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Spatial organization of cooperation.

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The structure of the environment spatially confines bacteria inside groups where they live and evolve with their siblings. This population structure may not only select for individual abilities but also for group properties that would eventually enhance the fitness of the colony. In poor media, we might think that maximizing the contact with the environment would maximize the fitness of individual cells. However, we will show that the microcolony of P. aeruginosa adapts its morphogenesis to maximize cell-cell contacts rather than cell-environment interactions when iron becomes scarce in the environment. In this case, reducing the surface of exchange with the environment allows to limit the loss of secreted molecules required to efficiently fetch extracelllular iron at very low concentration.