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Geometric cue for protein localization in a bacterium SIGOLENE LECUYER, Harvard University, School of Engineering and Applied Sciences, KUMARAN RAMAMURTHI, Harvard University, Department of Molecular and Cellular Biology, HOWARD STONE, Harvard University, School of Engineering and Applied Sciences, RICHARD LOSICK, Harvard University, Department of Molecular and Cellular Biology — Proteins in bacteria deploy to particular places, but the cues for localization are frequently mysterious. We present evidence that the membrane protein SpoVM recognizes a geometric cue in *Bacillus subtilis*. In vivo experiments show that SpoVM localizes to a particular patch of the inner membrane in sporulating *Bacillus subtilis* bacteria, namely the convex surface of the developing spore. Our in vitro experiments support the hypothesis that this localization is driven by geometry rather than biochemical recognition. When purified SpoVM is incubated with polydisperse micrometer-sized DOPC vesicles, we observe that the protein preferentially adsorbs on smaller vesicles, of diameter similar to the size of the bacterial spore ($\sim$ 1 μm). Using fluorescent GFP-tagged SpoVM, we quantify the amount of adsorbed protein by confocal microscopy. Our results, when interpreted using existing protein adsorption models, suggest the existence of a cooperative adsorption mechanism for high enough membrane curvature, which involves the formation of small clusters of proteins. Membrane curvature could be a general cue for protein localization in bacteria.

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