SUPPLEMENTARY INFORMATION

Extracellular protonation modulates cell-cell interaction mechanics and tissue invasion in human melanoma cells

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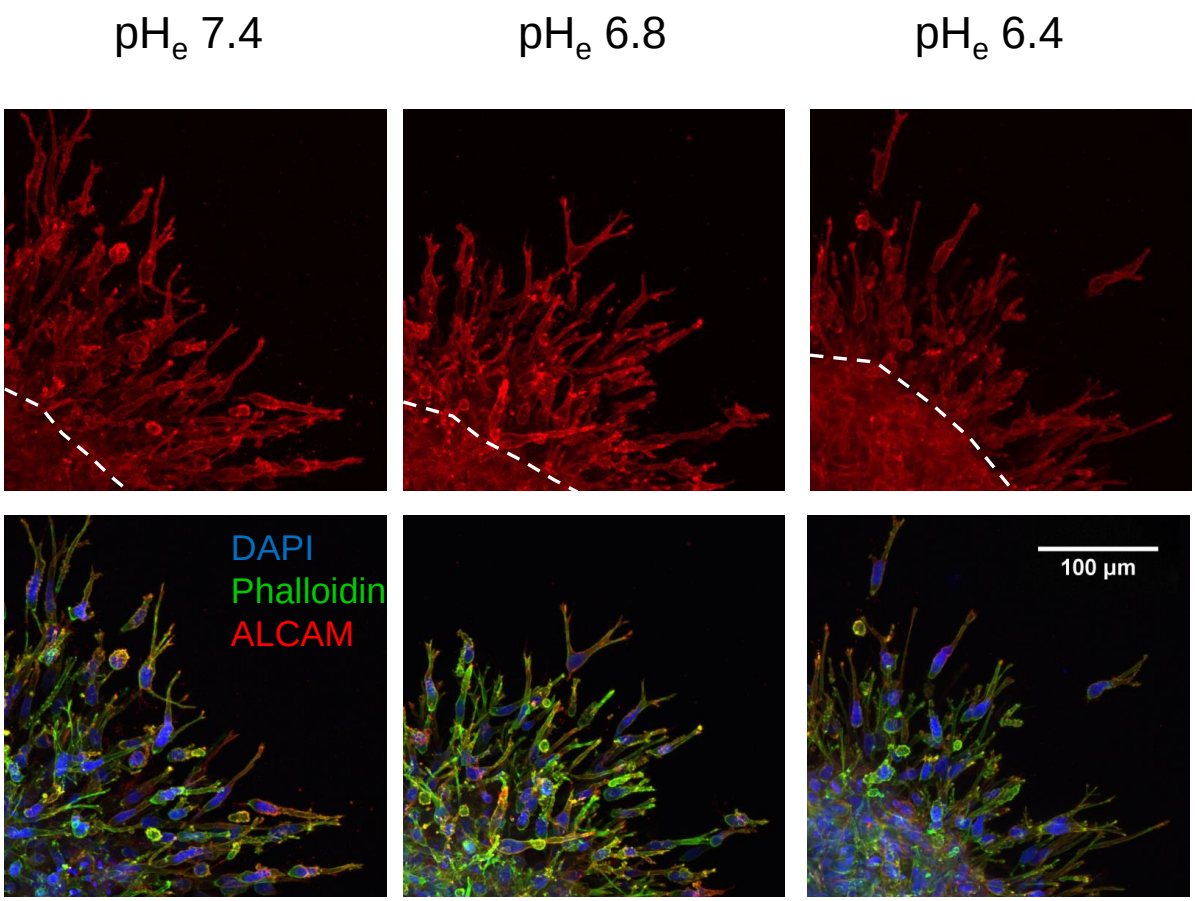
Figure S1



<u>Figure S1</u>: Close-ups of MV3 migration in 3D through a collagen I meshwork at varying pH$_e$. The dashed line indicates the interphase between spheroid core and invasion zone. Images were obtained with an Olympus FV1000 scanner confocal microscope equipped with a 40x/0.8NA water immersion objective.

Figure S2

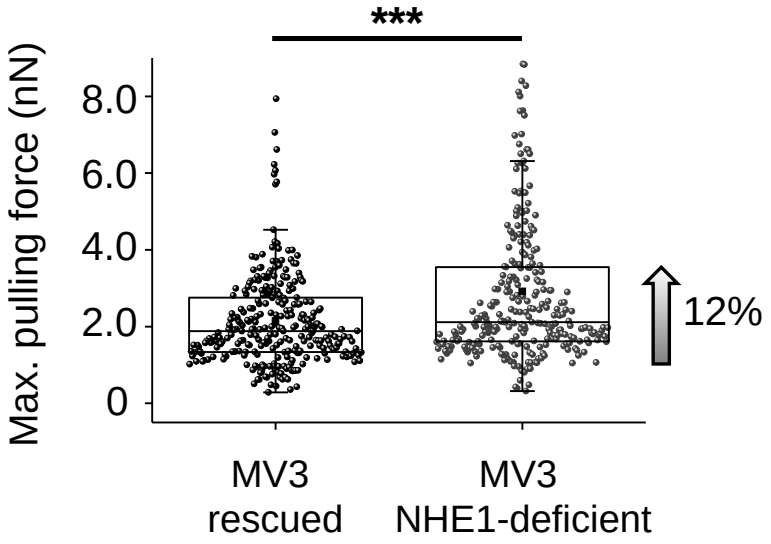


Figure S2: Single cell force spectroscopy using MV3 cells with different NHE1 expression levels. NHE1-deficient MV3 cells showed a significant 12% increase in the maximum pulling force compared to the respective control (NHE1-deficient: 2.11 nN (1.61/3.55 nN, N = 3, n = 286); rescued: 1.88 nN (1.34/2.76 nN, N = 3, n = 299)).

Figure S3

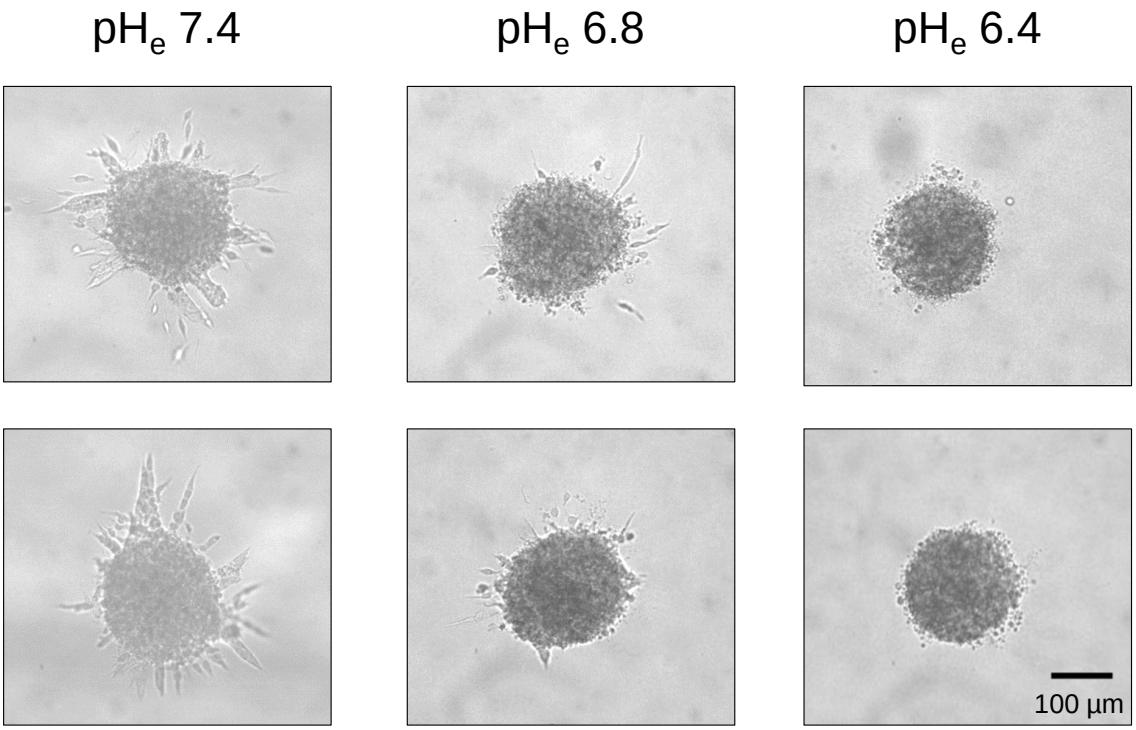


Figure S3: 3D migration of breast cancer cells (4T1; 1.000 cells / spheroid for 24h) through a collagen I (4 mg/ml) meshwork. Increasing the extracellular proton concentration reduces the formation of solid strands and leads to single cell migration.