

# Design Rules for Soft Materials with Integrated Natural and Synthetic Building Blocks

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Bacteria communicate via molecular signals that they produce in high concentrations (**A** at right). Bacterial communication promotes the formation of biofilms that can be harmful to humans and costly to industry.

We have shown that collections of individual bacterial signaling molecules interact in water to form soft materials ("self-assemble") with spherical, layered, or cylindrical structures. Simulation images showing the formation of a spherical structure ("micelle") are shown in **B** with corresponding experimental images.

Understanding how natural molecules self-assemble will enable the design of artificial soft materials that mimic natural communication to, for example, detect the presence of bacteria or trigger the release of antimicrobial agents.

