No. 62

A general mechanism for SSB displacement from ssDNA upon SSB–protein interaction

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Homologous recombination (HR) is important for the maintenance of genomic integrity and survival of all organisms since it corrects serious DNA damage such as a double strand DNA (dsDNA) break (DSB) and single strand DNA (ssDNA) gap (SSG) by using homologous region of the genome as template for repair. The regions of ssDNA that result from DSB and SSG are immediately coated by the ssDNA bonding protein (SSB). During the process of HR, several proteins facilitate the displacement of SSB from ssDNA, allowing the RecA protein to form nucleoprotein filament on the ssDNA region. This phenomenon is conserved among all organisms, although the proteins participating in the process are structurally different. In RecF pathway, RecF, RecO and RecR facilitate the filament formation of RecA on SSB-coated ssDNA. Our previous study indicated that interaction of RecO with SSB causes replacement of SSB on ssDNA [Ref., Figure 1 (2)]. However, the interaction has not been characterized at the atomic level. In this study, to clarify the mechanism underlying SSB displacement from ssDNA upon RecO binding, we examined the interaction between *Thermus thermophilus* RecO and cognate SSB by NMR analysis. Taken together with the findings of previous studies, the detailed analysis of the SSB–RecO interaction provided a general model to explain displacement of SSB from ssDNA.

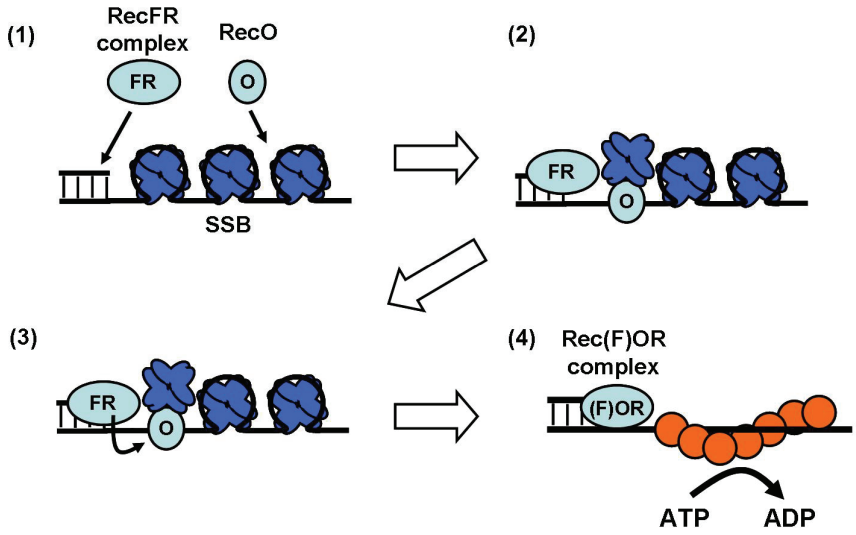

Figure 1. Model of RecF pathway

Reference

Inoue *et al*., (2008) *Nucleic Acids Res*. **36**:94-109