
Bacterial chemotaxis allows bacteria to swim to a nutrient-rich environment using nanoarrays, that consist of receptors in complex with two other proteins, CheA and CheW. Studies of this system enhance our understanding of sensing and signaling in biology. We have developed new tools that enable us to monitor changes in receptor structure and dynamics in these nanoarrays. Our results indicate that there are changes in the regions of the receptor that are involved in the adaptation to stimulus (colored in orange, with methylation sites of adaptation in magenta) and in the regions that interact with other proteins (colored in red) in the complex (Figure 1c). These results will be useful in understanding how the receptor changes to control the activity of CheA in these nanoarrays.

Figure 1: Receptors arrays and changes with signaling state: (a) Electron cryotomography of bacterial cells. (b) & (c) two representations of a model of the array developed by Crane, Jensen, and coworkers by fitting crystal structures into the tomograms, showing receptor cytoplasmic domains (gray) and two interacting proteins, CheA and CheW. Orange and red highlight the two regions of the receptor that change their structure or dynamics with signaling state, as shown by hydrogen exchange mass spectrometry of functional arrays.