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A propagating ATPase gradient drives transport of surface-confined cellular cargo ANTHONY VECCHIARELLI, KEIR NEUMAN, KIYOSHI MIZUUCHI, Natl Inst of Health - NIH — The process of DNA segregation is of central importance for all organisms. Although eukaryotic mitosis is relatively well established, the most common mechanism employed for bacterial DNA segregation has been unclear. ParA ATPases form dynamic patterns on the bacterial nucleoid, to spatially organize plasmids, chromosomes and other large cellular cargo, but the force generating mechanism has been a source of controversy and debate. A dominant view proposes that ParA-mediated transport and cargo positioning occurs via a filament-based mechanism that resembles eukaryotic mitosis. Here we present direct evidence against such models. Our cell-free reconstitution supports a non-filament-based mode of transport that may be as widely found in nature as actin filaments and microtubules.

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