Supporting Information

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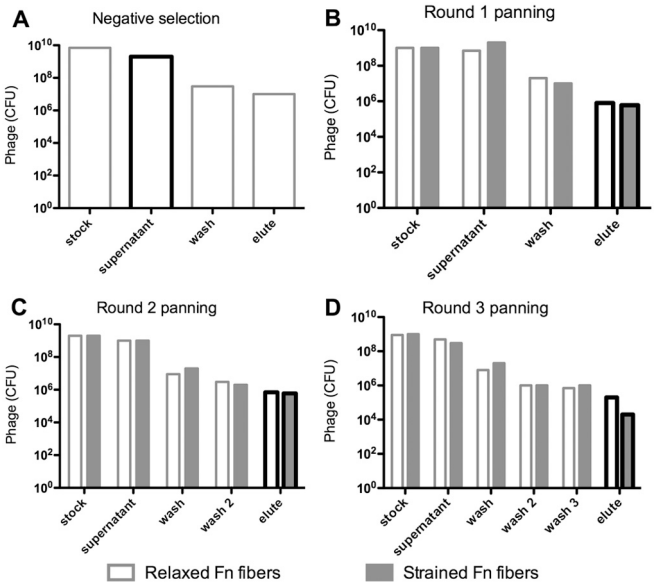

Fig. S1. Phage titers of successive panning rounds show emergence of a strongly bound phage population. (*A*) Negative selection round to deplete library of nonspecific binders to surface. (*B–D*) Three successive rounds of panning, with stringency of binding controlled by number of wash incubations.

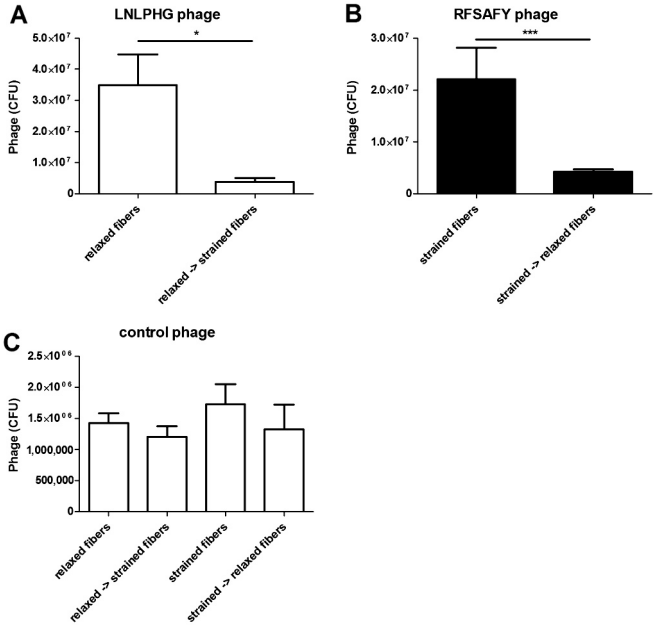

Fig. S2. Reversible binding of phage probes on fibronectin (Fn) fibers. (*A*) LNLPHG phage (1e12 cfu) was incubated on relaxed Fn fibers ($\lambda = 0.93$) for 30 min, fibers were then strained to $\lambda = 2.6$ and phages were recovered and quantitated by titers. (*B*) RFSAFY phage (1e12 cfu) was incubated on strained Fn fibers ($\lambda = 2.6$) for 30 min, fibers were then relaxed to $\lambda = 1$ and phages were recovered and quantitated by titers. (*C*) Control phage (1e12 cfu) incubated on Fn fibers, and recovered after strain application (*, $p < 0.05$, ***, $p < 0.001$).

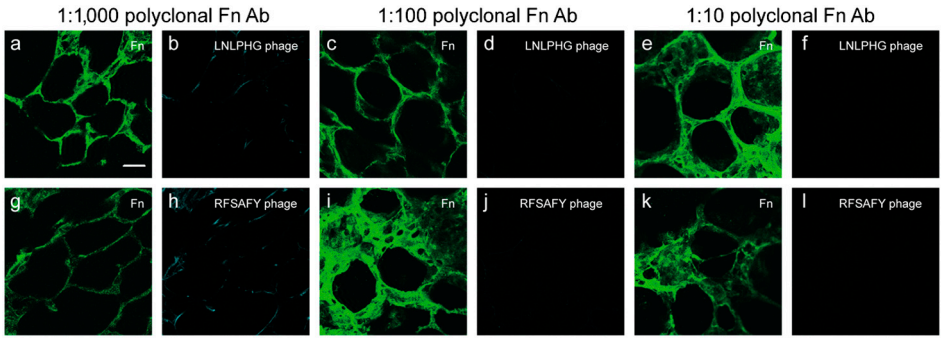

Fig. S3. Competitive binding of polyclonal anti-fibronectin (Fn) antibody displaces binding of phage probes on tissue lung slices. A polyclonal anti-Fn antibody (1 mg/mL) was titrated in along with the LNLPHG phage and RFSAFY phage at 1:1,000 (*A*, *B*, *G*, *H*), 1:100 (*C*, *D*, *I*, *J*), and 1:10 (*E*, *F*, *K*, *L*) dilutions. Images acquired with 63× oil immersion objective. (Scale bar: 20 um.)

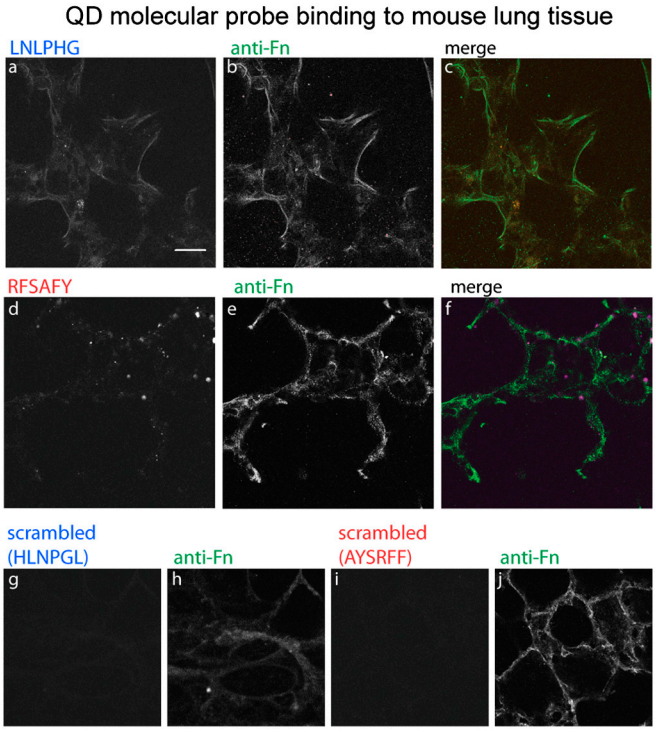

Fig. S4. Staining of labeled peptides on prepared living lung slices. Peptides corresponding displayed peptides on phage-based probes were generated by solid phase synthesis and contain a C-terminal cysteine for chemical ligation (peptides: LNLPHGGGC, RFSAFYGGC, HLNPGLGGC, AYSRFFGGC). Peptides were conjugated to Qdot (QD) and purified per manufacturer's instructions (Molecular Probes). (*A*–*C*) Staining of LNLPHG probe and costaining with polyclonal anti-fibronectin (Fn) antibody. (*D*–*F*) Staining of RFSAFY probe and costaining with polyclonal anti-Fn antibody. (*G* and *H*) Staining of scrambled LNLPHG probe. (*I* and *J*) Staining of scrambled RFSAFY probe. All images acquired with 63× oil immersion objective. (Scale bar: 20 um.)

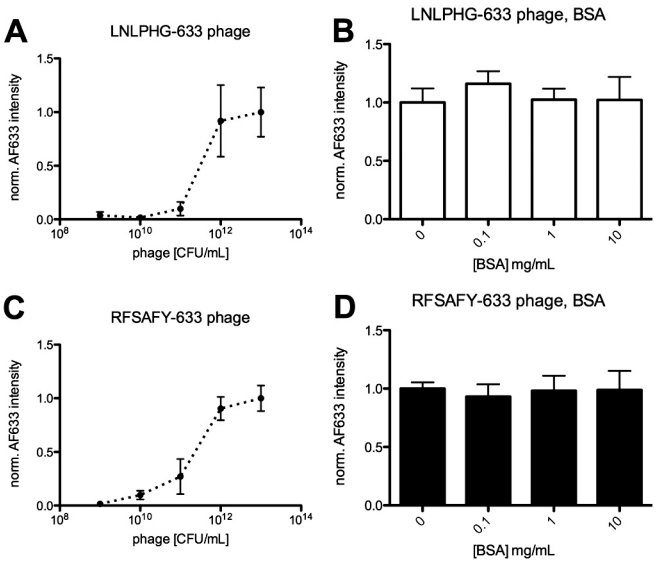

Fig. S5. Staining of phage probes is specific and cannot be displaced by BSA. (*A*) AF633-labeled LNLPHG phage were incubated on fibronectin (Fn) fibers of $\lambda = 0.9$ at the indicated concentrations for 1 h. (*B*) AF633-labeled LNLPHG phage were incubated on Fn fibers of $\lambda = 0.9$ at 1×10^{12} phage particles per milliliter for 1 h, and incubated with BSA at the indicated concentrations for 30 min. (*C*) AF633-labeled RFSAFY phage were incubated on Fn fibers of $\lambda = 2.6$ at the indicated concentrations for 1 h. (*D*) AF633-labeled RFSAFY phage were incubated on Fn fibers of $\lambda = 2.6$ at 1×10^{12} phage particles per milliliter for 1 hr, and incubated with BSA at the indicated concentrations for 30 min. $N > 3$ for all samples, error bars are SEM.

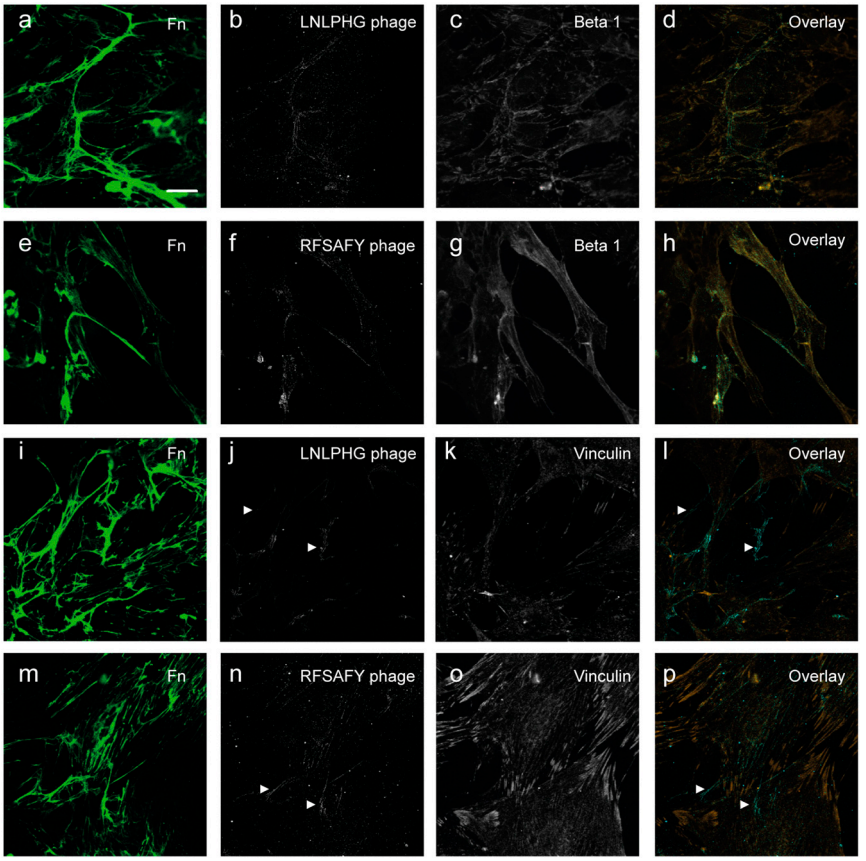

Fig. S6. Costaining of phage probes with β-1 integrin subunit and vinculin on fibroblast cultures. (*A–D*) Staining of LNLPHG phage with β-1 integrin subunit. (*E–H*) Staining of RFSAFY phage and β-1 integrin subunit. (*I–L*) Staining of LNLPHG phage and vinculin. (*M–P*) Staining of RFSAFY phage and vinculin. Arrowheads indicate significant accumulation of phage probes without coincident vinculin staining. Images acquired with 63× oil immersion objective. (Scale bar: 20 um.)

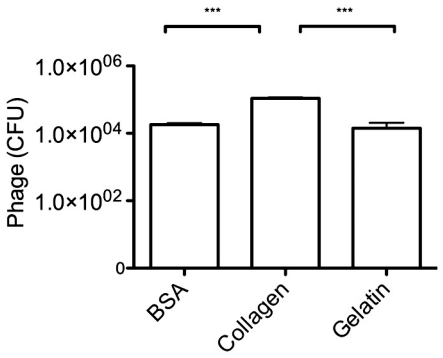

Fig. S7. Phage clones after round three of panning do not bind to control surfaces. Phage particles 1×10^{11} were incubated on polydimethylsiloxane surfaces coated with BSA (10 mg/mL), collagen I (10 mg/mL), or gelatin (10 mg/mL) for 1 h. $N > 3$ for all samples, statistics were performed using a one-way ANOVA with Bonferroni post test correction (***, $p < 0.001$).

Table S1. List of clones identified after panning with fuse5 6-mer library and frequency each clone was identified

Phage clone	Sequence	Identification freq.
Relaxed		
Fuse5-c15	**SRWYRI**	5
Fuse5-c20	**LNLPHG**	3
Fuse5-c12	**ARERFY**	2
Fuse5-c11	**GSNSKY**	1
Strained		
Fuse5-s05	**RFSAFY**	2
fuse5-39	EVIRQR	1
fuse5-03	**GHVTRN**	1
fuse5-11	GIYLLP	1
fuse5-15	GKPHGW	1
fuse5-25	IGGVSR	1
fuse5-21	KPSGLY	1
fuse5-24	KPTTVD	1
fuse5-35	LTRKSD	1
fuse5-07	LVGVLS	1
fuse5-33	PESSIG	1
fuse5-23	PPNDVH	1
fuse5-05	PRNLRQ	1
fuse5-22	QAPSFR	1
fuse5-27	RTVKYW	1
fuse5-14	SSHWFT	1
fuse5-31	SSSRTQ	1
fuse5-17	SSTYGH	1
fuse5-02	TGRRID	1
fuse5-20	TLAKAH	1
fuse5-32	TRSGGK	1
fuse5-13	TVLVGQ	1
fuse5-10	VRGVTL	1
fuse5-01	**VTRLLH**	1
fuse5-29	WRAKLV	1
fuse5-04	**WRVLYA**	1
fuse5-36	WSYILS	1
fuse5-41	YFFVDT	1
fuse5-30	YIQDYN	1
fuse5-38	YTHLAK	1

Clones were sequenced after three rounds of panning. Bolded clones were produced and assayed for binding to Fn fibers.