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Supplementary Materials for

Filamentous bacteriophages are associated with chronic *Pseudomonas* lung infections and antibiotic resistance in cystic fibrosis

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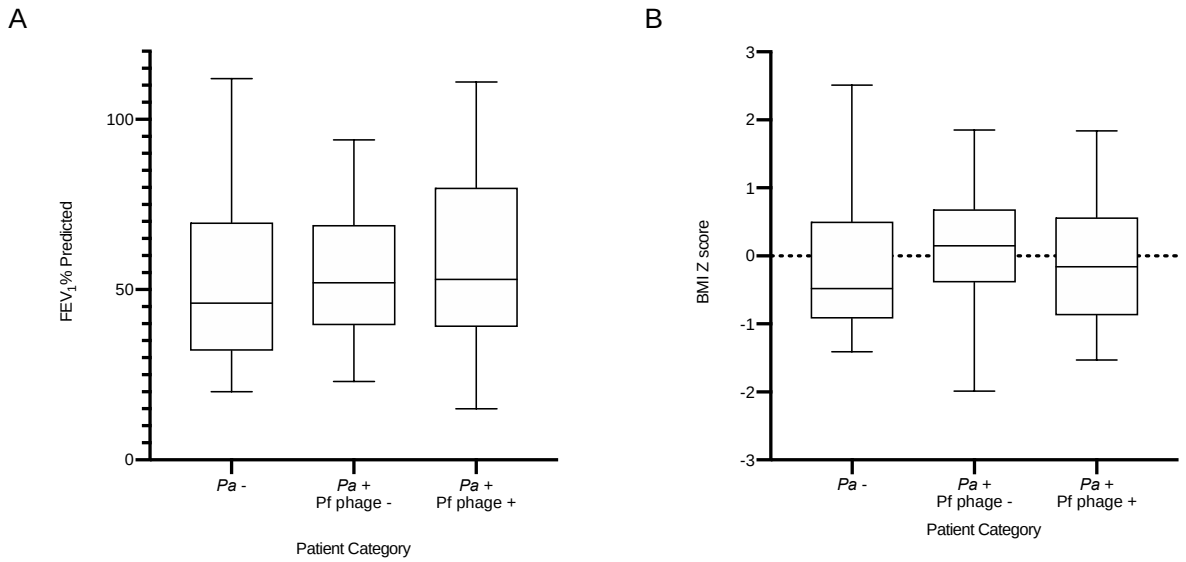

Fig. S1. Baseline characteristics of the Stanford CF Cohort. (A) FEV1% predicted at time of sample acquisition in patients with no P. aeruginosa in their sputum, with *P. aeruginosa* and no Pf phage and those with *P. aeruginosa* and with Pf phage. **(B)** BMI z-scores of patients within each patient category. Box represents interquartile range (IQR) with whiskers showing 1.5x IQR and dots as outliers. Comparison by Wilcoxon ranked sum with no significant differences.

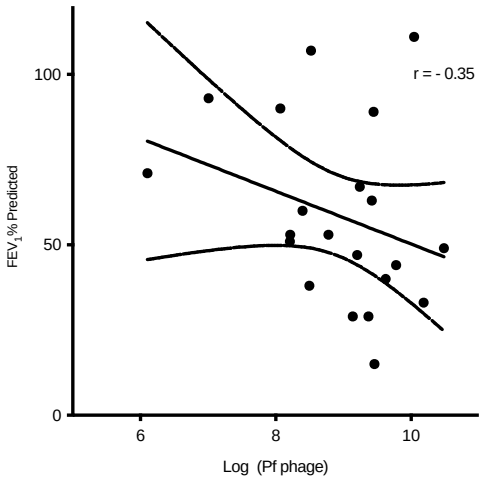

Fig. S2. Patients with higher Pf phage concentrations have lower FEV_1 percent predicted values. The relationship between FEV_1 and concentration of Pf phage is displayed. (r = - 0.35, p = 0.01). Area between the hashed line represents the 95% confidence interval. Correlation calculated by Kendall correlation.

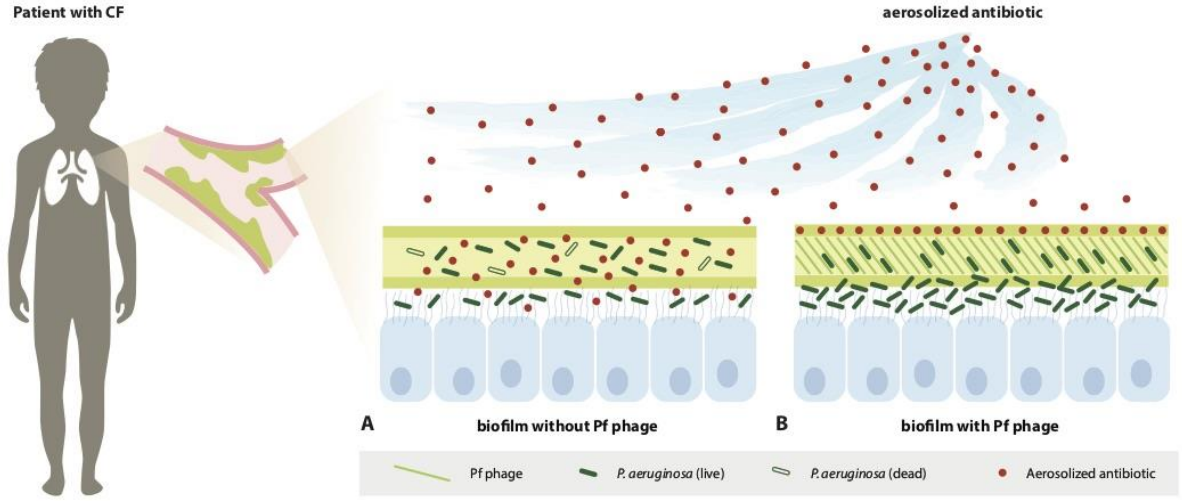

Fig. S3. Pf phage liquid crystal biofilm sequesters antibiotics leading to the development of antibiotic resistance and chronic infection. (**A**) In the absence of Pf phage aerosolized antibiotics can penetrate the biofilm more easily, leading to more effective treatment. (**B**) In the presence of Pf phage aerosolized antibiotics are sequestered in the sputum. This promotes antibiotic tolerance and, ultimately, favors survival of resistant clones and promotes chronic infection.

Table S1. Individual values for Fig. 2B. For each category of patients from the Danish cohort, the ages in years are listed. Comparison was made between Pf phage-positive and Pf phage-negative patients. Pf phage-negative indicates all samples were negative, Pf intermittent indicates that there both Pf phage-positive and Pf phage-negative samples and Pf phage-positive indicates all samples from that patient were Pf phage-positive.

Pf phage - Patients	Pf phage intermittent	Pf phage + Patients
9	13	20
19	8	19
18	3	16
18	16	16
5	34	31
16	14	14
14	13	23
13	16	11
11	15	22
11		
22		
11		

Table S2. Individual data points from Fig. 4 (C and D). Data from the Stanford cohort. Values listed are the FEV1% predicted at time of enrollment with FEV1% predicted at presentation with subsequent exacerbation. Only patients from the cohort who were enrolled when at baseline and who had exacerbation in study period were included. n = 11 for Pf phage-positive and n = 20 for Pf phage-negative patients. Comparisons made using Mann-Whitney.

Pf phage -	**Pf phage +**
7	22
10	17.3
0	15
3	25
8	7
39	5
17	11
1	11
7	2
5	20
0	12
15	
15	
1	
7	
10	
4	
2	
-1	
16	

Table S3. Resistance patterns in mucoid and nonmucoid isolates. Includes all *P. aeruginosa* isolates from patients in the Stanford CF Cohort (both Pf phage-positive and Pf phage-negative isolates). Comparison by Pearson Chi Squared.

	Mucoid (% resistant)	Non Mucoid (% resistant)	p-value
Aztreonam	22.0%	13.0%	0.38
Amikacin	45.0%	21.7%	0.06
Meropenem	24.4%	21.7%	0.81
Ciprofloxacin	34.2%	17.4%	0.15
Tobramycin	24.4%	17.4%	0.51
Cefepime	27.5%	17.4%	0.36
Ceftazidime	22.0%	13.0%	0.38
Piperacillin-tazobactam	19.5%	21.7%	0.83