

Biophysical Journal, Volume 112

Supplemental Information

Enhanced Directional Migration of Cancer Stem Cells in 3D Aligned Collagen Matrices

Arja Ray, Zachary M. Slama, Rachel K. Morford, Samantha A. Madden, and Paolo P. Provenzano

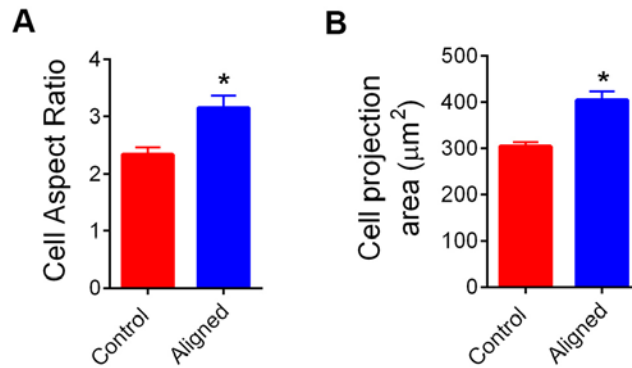


Fig. S1: Breast carcinoma cells are more elongated (A) and have greater spread area (B) in the XY plane in aligned vs. control matrices. Data are mean \pm SEM (* $p < 0.0001$, $n > 100$ cells/group).

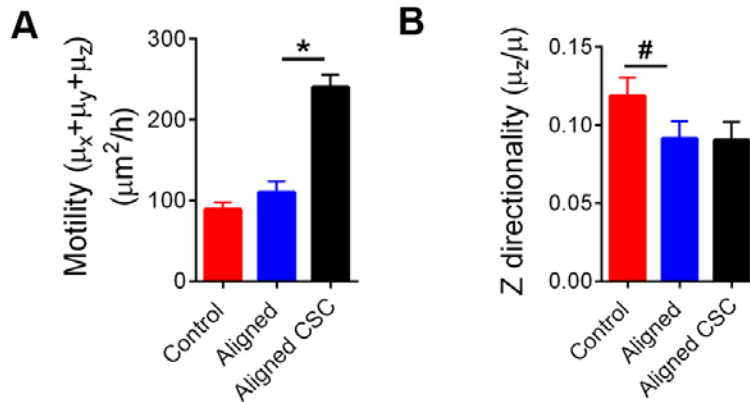


Fig. S2: Total cell motility (A) and Z-directionality (B) of MDA-MB-231 cells and their CSC subpopulations in control and aligned collagen matrices. Data are mean \pm SEM, (* $p < 0.0001$), (# $p < 0.05$), $n = 130-140$ cells/group.

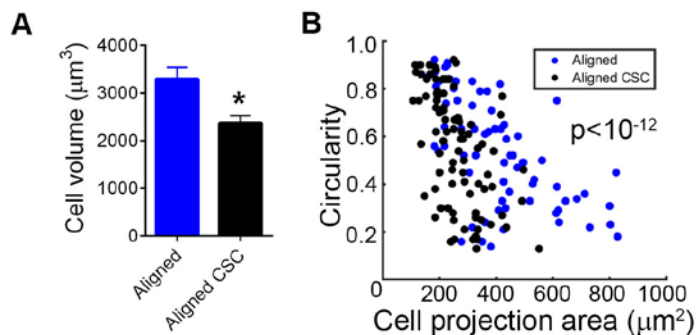


Fig. S3: (A) Cell sizes are significantly smaller for CSCs than the whole population. (B) Scatter plot showing the correlation between cell area and circularity of cell shape, p-value for the null hypothesis that no correlation exists between the groups is noted ($n > 70$ /group); Data in (A) are mean \pm SEM (* $p < 0.0001$, $n > 70$ cells/group).

Supplementary Movie Text:

Movie1: Simultaneous MPE and SHG imaging showing migration of breast carcinoma cells in control (left panel) and aligned (middle) collagen matrices and the same for the CSCs subpopulation in aligned matrices (right); cells are shown in green and collagen in gray; the top panels represent XY projection images of the z-stack at each time point, whereas the bottom panels represents the XZ projection. Scale bar=50 μ m.

Movie2: Time-lapse imaging of cell nuclei by MPE showing dynamic nuclear deformations as breast carcinoma cells migrate through an aligned collagen matrix. Scale bar=50 μ m.

Movie3: Time-lapse imaging of cell nuclei by MPE showing dynamic nuclear deformations as breast carcinoma CSCs migrate through an aligned collagen matrix. Scale bar=50 μ m.