

### Supplementary Information

(Interplay of cell motility and self-secreted extracellular polymeric substance induced depletion effect on spatial patterning in a growing microbial colony)

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Table S1: **Parameters and constants used in our agent-based model**

Parameter	Symbol	Simulations
Maximum length	$l_{\max}$	5.0 $\mu\text{m}$
Diameter of cell	$d_o$	1.0 $\mu\text{m}$
Diameter of EPS particle	$d_{\text{eps}}$	0.5 $\mu\text{m}$
Linear growth rate	$\phi$	3.5 $\mu\text{m}/\text{h}$
Cell division rate	$k_{\text{div}}$	1 /h
EPS production rate	$k_{\text{eps}}$	1.0 /h
Elastic modulus (cell and EPS)	E	$(2 - 7) \times 10^5$ Pa
Friction coefficient (cell)	$\eta$	200 Pa · h
Friction coefficient (EPS)	$\eta_{\text{eps}}$	200 Pa · h
Nutrient concentration	$C_0$	3.0 fg · $\mu\text{m}^3$
Nutrient consumption rate	k	4.0 /h
Diffusion rate of nutrient	D	300 $\mu\text{m}^2/\text{h}$
Threshold area-density of cell	Cell [x, y]	5.0 $\mu\text{m}^2$
Threshold area-density of EPS	EPS[x, y]	0.3 $\mu\text{m}^2$
Motility force	$f_{\text{mot}}$	100, 300, 500, 700, 900, and 1100 Pa · $\mu\text{m}^2$

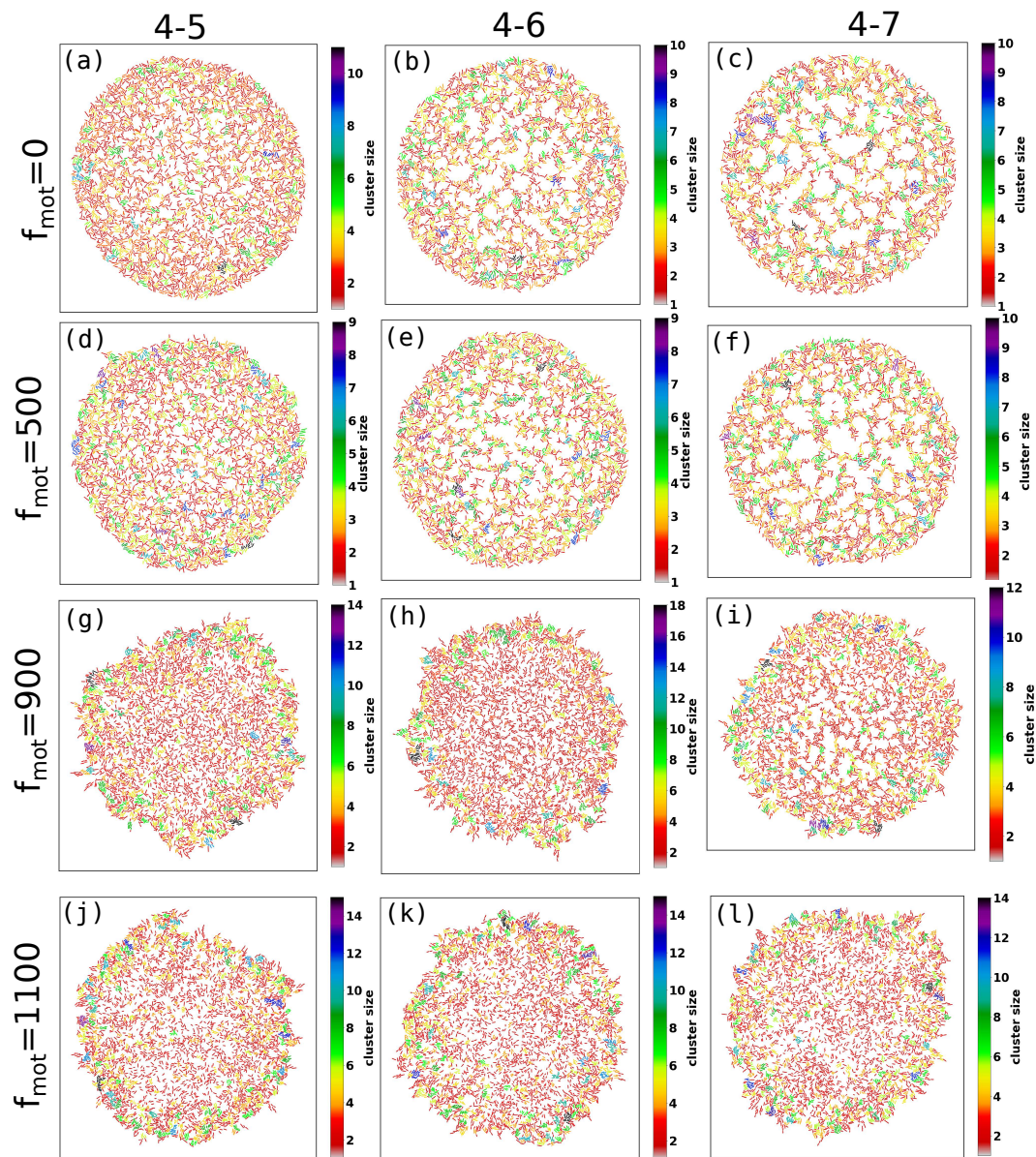


Figure S1: The cluster of bacterial cells for different values of motility forces and depletion effects. The clustering algorithm takes care of the distance cut-off as well as the angle cut-off. The various colored patches represent clusters of different sizes. The color bar corresponds to the size of the cluster.

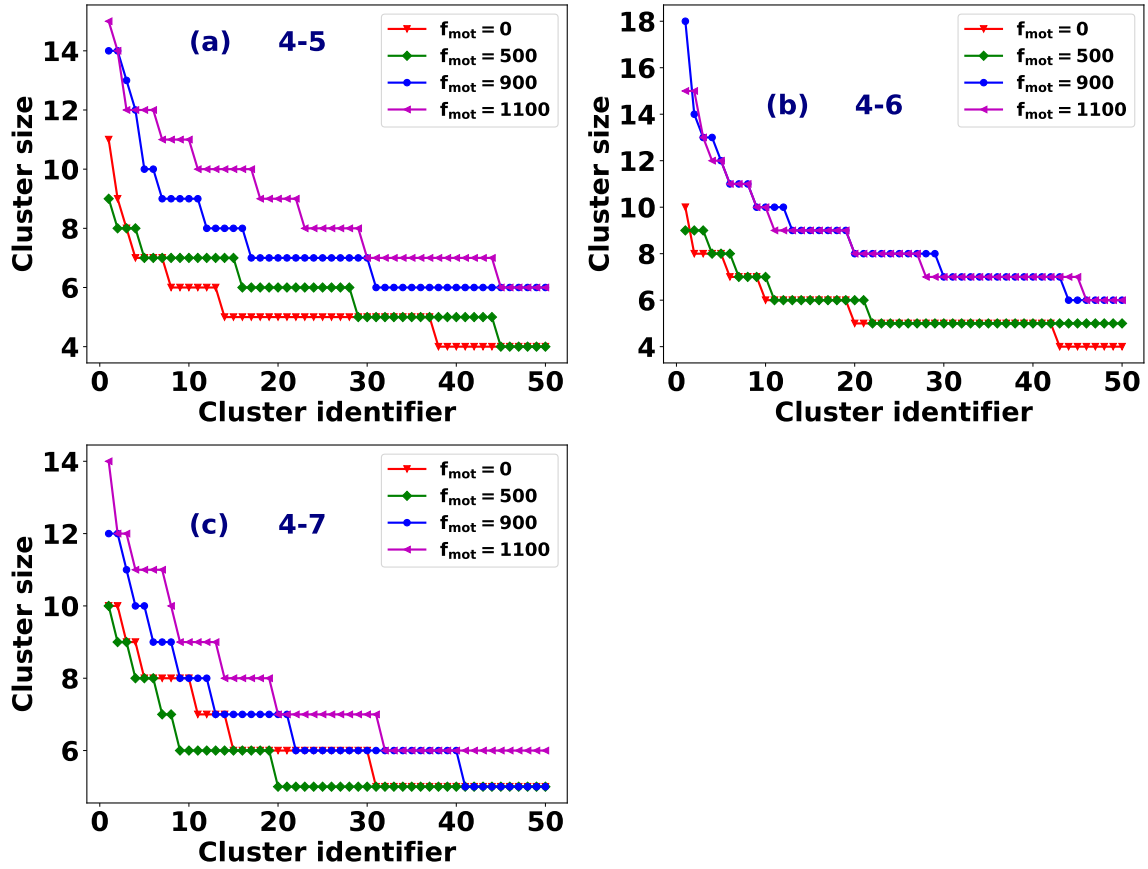


Figure S2: The plot of the first 50 cluster of the cells, in descending order in their cluster size, for different values of motility forces and depletion effects. The depletion values are reported in the legend of each figure.

## Movie

Movie-S1 illustrates the architectural dynamics of the growing colony under the influence of a motility force  $f_{mot} = 0.0 \text{ Pa}\cdot\mu\text{m}^2$  with high depletion effect (4-7).

Movie-S2 shows the architectural dynamics of the growing colony under the influence of a motility force  $f_{mot} = 900.0 \text{ Pa}\cdot\mu\text{m}^2$  with high depletion effect (4-7).

All other parameter values are the same as Table S1. Upon observing the movies, a discernible pattern emerges: over time, a series of association and dissociation events occur within the cluster of EPS.