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Super-resolution Imaging of the Bacterial Chemotaxis System in *Bacillus Subtilis* UTSAV AGRAWAL, HANNA WALUKIEWICZ, University of Illinois Urbana-Chamapign, CHRISTOPHER RAO, CHARLES SCHROEDER, Dept. of Chemical and Biomolecular Engineering, University of Illinois Urbana-Champaign — In this work, we use fluorescence nanoscopy to elucidate a near molecular scale view of proteins involved in bacterial motility. In bacteria, chemotaxis is mediated by receptor clusters that play a key role in response to stimulants, ultimately eliciting a behavioral response as cell motility. Here, we study the chemotaxis system in *B. subtilis* using stochastic optical reconstruction microscopy (STORM), which enables analysis of nanometer-scale cellular protein assemblies with ∼25 nm spatial resolution. We employ STORM to directly visualize dynamic changes in nano architectures of chemotactic receptors (McpB) in response to chemical stimulation. Our work has revealed marked differences in the subcellular localization of receptors upon chemical stimulation in individual cells. We observe that receptor rearrangement is characterized by a largely polar localization in unstimulated cells to a more polar-lateral configuration in cells that have been exposed to ligand. Our work provides crucial information on changes in structure and composition of the polar and lateral receptor clusters in *B. subtilis* during chemotaxis towards asparagine by quantifying individual molecules, which were previously inaccessible with conventional fluorescence microscopy.

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