

Electronic Supplementary Material

Nanoparticles modulate Surfactant Protein A and D mediated protection against Influenza A infection *in vitro*.

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Treatment	NP concentration (cm ² /mL)					
		0	0.0016	0.04	1	5
A549 cells	Mean	100.0	100.4	97.0	98.7	100.2
	p value	-	0.219 ^b	0.219 ^b	0.219 ^b	1.000 ^b
U-PS	Mean	65.5	73.5	74.1	63.4	48.8
	p value	0.019^a	0.050^b	0.050^b	0.275 ^b	0.050^b
U-PS + SP-A	Mean	44.7	48.6	44.2	45.3	13.9
	p value	0.014^a	0.386 ^b	0.773 ^b	1.000 ^b	0.021^b
U-PS + SP-D	Mean	101.8	108.6	100.3	99.1	98.8
	p value	0.435 ^a	0.275 ^b	0.827 ^b	0.827 ^b	0.513 ^b
U-PS + BSA	Mean	100.0	98.4	92.7	92.2	95.0
	p value	-	0.487 ^b	0.037^b	0.487 ^b	0.487 ^b
TT1 cells	Mean	73.6	67.7	63.8	74.4	60.6
	p value	0.037^a	0.513 ^b	0.513 ^b	0.827 ^b	0.127 ^b
U-PS + SP-A	Mean	60.1	69.1	78.8	59.7	16.3
	p value	0.037^a	0.513 ^b	0.050^b	0.827 ^b	0.050^b
U-PS + SP-D	Mean	99.7	92.5	94.0	88.1	101.7
	p value	0.487 ^a	0.513 ^b	0.827 ^b	0.513 ^b	0.827 ^b
U-PS + BSA	Mean	100.0	112.4	105.6	106.3	102.0
	p value	-	0.219 ^b	0.219 ^b	0.219 ^b	1.000 ^b
THP-1 cells	Mean	90.0	97.0	101.5	91.5	98.1
	p value	0.014^a	0.564 ^b	0.149 ^b	0.386 ^b	0.564 ^b
U-PS + SP-A	Mean	68.4	70.7	75.6	67.1	46.4
	p value	0.014^a	0.386 ^b	0.386 ^b	0.773 ^b	0.021^b
U-PS + SP-D	Mean	111.7	109.2	86.2	103.9	90.6
	p value	0.435 ^a	0.827 ^b	0.275 ^b	0.827 ^b	0.275 ^b
U-PS + BSA	Mean	111.7	109.2	86.2	103.9	90.6
	p value	0.435 ^a	0.827 ^b	0.275 ^b	0.827 ^b	0.275 ^b

Table S1: Relative Infection following influenza pre-incubation with U-PS and proteins. ^ap values determined using Mann-Whitney U test versus protein free control; ^bp values determined using Mann-Whitney U test versus nanoparticle free protein containing control.

Treatment		NP concentration (cm ² /mL)				
A549 cells		0	0.0016	0.04	1	5
A-PS	Mean	100.0	98.0	96.0	92.6	66.8
	p value	-	1.000 ^b	0.219 ^b	0.219 ^b	0.014 ^b
A-PS + SP-A	Mean	53.3	52.5	53.6	60.6	46.8
	p value	0.019 ^a	0.513 ^b	0.827 ^b	0.513 ^b	0.513 ^b
A-PS + SP-D	Mean	37.6	45.7	42.5	42.5	33.3
	p value	0.019 ^a	0.043 ^b	0.248 ^b	0.248 ^b	0.248 ^b
A-PS + BSA	Mean	101.1	110.1	102.9	101.5	82.0
	p value	0.219 ^a	0.513 ^b	0.827 ^b	0.827 ^b	0.275 ^b
TT1 cells						
A-PS	Mean	100.0	102.5	101.2	102.5	80.2
	p value	-	0.577 ^b	0.095 ^b	0.577 ^b	0.005 ^b
A-PS + SP-A	Mean	63.0	69.0	74.0	69.7	57.3
	p value	0.007 ^a	0.248 ^b	0.021 ^b	0.386 ^b	0.386 ^b
A-PS + SP-D	Mean	60.9	54.0	55.2	55.5	46.6
	p value	0.016 ^a	0.251 ^b	0.602 ^b	0.465 ^b	0.076 ^b
A-PS + BSA	Mean	96.6	105.2	101.7	97.9	89.0
	p value	0.180 ^a	0.117 ^b	0.465 ^b	0.917 ^b	0.602 ^b
THP-1 cells						
A-PS	Mean	100.0	101.4	99.9	101.9	96.2
	p value	-	0.219 ^b	1.000 ^b	1.000 ^b	0.219 ^b
A-PS + SP-A	Mean	72.0	80.2	72.1	68.5	74.4
	p value	0.019 ^a	0.127 ^b	0.827 ^b	0.827 ^b	0.827 ^b
A-PS + SP-D	Mean	63.1	69.4	60.5	64.3	64.1
	p value	0.014 ^a	0.386 ^b	0.885 ^b	1.000 ^b	0.885 ^b
A-PS + BSA	Mean	102.0	108.2	103.5	84.2	100.6
	p value	0.435 ^a	0.513 ^b	0.827 ^b	0.513 ^b	0.513 ^b

Table S2: Relative Infection following influenza pre-incubation with A-PS and proteins. ^ap values determined using Mann-Whitney U test versus protein free control; ^bp values determined using Mann-Whitney U test versus nanoparticle free protein containing control. Significant values in bold.

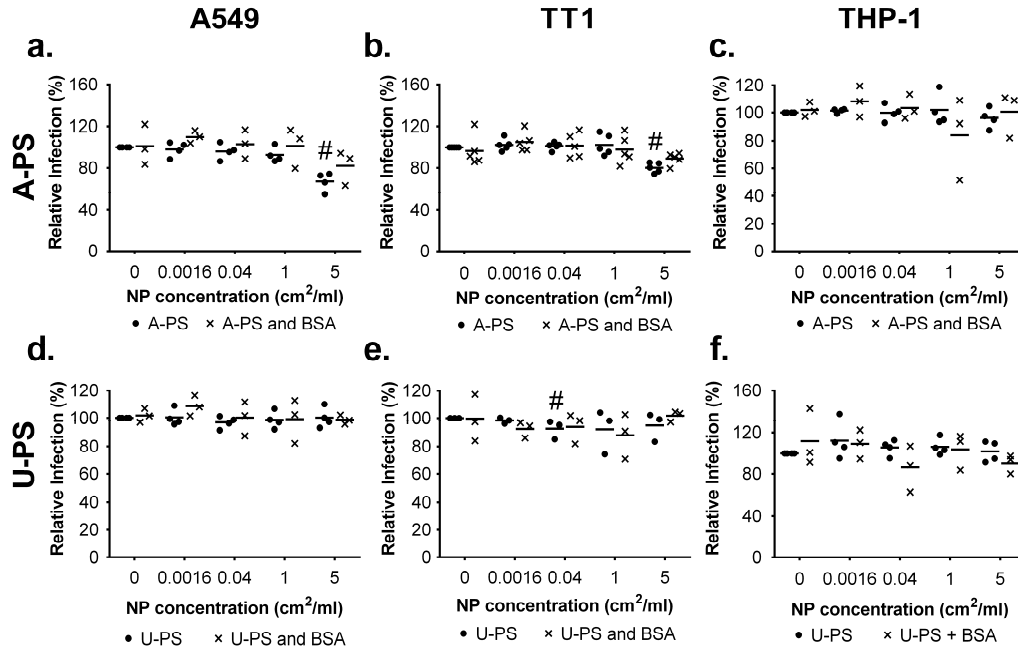


Figure S1: Effect of 100 nm A-PS and U-PS with BSA on influenza A infection.

A-PS were pre-incubated with 5 $\mu\text{g}/\text{mL}$ BSA prior to incubation with IAV and treatment of **A.** A549, **B.** TT1 and **C.** differentiated THP-1 cells. U-PS particles were pre-incubated with 5 $\mu\text{g}/\text{mL}$ BSA prior to incubation with IAV and treatment of **D.** A549 **E.** TT1 and **F.** THP-1 cells. Horizontal line represents mean of at least three independent experiments conducted in duplicate. Statistics determined using Mann-Whitney U test where * $p \leq 0.050$ compared to relative infection in particle free protein control; # $p \leq 0.050$ versus IAV alone.