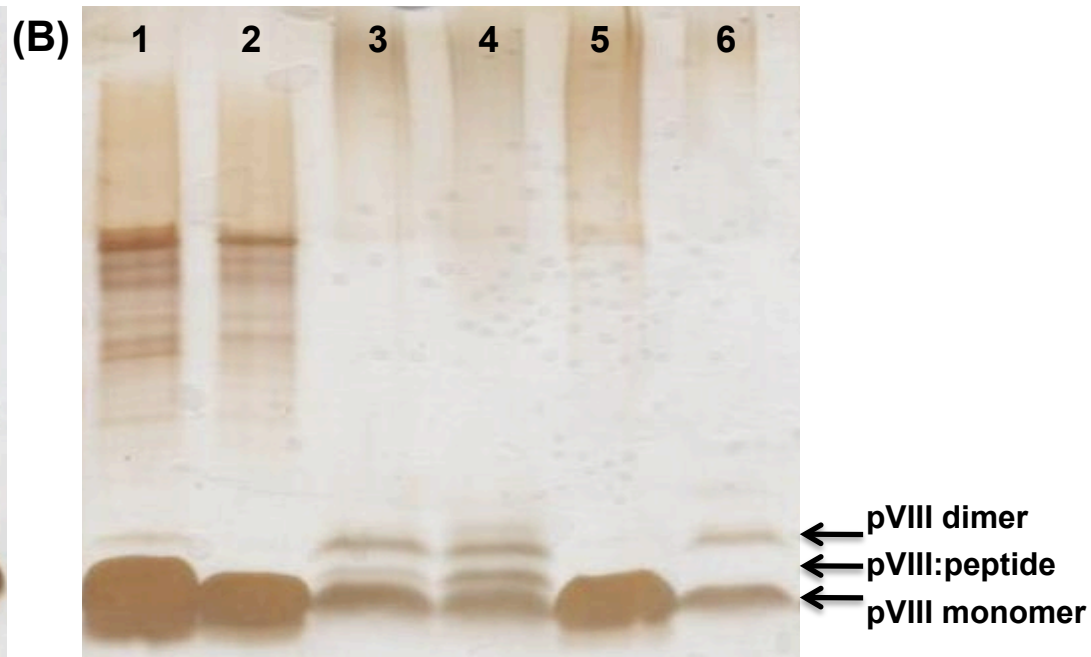


Supplemental Figure S2





MD10 Phage Conjugate



4E10_L^B Phage Conjugate