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Dissecting the dissociation process of RecA monomer from a nucleoprotein filament DOSEOK KIM, Department of Physics, Sogang University, SUNG HYUN KIM, Interdisciplinary Program of Integrated Biotechnology, Sogang University, CHIRLMIN JOO, School of Biology, Seoul National University, JEE-HAE PARK, KAUSHIK RAGUNATHAN, Center for Biophysics and Computational Biology, University of Illinois, TAEKJIP HA, Department of Physics, University of Illinois — RecA protein is a DNA-dependent ATPase and plays a key role in DNA repair mechanisms. RecA proteins form a helical filament on a single-strand DNA mediating homologous recombination. Understanding the molecular mechanisms of RecA-DNA interaction is crucial for further investigation on its biochemical properties. Using a single-molecule fluorescence technique, we dissected the dissociation process with single-monomer resolution. We could resolve the existence of an intermediate state after ATP hydrolysis in the dissociation process. In the nucleotide cofactor free environment, RecA did not dissociate indicating that the bound ADP is required for the monomer dissociation. Based on our observation, we suggest a model for the RecA dissociation process coupled with ATP hydrolysis cycle.

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