ABSTRACT 1

Identification of Rad52 complexes reveals a functional link between DNA repair and cytokinesis

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Rad52 plays important roles in repairing DNA double-strand breaks in cells. Using our quantitative dual-tagging proteomic method for detecting protein-protein interactions, we investigated the protein complexes associated with Rad52 in mammalian cells. Multiple known and unknown proteins functioning in DNA replication, cytokinesis, protein oxidation, etc were identified to complex with Rad52. Mammalian two-hybrid screening was then employed to further analyze the binary protein-protein interactions among the closely related proteins. The results demonstrate that eight proteins, including Rad52, Rad51, ß-actin, profilin I, heat shock protein 70, and three subunits of the DNA replication protein, form a complex protein-protein interaction network. Within the network, Rad52 and members of RPA interact with ß-actin, and Rad51 interacts with both ß-actin and profilin I. The physical interactions between important factors functioning in DNA repair and the essential factors functioning in cytokinesis suggest

that there may be coordination molecular mechanisms between DNA repair and cytokinesis.