SUPPORTING INFORMATION

LOCALIZATION OF ADHESINS IN THE SURFACE OF PATHOGENIC BACTERIAL ENVELOPE THROUGH ATOMIC FORCE MICROSCOPY

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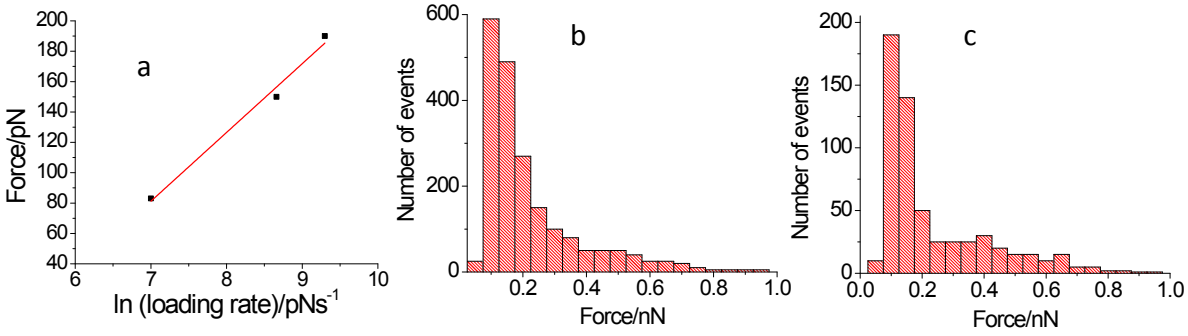

Figure S1: a) Adhesion force of recognition events of an anti-FHA functionalized tip and the purified FHA immobilized on mica at three different retracting velocities. b) Histogram of adhesion events between anti-FHA and the purified protein on mica. c) Histogram of adhesion events between anti-FHA and the purified protein on mica blocked with the antibody.

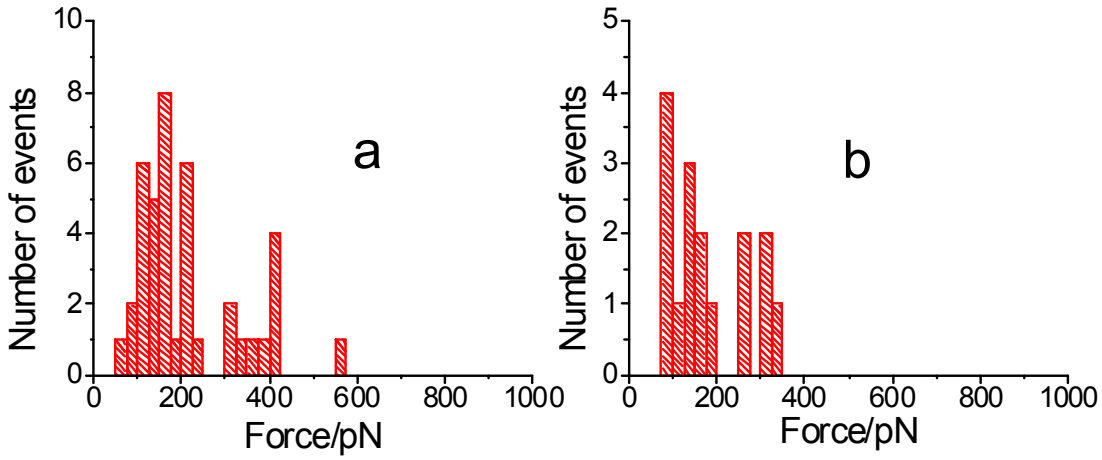

Figure S2: ***a)*** *Force histogram corresponding to the recognition events on an individual cell of* ***B. pertussis Tohama I after blocking*** *the surface with antibody solution. The mean force value of 150pN is consistent with the mean value observed in the non-blocked cells but the amount of interaction events diminished dramatically (see Figure 3 of the manuscript).* ***Figure b*** *corresponds to a force histogram performed with the recognition events on an individual cell belonging to the* ***FHA- strain (mutant where FHA adhesin is absent)****. The histogram does not show a clear maximum and the number of recognition events is low and can be attributed to unspecific interactions.*

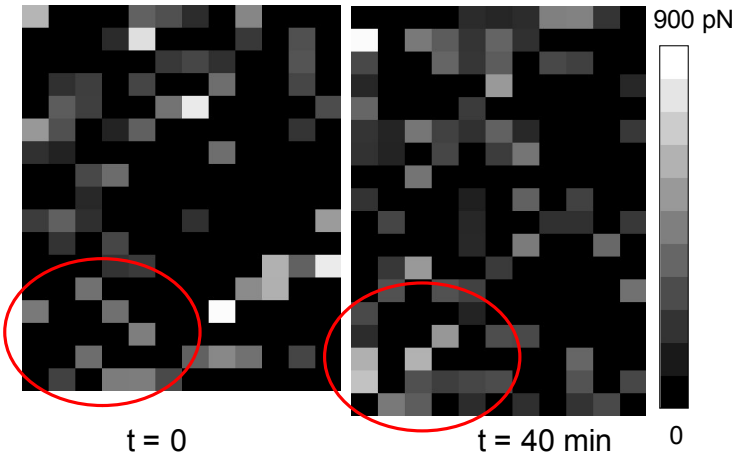

Figure S3. Force maps of cell ii (Figure 3.a of the manuscript). The circled area corresponds to the contact zone between cell ii and cell iii. After 40 min, in the second scan, the amount of recognition events rose in the mentioned area.

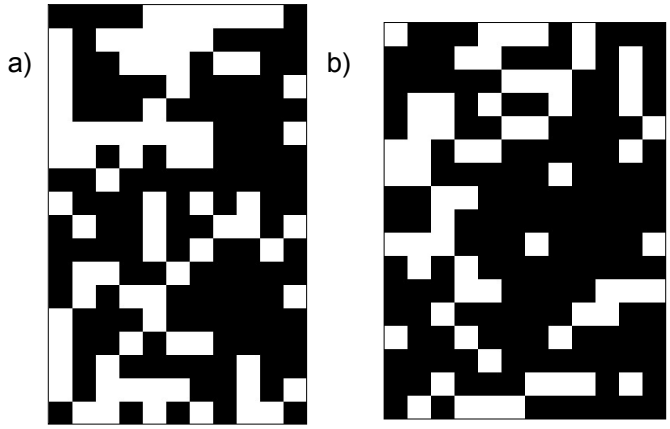

Figure S4. Cluster analysis for cell ii in Figure 3.a of the manuscript. a) t= 0. Recognition events (white) = 62. Clusters=10. Average coordination number: First neighbors=0.94, second neighbors=1.86.b) t= 40. Recognition events= 78. Clusters = 7. Average coordination number: First neighbors=1.03, second neighbors=2.10. Non-recognition events in black. The size of each pixel is 94x94nm.

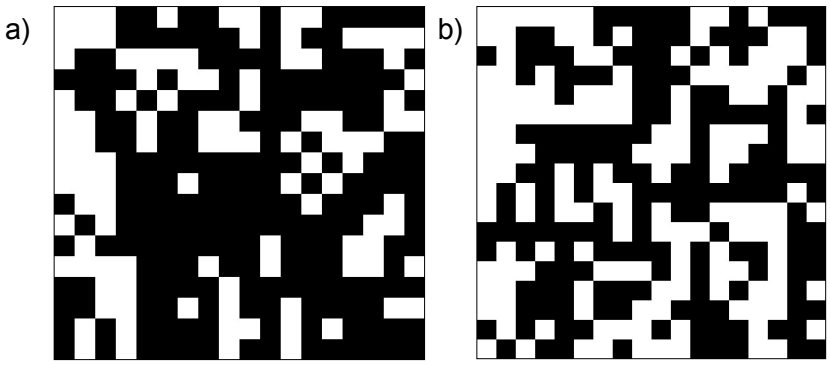

Figure S5. Cluster analysis for cell i in Figure 3.a of the manuscript. a) t= 0. Recognition events (white) = 106. Clusters=16. Average coordination number: First neighbors= 1.24, second neighbors= 2.41. b) t= 40. Recognition events 156. Clusters = 8. Average coordination number: First neighbors= 1.52, second neighbors= 2.93.Non-recognition events in black. The size of each pixel is 94x94nm.

Table S1

Summary of the molecular recognition events for the total number of individual *B. Pertussis* cells analyzed

Culture	Cell	% Increase in recognition events after 40 min.	Number of clusters t= 0 min	Number of clusters t= 40 min
A	**I**	15	22	6
A	**II**	23	5	1
A	**III**	12	9	8
B	**I**	12	22	6
C	**I**	28	13	1
C	**II**	9	2	1
D	**I**	10	2	2
E	**I**	8	6	2
E	**II**	14	5	3
E	**III**	9	7	5
F	**I**	14	8	4
F	**II**	13	5	3

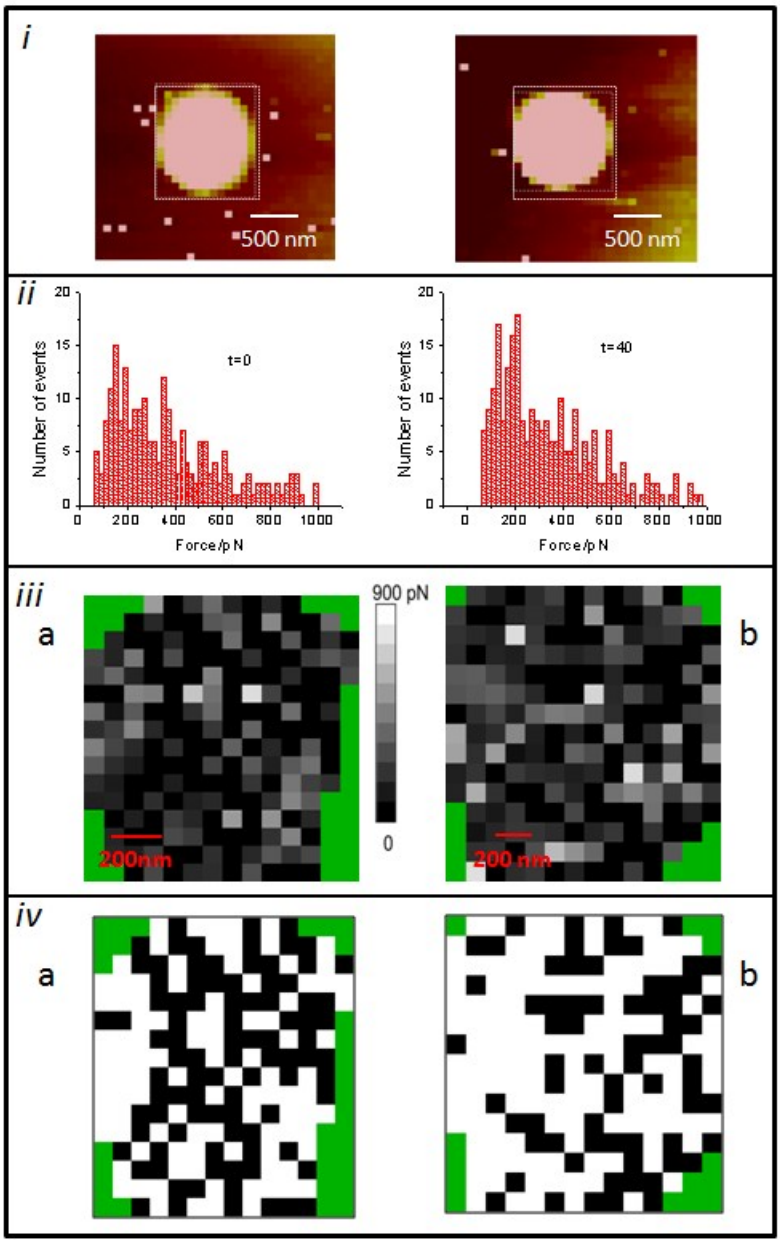

Figure S6: i) Force Volume image of an individual B. pertussis Tohama I cell acquired with a functionalized tip. ii) The specific recognition events between FHA-antiFHA on the surface of cells shown in i) are represented in the corresponding histograms for the respective time points studied (0 and 40 min). The number of adhesion events increases 8% in the second FV image. iii) Force maps of cell shown in i) at t=0(a) and t= 40 (b).iv) Cluster analysis for cell i. a) t= 0. Recognition events = 218. Clusters= 6. Average coordination number: First neighbors=1.5, second neighbors=3. b) t= 40. Recognition events=246. Clusters =2. Average coordination number: First neighbors=2, second neighbors=4. Non-recognition events in black.

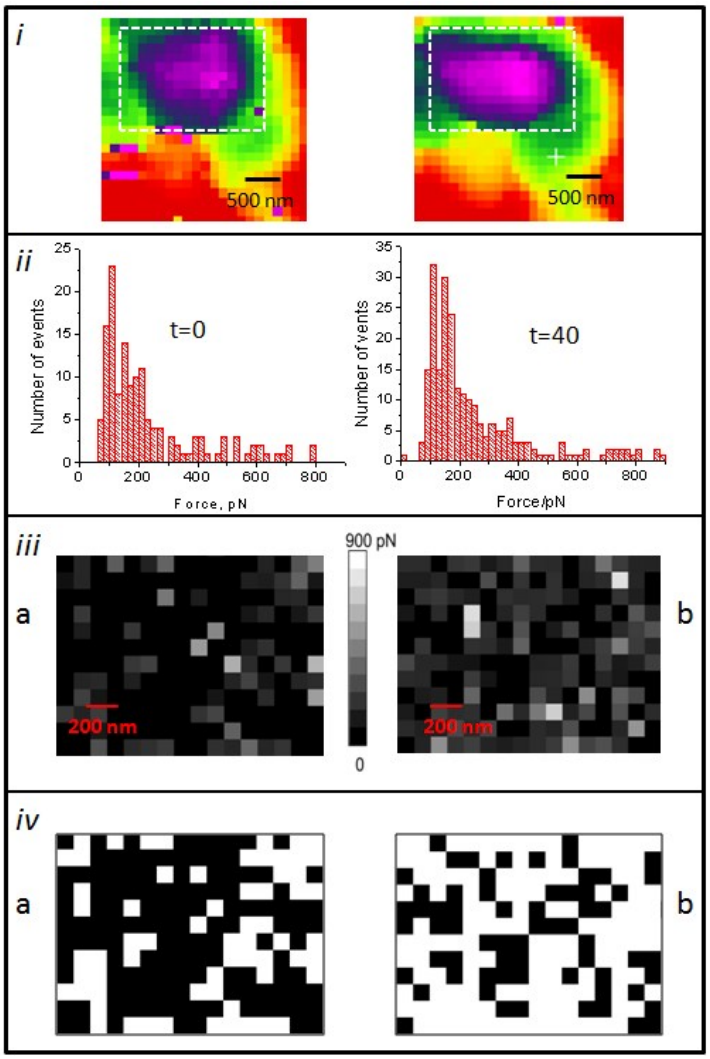

Figure S7: i) Force Volume image of an individual B. pertussis Tohama I cell acquired with a functionalized tip. ii) The specific recognition events between FHA-antiFHA on the surface of cells shown in i) are represented in the corresponding histograms for the respective time points studied (0 and 40 min). The number of adhesion events increases 28% in the second FV image.iii) Force maps of cell shown in i) at t=0(a) and t= 40 (b).iv) Cluster analysis for cell i. a) t= 0. Recognition events = 142. Clusters= 13. Average coordination number: First neighbors=1.15 second neighbors=2.2. b) t= 40. Recognition events= 234. Clusters = 1. Average coordination number: First neighbors=1.78, second neighbors=3.60. Non-recognition events in black.

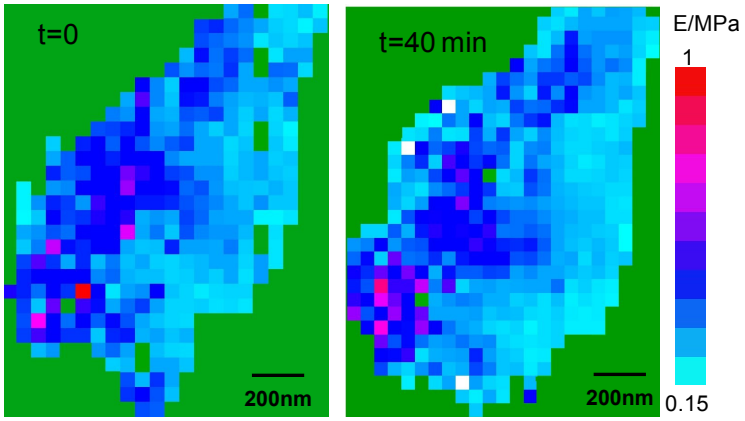

Figure S8: Young modulus map of a B. Pertussis cell in two consecutive scans. The AFM tip is ***not*** *functionalized with the FHA antibody. No change in the stiffness demonstrates that the mechanical stress is not the cause of the recruitment of FHA in the cell surface as was observed in consecutive scans where an antibody functionalized tip was used (Figures 2-4 of the manuscript)*