Supporting Information for "Adaptive adhesion strategies of *Dictyostelium discoideum* - a force spectroscopy study"

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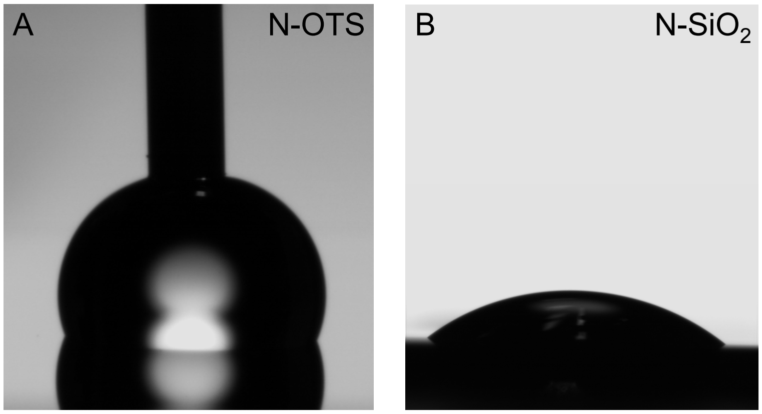

Figure S1 Water contact angle measurements, exemplary shown for the N-wafer A: with and B: without silanization (after piranha cleaning).

Table S1 Summary of the substrate properties of N- and T-wafer as well as the silanization. Advancing (adv) and receding (rec) contact angle of H_2O, as well as contact angle measurement based hysteresis ($\Delta\alpha$) (Piranha cleaned); complete wetting (CW). Surface energy and roughness were reported by Kreis[1] (Ethanol-cleaned). The isoelectric point (IEP) was reported by Loskill *et al.*[2] (Ethanol-cleaned)

Substrate	α_{adv}	α_{rec}	$\Delta\alpha$	γ^{tot} (mJ/m^2)	γ^{LW} (mJ/m^2)	γ^{AB} (mJ/m^2)	rms (nm)	IEP
N-SiO$_2$	CW	CW		35 ± 4	32 ± 1	3 ± 3	0.17	3
T-SiO$_2$	CW	CW		37 ± 3	32 ± 1	5 ± 3	0.19	3
OTS	$113 \pm 3°$	$100 \pm 2°$	13°	23 ± 1	23 ± 1	≤ 0.2	0.16	≤ 4

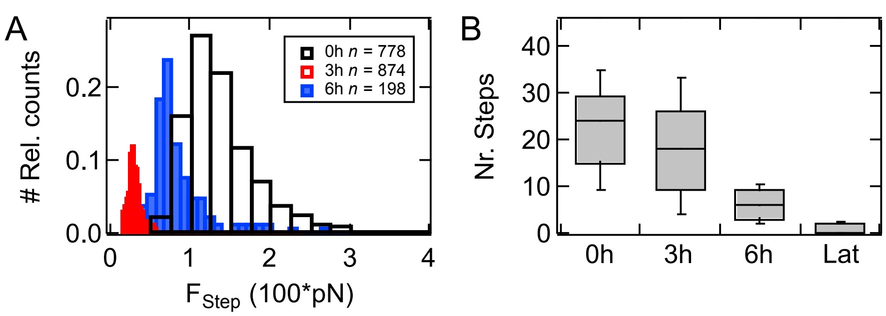

Figure S2 A: Tether force and B: amount of tethers from SCFS of AX3 WT cells on a glass surface during starvation-induced development (switch from medium to PB-buffer at $t = 0$ h). 5 μM Latrunculin A (LatA) treatment is shown as reference.

Table S2 Parameters used for figure 4B

Cells	w (mN/m)	T_0 (mN/m)	R_2 (μm)	K_A (mN/m)
AX3	0.11	0.12	3.5	50
AX3+αM	0.06	3	3.5	100
AX3+*sadA0*	0.09	0.12	3.5	85
AX3+*sadA0*+αM	0.022	3	3.5	85

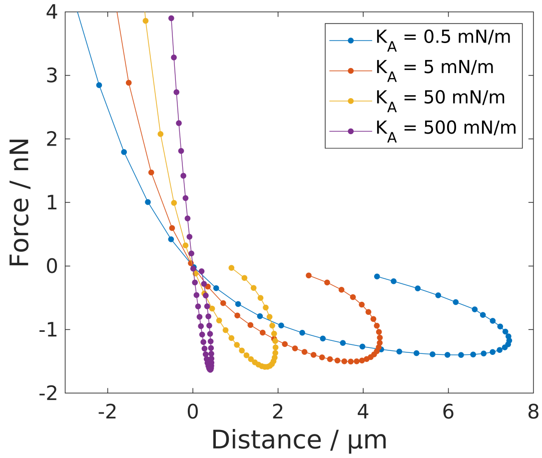

Figure S3 Computational force distance curves illustrating the impact of the mechanics of the cellular cortex by varying the area compressibility modulus K_{A}.

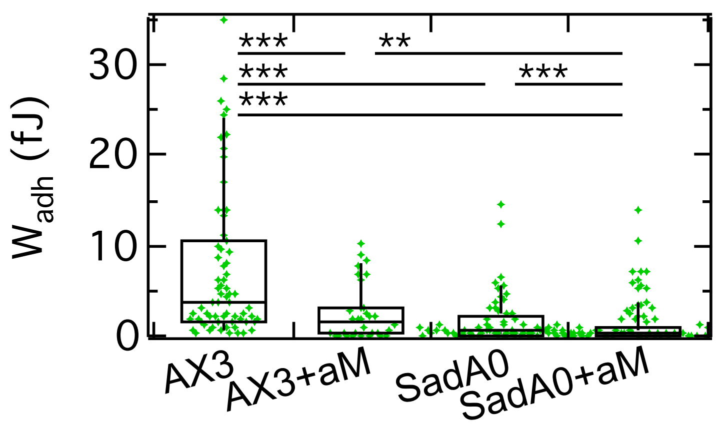

Figure S4 Adhesion work of wildtype AX3 modifications on T-OTS. W_{adh} decreased from AX3 to α-Mannosidase-treated AX3+ by a factor of 2.5, from AX3 to AX3-*sadA0* nearly by a factor of 5. The αM-treatment reduces W_{adh} of AX3-*sadA0* further by a factor of 2.5.

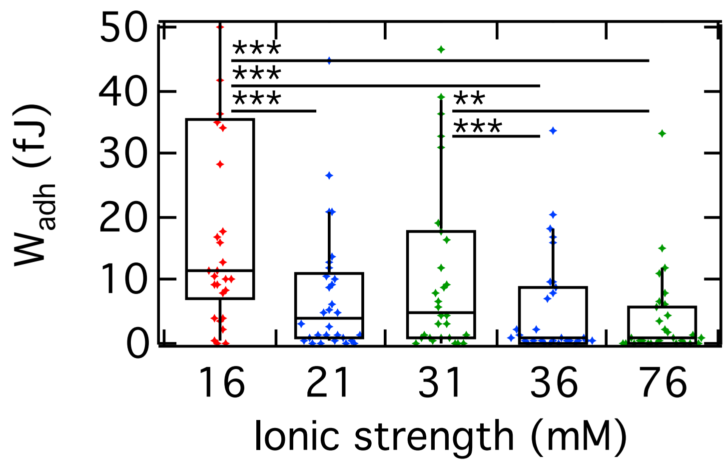

Figure S5 Adhesion work of AX3 in PB (red) in comparison to an ionic strenght of mono- or divalent ions on a non-silanized T-wafer (*T-SiO*$_2$). For the monovalent ion K^{+} (blue), there is only a slight decrease of W_{adh}, which is much stronger for the divalent ion Mg^{2+}(green).

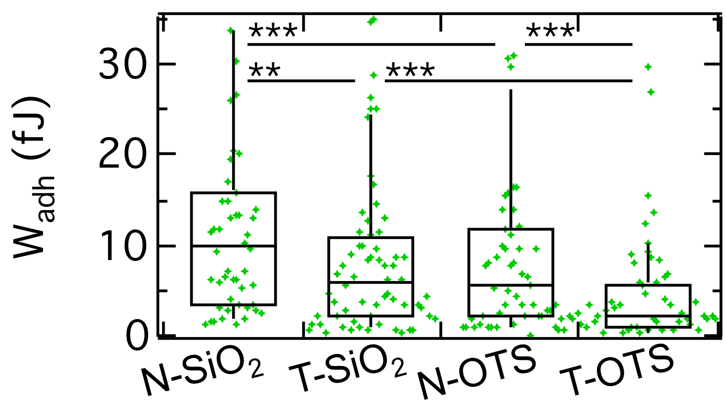

Figure S6 Adhesion work of WT AX2 on model substrates. W_{adh} decreased from *N-*SiO_2 to *T-*SiO_2 by a factor of 2.5 and by a factor of 1.7 from *N-OTS* to *T-OTS*. Silanization also reduces adhesion work roughly by a factor of 2.

Table S3 Overview of SCFS for all cells, substrates and conditions used in this study. Medians of maximal adhesion force and adhesion work are given. As a reference the results for AX2 cells on glass by Leonhardt *et al.*[3] and for AX3 cells and Latrunculin A (LatA) treated AX3 cells on glass by Tarantola *et al.*[4] are shown.

Cells	Substrate	Conditions	F_{max} (nN)	W_{adh} (fJ)
AX2	Glass	PB	7.7[3]	16.5[3]
AX3	Glass	PB	7.6[4]	27.3[4]
AX2	*N-*SiO_2	PB	5.4	10.0
AX2	*T-*SiO_2	PB	3.7	5.9
AX2	*T-*SiO_2	PB+5 mM KCl	3.5	3.9
AX2	*T-*SiO_2	PB+20 mM KCl	2.1	1.0
AX2	*T-*SiO_2	PB+5 mM $MgCl_2$	1.9	5.0
AX2	*T-*SiO_2	PB+20 mM $MgCl_2$	1.8	1.0
AX2	*N-OTS*	PB	3.1	5.5
AX2	*T-OTS*	PB	2.1	2.2
AX3	*T-OTS*	PB	2.5	3.8
AX3+αM	*T-OTS*	PB	1.4	1.5
AX3+*sadA0*	*T-OTS*	PB	0.7	0.8
AX3+*sadA0*+αM	*T-OTS*	*PB*	0.5	0.3
AX3+LatA	Glass	PB	0.16[4]	0.2[4]

Notes and references

[1] C. T. Kreis, *PhD thesis*, Universität Göttingen, 2017.

[2] P. Loskill, H. Hahl, N. Thewes, C. T. Kreis, M. Bischoff, M. Herrmann and K. Jacobs, *Langmuir*, 2012, **28**, 7242–7248.

[3] H. Leonhardt, M. Gerhardt, N. Höppner, K. Krüger, M. Tarantola and C. Beta, *Physical Review E*, 2016, **93**, 012414(8).

[4] M. Tarantola, A. Bae, D. Fuller, E. Bodenschatz, W. J. Rappel and W. F. Loomis, *Plos One*, 2014, **9**, e106574.