

SUPPLEMENTARY INFORMATION

to

Differential Membrane Permeability Responses to Thermal and Acidic Stress in CHO-K1 and HEK-293E Suspension Cells

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Table S1. Statistical evaluation of CHO-K1 cell viability post-acid shock

Experimental Condition	Incubation Time (min)	Mean Viability (%)	Statistical Group
pH 7	1	86.4	A
pH 7	2	88.7	A
pH 7	3	87.3	A
pH 7	4	86.3	A
pH 7	5	86.1	A
pH 4	1	77.2	A, B
pH 4	2	66.1	B
pH 4	3	65.6	B
pH 4	4	60.4	B
pH 4	5	60.3	B

Table S1: Post-hoc pairwise comparisons were performed using Tukey's test following ANOVA analysis (N = 3). Means sharing a common letter in the "Statistical Group" column are not significantly different ($p > 0.05$), whereas different letters denote statistically significant differences ($p < 0.05$).

Table S2. Statistical evaluation of HEK-293E cell viability post-acid shock

Experimental Condition	Incubation Time (min)	Mean Viability (%)	Statistical Group
pH 7	1	92.6	A
pH 7	2	93.1	A
pH 7	3	93.2	A
pH 7	4	93.5	A
pH 7	5	93.7	A
pH 4	1	91.5	A, B
pH 4	2	89.8	A, B
pH 4	3	86.7	B, C
pH 4	4	84.3	C
pH 4	5	82.4	C

Table S2: Post-hoc pairwise comparisons were performed using Tukey's test following ANOVA analysis (N = 3). Means sharing a common letter in the "Statistical Group" column are not significantly different ($p > 0.05$), whereas different letters denote statistically significant differences ($p < 0.05$).

Figure S1. Smoothed GP profiles of CHO-K1 cells

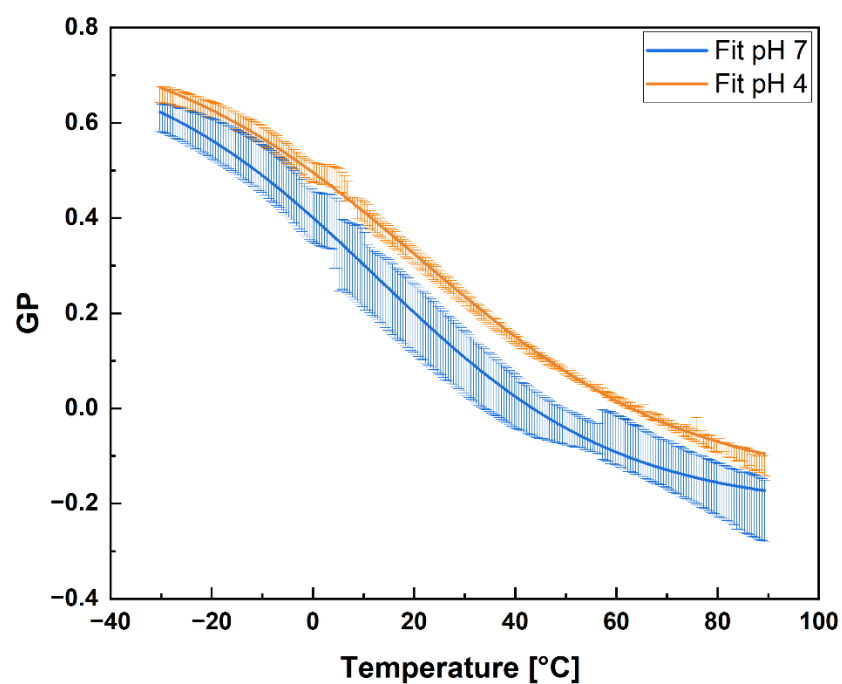


Figure S1. Smoothed Generalized Polarization (GP) temperature-dependent profiles for CHO-K1 cells under control (pH 7, blue line) and acid-stress conditions (pH 4, orange line) during temperature up-scans (−30 °C to 90 °C). Data represent the mean $\pm$ SD of N = 3 independent experiments. Smoothing was applied to reduce high-frequency instrument noise while preserving the intrinsic lipid phase transition features.

Figure S2. Smoothed GP profiles of HEK-293E cells

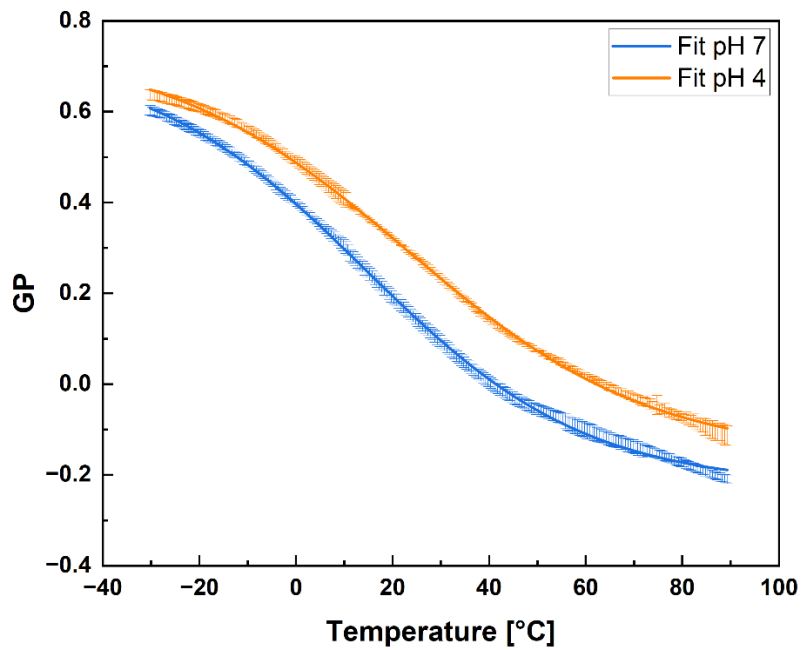


Figure S2. Smoothed Generalized Polarization (GP) temperature-dependent profiles for HEK-293E cells under control (pH 7, blue line) and acid-stress conditions (pH 4, orange line) during temperature up-scans (−30 °C to 90 °C). Data represent the mean $\pm$ SD of N = 3 independent experiments. A smoothing algorithm was applied to remove high-frequency thermal noise without altering transition parameters (T_0 and slope).