

Video 1 Sub-confluent MDCK cells migrating on a 200 μm diameter fibronectin pattern. Time stamp shows hours: minutes.

Video 2 Confluent MDCK cells exhibiting synchronized rotation on a 200 μm diameter fibronectin pattern. Time stamp shows hours: minutes.

Video 3 Collective behavior persists in over-confluent MDCK cells on a 200 μm diameter fibronectin pattern. Time stamp shows hours: minutes.

Video 4 200 μm diameter micropatterns were repopulated with fresh cells after removing confluent cells. The coordinated rotational motion of epithelial cells was only promoted when cells reached a confluent state. Time stamp shows hours: minutes.

Video 5 MDCK cells migrating on a 100 μm fibronectin pattern exhibiting synchronized rotation after reaching confluence. Time stamp shows hours: minutes.

Video 6 MDCK cells migrating on a 500 μm diameter fibronectin pattern showing a localized 'vortex' ~ 300 μm in diameter. Time stamp shows hours: minutes.

Video 7 Numerical simulation of sub-confluent cell clusters confined to a disc. Cell clusters do show coordination, although the collective patterns are evolving over time due to the lack of interaction with static boundaries.

Video 8 Numerical simulation of cells migrating within a confined disc of size equal to the correlation length of the system.

Video 9 Numerical simulation of cells migrating within a confined disc of size larger than the correlation length of the system.

Video 10 Numerical simulation of cells migrating within a confined disc of size much larger than the correlation length of the system.

Video 11 Snail-1-MDCK cells on 200 μm diameter fibronectin pattern showing collective behavior. However, the rotation is not persistent and changes direction abruptly. Time stamp shows hours: minutes.

Video 12 Manual tracking of Snail-1-MDCK nuclei on 200 μm diameter fibronectin pattern showing how cells tend to move from the edge of the pattern to the center of the pattern and vice versa.

Video 13 Manual tracking of wt-MDCK nuclei on 200 μm diameter fibronectin pattern. Unlike Snail-1-MDCK cells, wt-MDCK have little tendency to move from the edge of the pattern to the center or vice versa. Time stamp shows hours: minutes.

Video 14 Numerical simulation of non-cohesive cells migrating within a confined disc. Ordered migration is observed only transiently similar to experimental observations in Snail-1-MDCK cells. Time stamp shows hours: minutes.

Video 15 MCF-10A cells (benign breast cancer cells) migrating on 200 μm fibronectin patterns. Cells closer to the edge of the pattern show a collective behavior but those in the centre migrate randomly. Time stamp shows hours: minutes.

Video 16 MCF-7 cells (invasive breast cancer cells) migrating on 200 μm fibronectin patterns showing little tendency for collective behavior. Time stamp shows hours: minutes.

Video 17 MDA-MB-231 cells (invasive breast cancer cells) migrating on 200 μm fibronectin patterns showing little tendency for collective behavior. Time stamp shows hours: minutes.