Supplementary Information
for:

Quantification of nanoscale forces in lectin-mediated bacterial attachment and uptake into giant liposomes

Ramin Omidvar[a,b,c,*] , Yareni A. Ayala[d], Annette Brandel[a,b], Lukas Hasenclever[a,b] , Martin Helmstädter[e], Alexander Rohrbach[d,*], Winfried Römer[a,b,c,*] and Josef Madl[a,b,c,1]

[a] *Faculty of Biology, University of Freiburg, Schänzlestraße 1, 79104 Freiburg, Germany*

[b] *Signalling Research Centres BIOSS and CIBSS, University of Freiburg, Schänzlestraße 18, 79104 Freiburg, Germany*

[c] *Freiburg Center for Interactive Materials and Bioinspired Technologies (FIT), University of Freiburg, Georges-Köhler-Allee 105, 79110 Freiburg, Germany*

[d] *Department of Microsystems Engineering (IMTEK), University of Freiburg, Georges-Köhler-Allee 105, 79110 Freiburg, Germany*

[e] *Renal Division, Department of Medicine, University Hospital Freiburg, Freiburg University Faculty of Medicine, Freiburg, Germany*

*To whom correspondence should be addressed:
ramin.omidvar@bioss.uni-freiburg.de , rohrbach@imtek.uni-freiburg.de and winfried.roemer@bioss.uni-freiburg.de

Keywords: *Pseudomonas aeruginosa*, endocytosis, glycosphingolipids, lipid zipper, artificial membrane models, atomic force microscopy, optical tweezers

[1] Current address: Institute for Experimental Cardiovascular Medicine, University Heart Center Freiburg · Bad Krozingen, and Faculty of Medicine, University of Freiburg, Freiburg, Germany

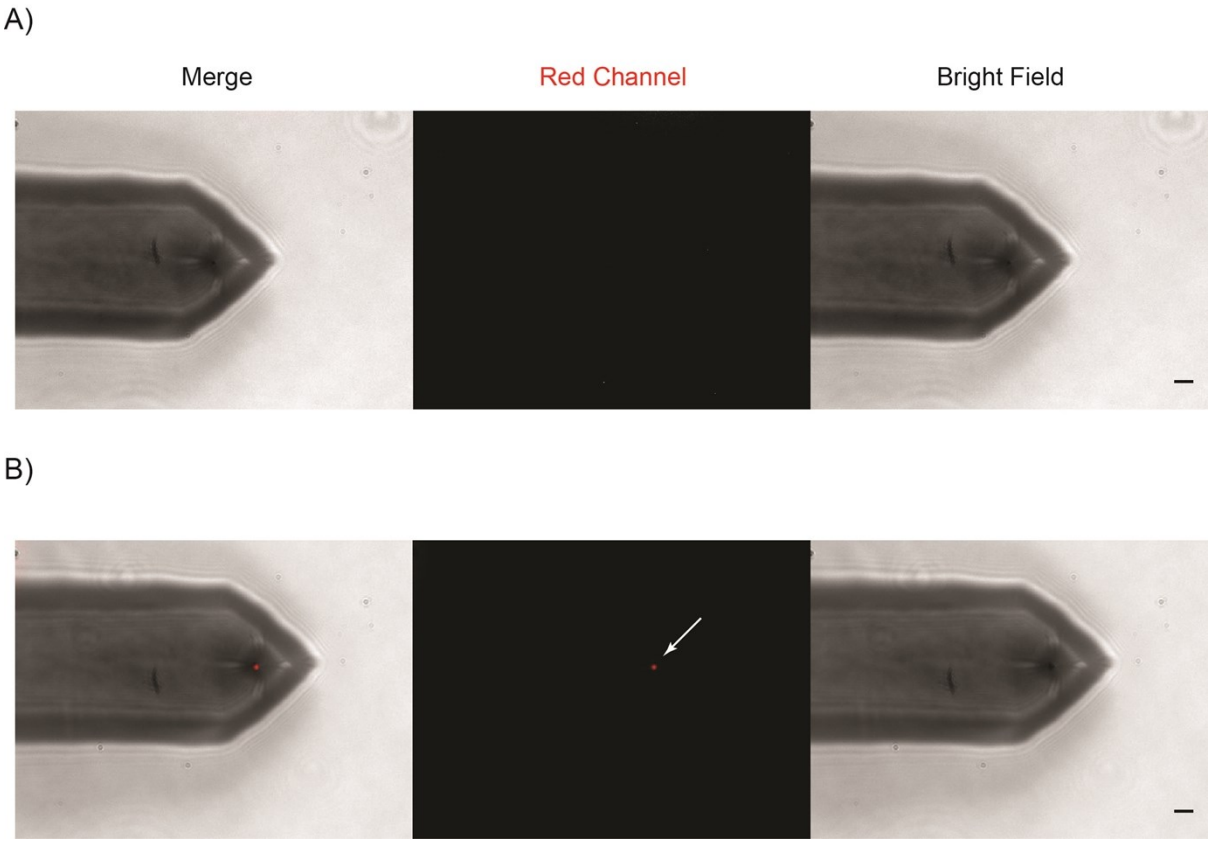

Fig. S1 Monitoring of fluorescent (red) signal as readout for for lipid attachment to AFM tips. While there is no signal in the red channel in (A), the red dot indicated with white arrow in (B) shows fluorescent lipids on the AFM tip after intending a GUV (scale bars: 10 µm).

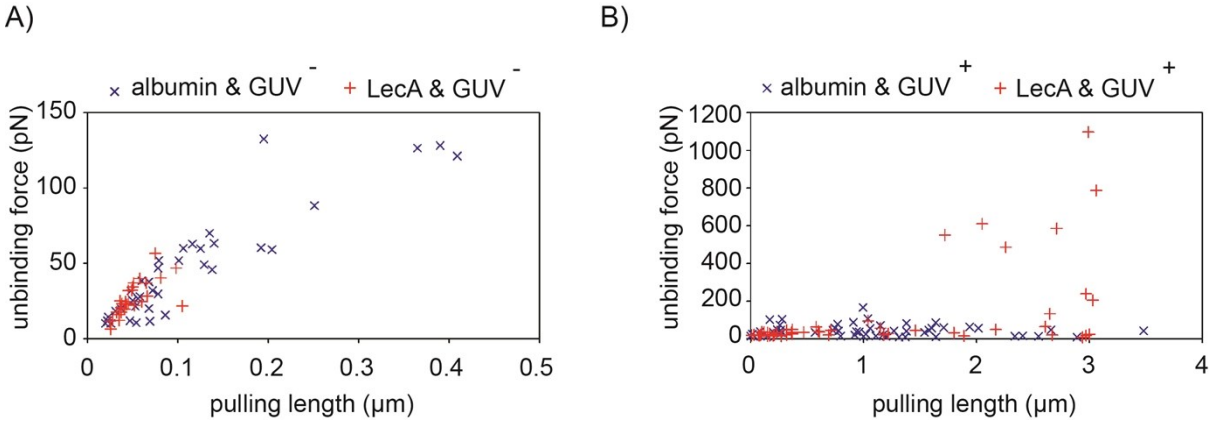

Fig. S2 Comparison of unbinding steps between albumin- and LecA-coated tips interacting with (A) Gb3-negative GUVs (GUV^-) and (B) Gb3-positive GUVs (GUV^+).

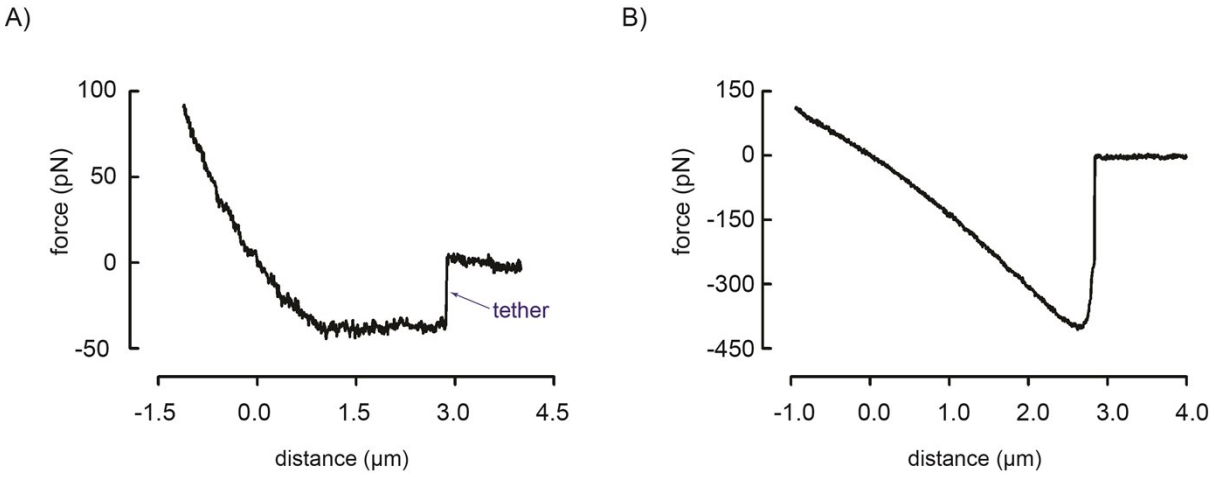

Fig. S3 Representative curves of AFM tips coated with higher concentration of LecA proteins (0.2 mg/ml LecA solution concentration) interacting with Gb3-functionalized GUVs depicted (A) membrane tether formation and (B) high detachment force (similar to the low LecA concentration of 0.1 mg/ml).

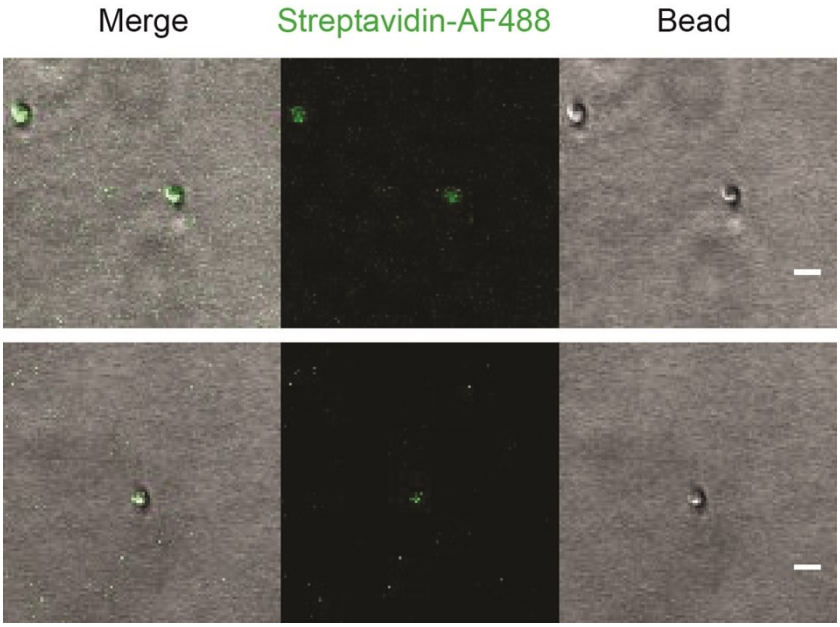

Fig. S4 The presence of biotinylated LecA proteins on latex beads was analyzed by fluorescently labeled streptavidin molecules (scale bars: 2 μm).

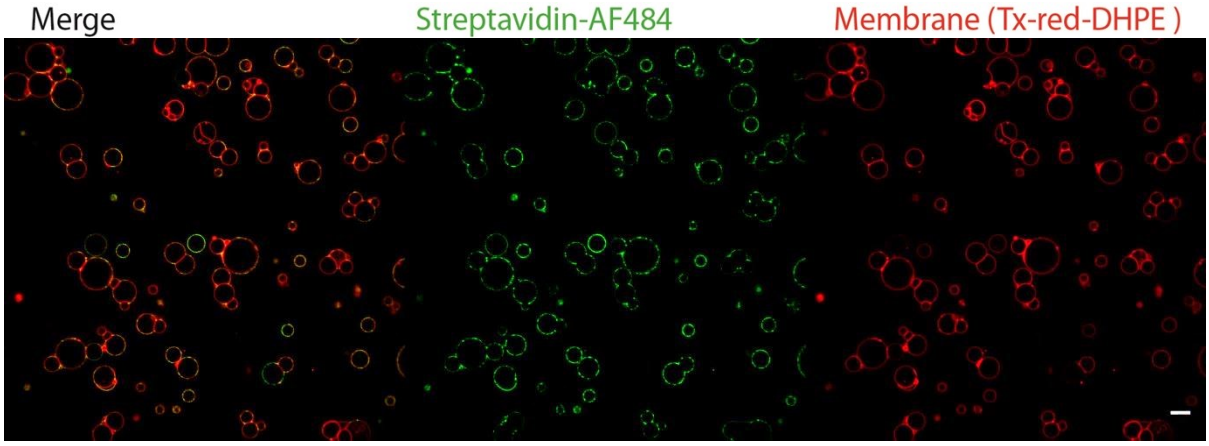

Fig. S5 After biotinylation, LecA proteins can efficiently bind to Gb3 in GUVs (scale bar: 10 μm). The lipid composition was: DOPC/Chol/Gb3/Tx-red-DHPE (64/30/5/1 mol %).

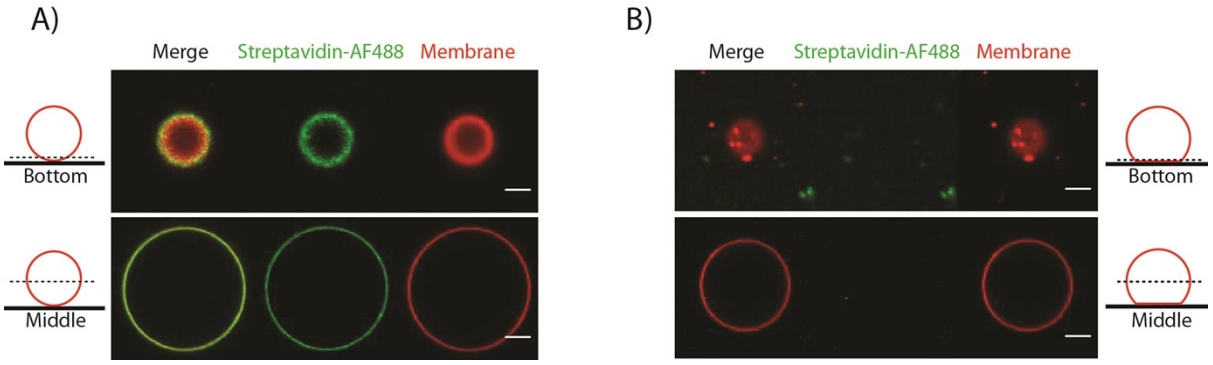

Fig. S6 Detection of the biotinylated lipids location on the non-adherent and adherent GUVs. (A) Non-adherent GUVs on albumin-coated coverslip show a homogenous binding of streptavidin-AF488 to GUVs (containing 1 mol% FSL-biotin) in different planes (bottom and middle (equatorial) planes). (B) For adherent GUVs, no binding of streptavidin-AF488 molecules to GUVs were observed indicating that biotinylated lipids reside in the contact region after binding to the streptavidin which covered the coverslips (scale bars: 5 μm).