Electronic Supplementary Material (ESI) for Soft Matter.

Collective stresses drive competition between monolayers of normal and Ras-transformed cells

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Electronic Supplementary Information

Supplementary Movie 1: A typical AMA between HEK-GFP wild type cells (green) and HEK Ras cells (magenta) showing the backward migration of the GFP population after meeting.The time reference $t = 0$ is set when the physical barrier is removed. Scale bar : $150\,\mu$m.

Supplementary Figures:

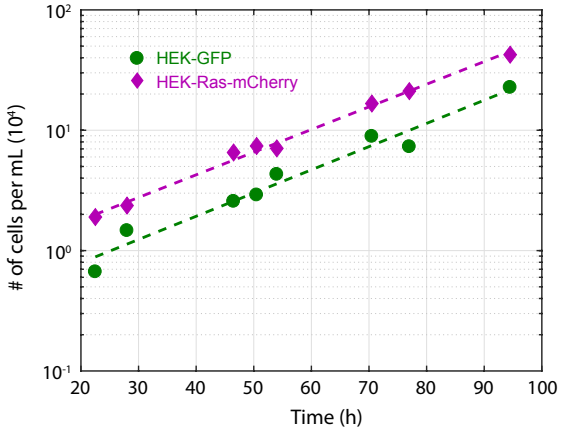

Fig. S1 Estimation of the population doubling time. Semi-logarithmic graph of the cell number *vs.* time, for the HEK-GFP (green circles) and HEK-Ras-mCherry (magenta diamonds) cell populations. Slopes of the dashed lines give an estimation of the population doubling time $\tau_d = 16$ h.

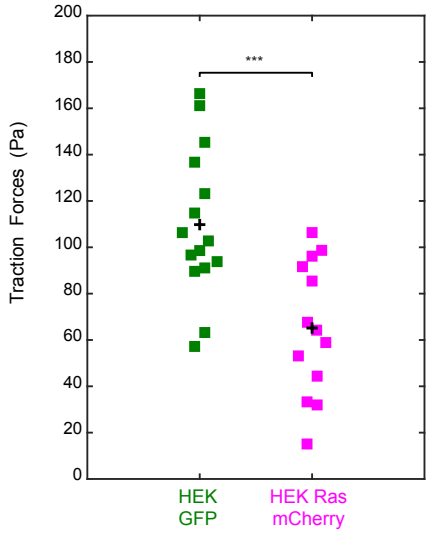

Fig. S2 Single cell traction forces. Average traction force amplitudes (Pa) of isolated adherent HEK cells. HEK wt cells (green) exert higher traction forces on the substrate than HEK Ras cells (magenta).

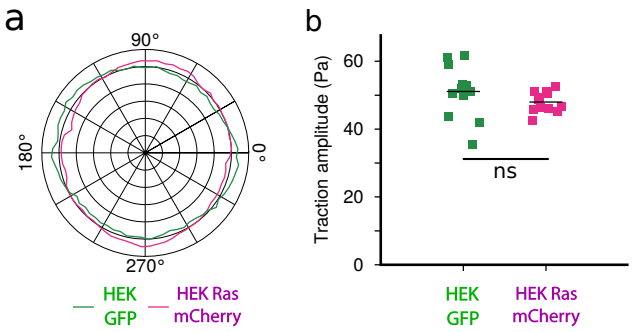

Fig. S3 Bulk collective cell traction forces. Traction force measurements of confluent monolayers between 1 h to 3.5 h after barrier removal. Only HEK wt cells (green) and HEK Ras cells (magenta) that are at least 700 μm away from the corresponding leading edges were considered. (a) Distribution of force orientation. (b) Average amplitude of traction forces. Values are substantially larger than in Fig. 5,b where average traction force *components* are plotted.

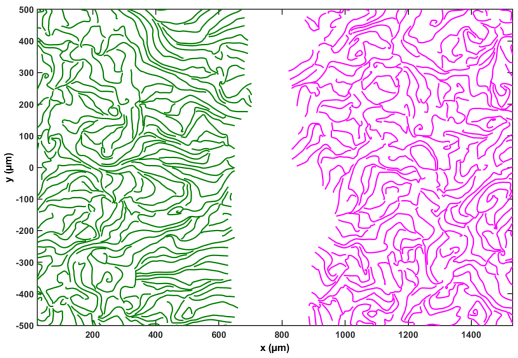

Fig. S4 Flow field of the AMAs before contact. Streamlines of the velocity fields for HEK wt cells (green) and HEK Ras cells (magenta) at $t = 6.6$ h of an AMA. Note that the streamlines for wild-type cells are more ordered at the front than for HEK Ras cells.

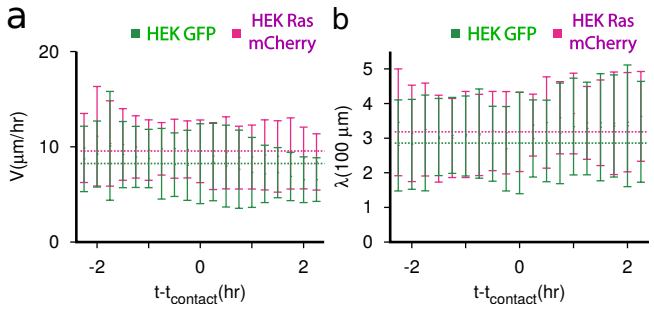

Fig. S5 Time dependence of the fitting parameters. The AMA velocity profiles at $t_{\mathrm{contact}} - 2\,\mathrm{h} < t < t_{\mathrm{contact}} + 2\,\mathrm{h}$ are fitted with the functions $V^{\mathrm{wt}} \exp((x-L)/\lambda^{\mathrm{wt}})$ and $-V^{\mathrm{Ras}} \exp(-(x-L)/\lambda^{\mathrm{Ras}})$, where L is the position of the front and (V, λ) are the fitting parameters (see Fig. 4). a. Front velocity V as a function of time. b. Exponential decay length λ as a function of time. Green corresponds to HEK wt cells and magenta to HEK Ras cells. Dashed lines correspond to the mean values at t_{contact}. Error bars denote standard deviations.

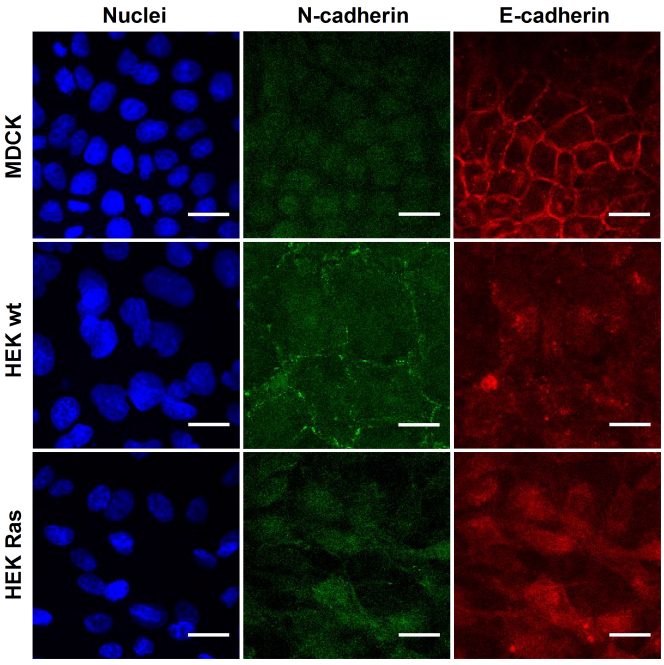

Fig. S6 Immunostaining for cell-cell junctions. MDCK, HEK wt and HEK Ras monolayers were fixed and stained with N-cadherin antibody (green) and E-cadherin antibody (red) and Dapi for nuclei (blue). E-cadherin is rather weak and localised through entire cells for both HEK cells. N-cadherin is also cytoplasmic for HEK ras cells while being localized at the cell-cell junctions for HEK normal cells. Scale bars = 20 μm.