



Cell Migration and Gene Expression - studying single cells on artificial micro-pattern

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Artificial micro-patterns with defined geometries are being used to build platforms to study cell migration at the single cell level. We present time-lapse microscopy studies of cell migration on short stripes, ring-shaped micro-lanes, ring-shaped micro-lanes with a built-in artificial chemical barrier as well as dumbbell pattern. The cell motion is analyzed in one dimension using a two-state model and compared to Potts Model computer simulations. Small groups of cells in mesoscale circular micro-pattern bridge from single cell migration to collective cell dynamics showing spontaneous emergence of rotational migration. Secondly we use automated time-lapse microscopy in combination with micro-patterned surfaces to trap cells for efficient high-throughput monitoring of fluorescent reporter signals at the single-cell level. We show that measurement of individual gene expression time traces yields access to mRNA translation efficiency, mRNA lifetime and delivery delay times.

References

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