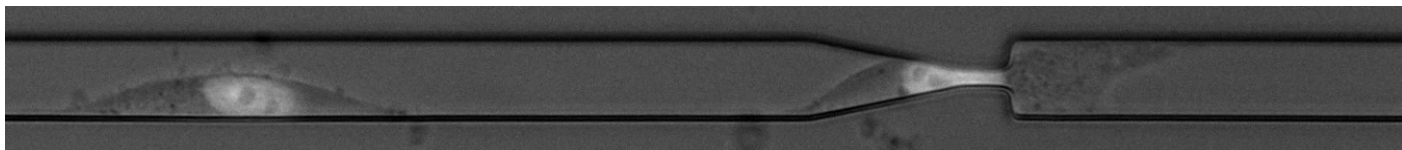


### Supplementary Information (SI):



**Fig. S1:** Two fixed MDA-MB-231 cells with nuclei counterstained with DAPI in the MUSIC device (fluorescence with brightfield illumination). The morphology and deformation of the cell nuclei in the larger channel and during invasion across the subnucleus barrier are demonstrated. The width of the larger channel is 15 $\mu$ m.

#### Video S1:

A sample experiment showing cell invasion in the MUSIC device. The video frame rate is 10000x real-time.

#### Video S2:

A taxol-treated cell fails to invade across the subnucleus barrier. The video frame rate is 10000x real-time.

#### Video S3:

As the cell invades across the subnucleus barrier, long extensions are protruded. The video frame rate is 10000x real-time.

#### Video S4:

A K20T cell divides asymmetrically at the subnucleus barrier interface. The daughter cells have unequal projected areas. The video frame rate is 10000x real-time.