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ELECTRONIC SUPPLEMENTARY INFORMATION: OSCILLATIONS OF MIN-PROTEINS IN MICROPATTERNED ENVIRONMENTS: A THREE-DIMENSIONAL PARTICLE-BASED STOCHASTIC SIMULATION APPROACH

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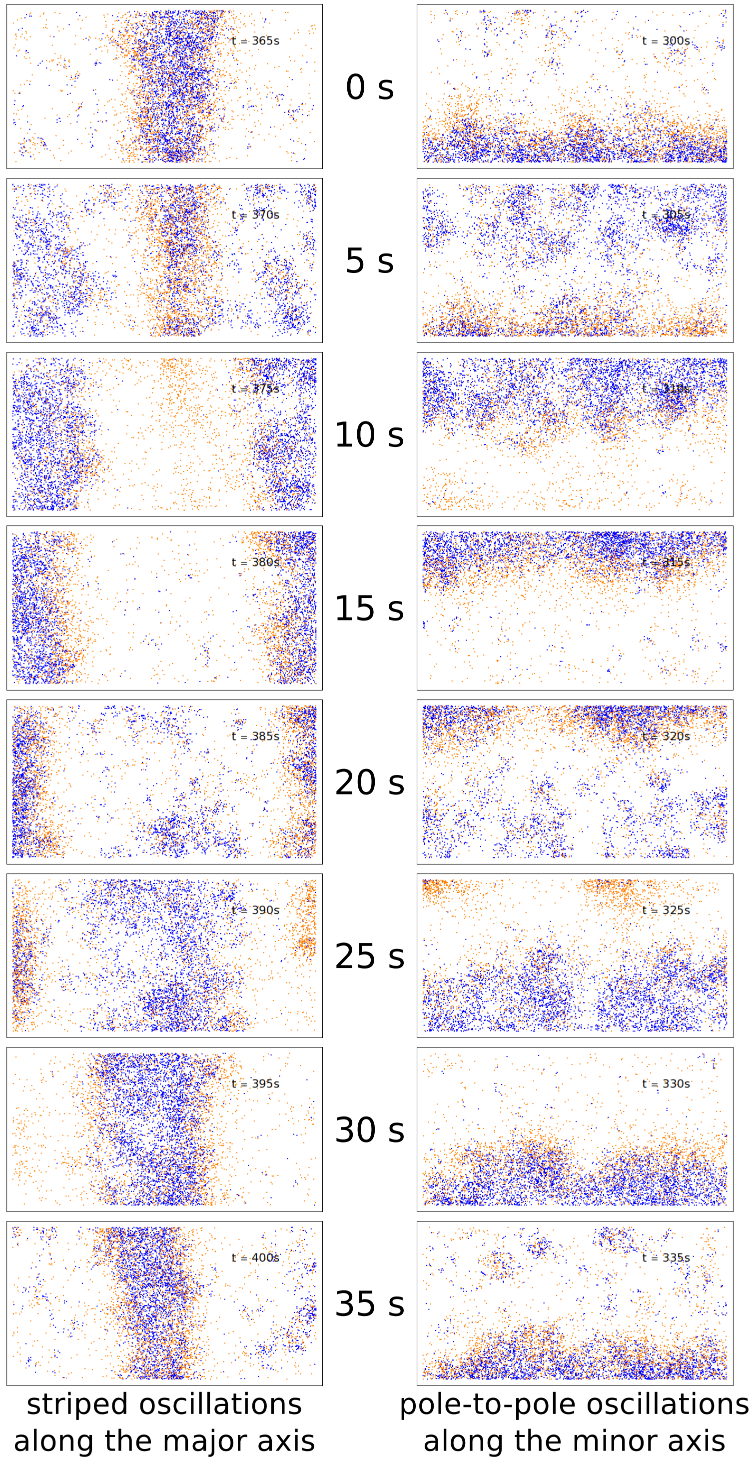

FIGURE S1. Snapshots of the simulations on the homogeneous surface for the sample from Figure 3A (left column) and the sample from Figure 3B (right column). The different patterns for striped oscillations along the major axis and pole-to-pole oscillations along the minor axis are clearly visible.

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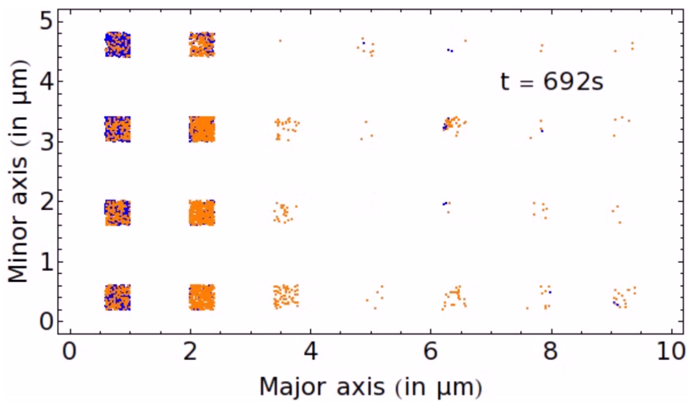

FIGURE S2. Screenshot of Movie S2, which shows the pole-to-pole oscillations along the major axis emerging on the grid pattern with patch size 0.4 μm and patch distance 1.0 μm. Membrane-bound MinD is marked in blue and membrane-bound MinDE complexes are marked in orange.

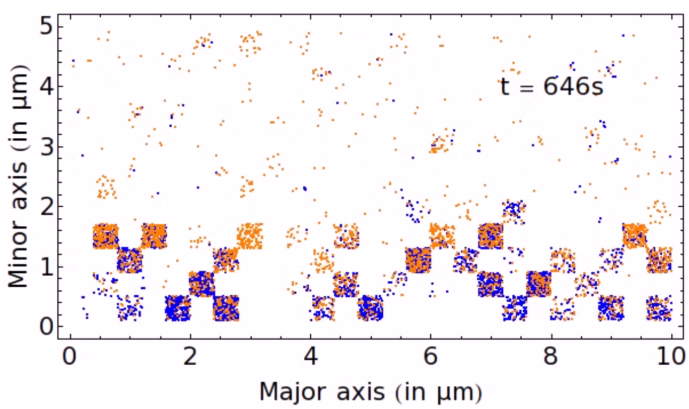

FIGURE S3. Screenshot of Movie S3, which shows the transition from striped oscillations along the major axis to pole-to-pole oscillations along the minor axis on the checkerboard pattern with patch size 0.4 μm and patch distance 0 μm. Membrane-bound MinD is marked in blue and membrane-bound MinDE complexes are marked in orange.

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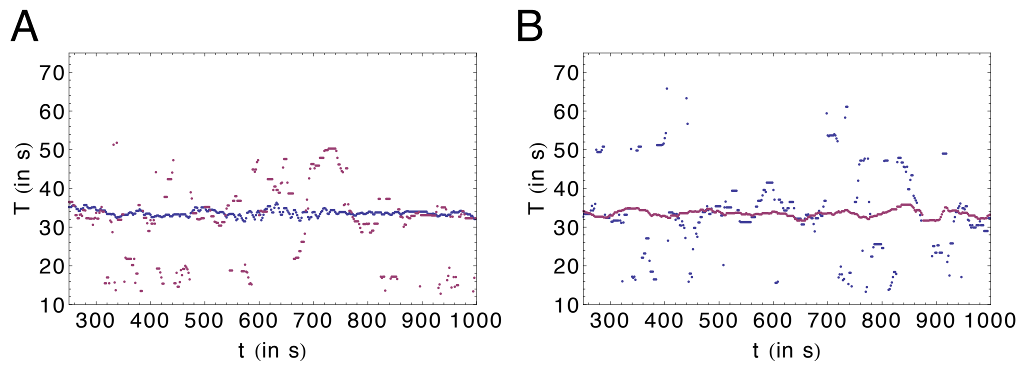

FIGURE S4. Instantaneous oscillation periods for the oscillations on the homogeneous substrate for the sample from Figure 3A (A) and the sample from Figure 3B (B). The values for oscillations along the major axis are marked in violet and those for the minor axis are marked in purple. Note that while the oscillation (period) along the major axis is stable in (A), it is the oscillation (period) along the minor axis which is stable in (B). The strong fluctuations of the instantaneous oscillation period along the non-oscillating axis make the definition of a mean oscillation period problematic in these cases.

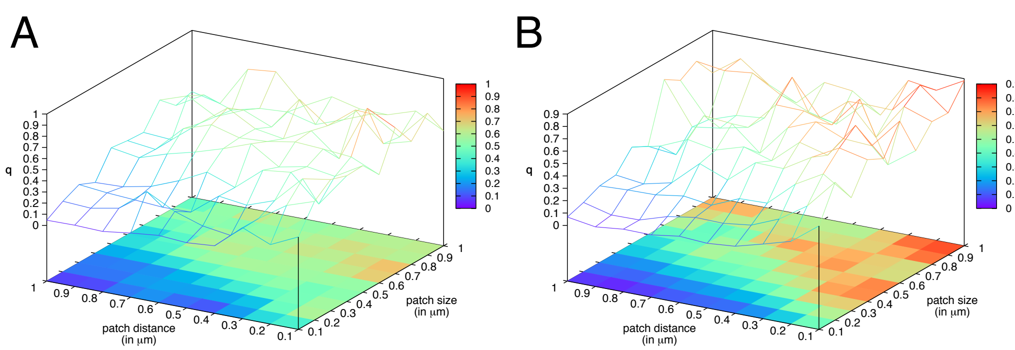

FIGURE S5. 3D and 2D plot of q for $\overline{T} = (33.6 \pm 3)$ s for oscillations along the major (A) and the minor axis (B) in dependence of patch size and patch distance for the grid pattern. Both plots are very similar both qualitatively and quantitatively, making averaging as in Figure 6 possible. It is also interesting to note that the plots for major axis and minor axis complement each other, a (small) maximum in the plot for one axis is often complemented with a minimum in the plot for the other axis. This highlights that are no oscillations occurring simultaneously along both axes, leading to higher q-values either along the major or the minor axis with the q-values for the respective other axis being lower.

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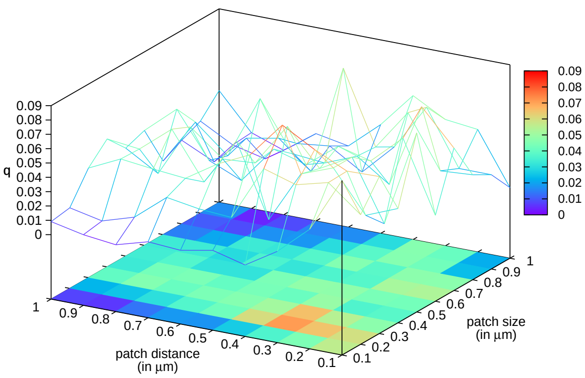

FIGURE S6. Same as in Figure 9 but for the minor axis. The maximum values are much smaller than for the major axis. No pattern is visible.

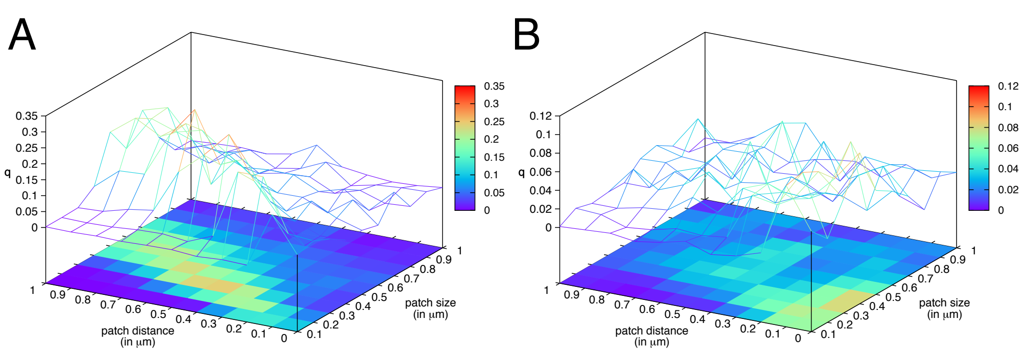

FIGURE S7. 3D and 2D plot of q for oscillations with an oscillation period of (46 ± 3) s along the major axis (A) and minor axis (B) in dependence of patch size and patch distance for the checkerboard pattern. Comparable to the grid pattern a clear ridge rises for oscillations along the major axis, although the maximum values are a little smaller than for the grid pattern and the ridge runs more diagonal. Again, there is no marked pattern visible for the minor axis with the maximum values being much smaller.

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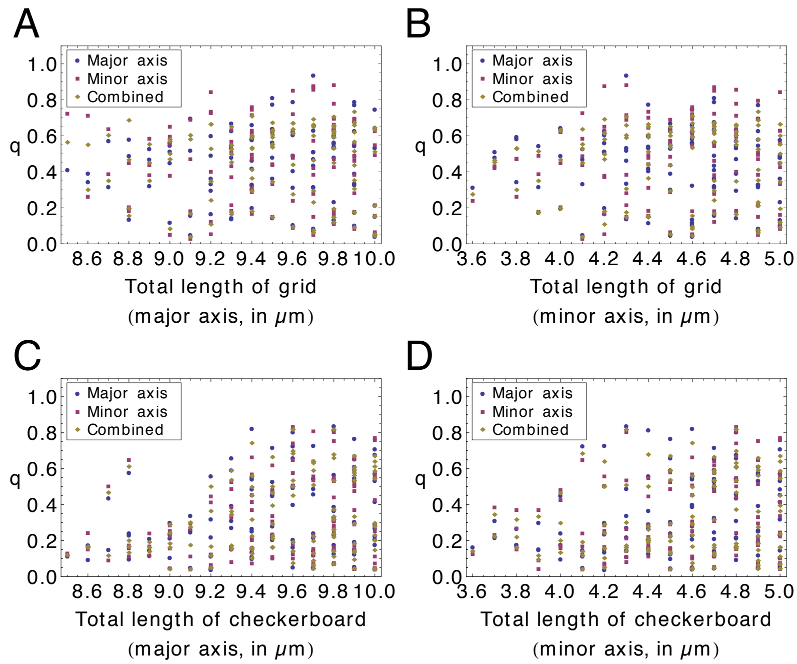

FIGURE S8. Dependence of q for $\overline{T} = (33.6 \pm 3)$ s on the total pattern length of the grid pattern (A - major axis , B - minor axis) and the checkerboard pattern (C - major axis, D - minor axis). For the grid pattern there is no correlation visible. For the checkerboard pattern short pattern lengths seem to be correlated with small q values, however this correlation vanishes for larger pattern lengths.

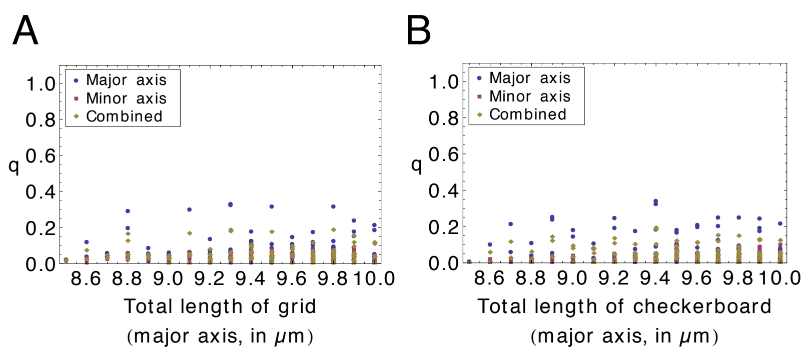

FIGURE S9. Same as above but for q for $\overline{T} = (46 \pm 3)$ s indicating pole-to-pole oscillations along the major axis. Both, for the grid pattern (A) and the checkerboard pattern (B), the samples with increased q values are not clustered at a specific pattern length, indicating that the pattern length is not responsible for the switch to pole-to-pole oscillations.

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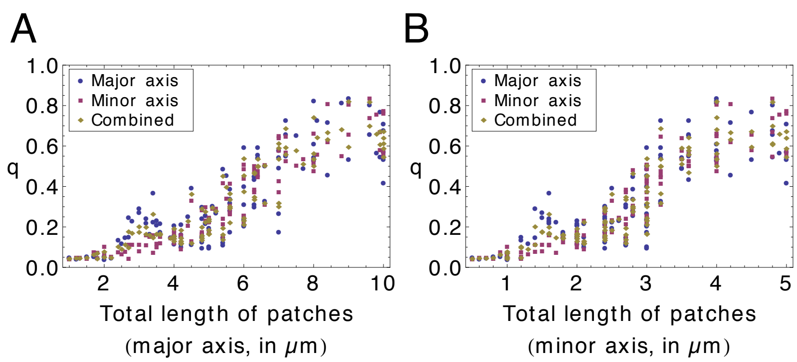

FIGURE S10. Dependence of q for $\overline{T} = (33.6 \pm 3)$ s on the total length of the patches for the checkerboard pattern along the major axis (A) and the minor axis (B). Note that both plots level out, however at larger lengths than in the grid pattern.

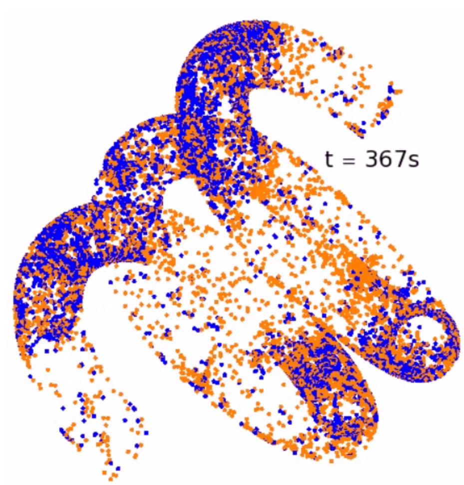

FIGURE S11. Screenshot of Movie S11, which shows the oscillations emerging in the helix-shaped cell. Membrane-bound MinD is marked in blue and membrane-bound MinDE complexes are marked in orange.