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**Growth mechanics of bacterial cell wall and morphology of bacteria** HONGYUAN JIANG, SEAN SUN, Johns Hopkins University, BIOPHYSICS GROUP TEAM — The peptidoglycan cell wall of bacteria is responsible for maintaining the cell shape and integrity. During the bacterial life cycle, the growth of the cell wall is affected by mechanical stress and osmotic pressure internal to the cell. We develop a theory to describe cell shape changes under the influence of mechanical forces. We find that the theory predicts a steady state size and shape for bacterial cells ranging from cocci to spirillum. Moreover, the theory suggest a mechanism by which bacterial cytoskeletal proteins such as MreB and crescentin can maintain the shape of the cell. The theory can also explain the several recent experiments on growing bacteria in micro-environments.

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