S. cerevisiae contains four structurally related complexes known as Replication Factor Ccomplexes, which are involved in various aspects of DNA metabolism. These complexes are comprised of 4 small subunitsand a large subunit whose identity varies depending on the process. The alternate forms of the large subunit and their pathway roles include: Rfc1p during processive DNA synthesis, Ctf18p during sister chromatid cohesion, Elg1p for genomic stability, and Rad24p during DNA damage checkpoints. Rad24-RFC, which contains Rad24p, Rfc2p, Rfc3p, Rfc4p, and Rfc5p,is a checkpoint complex that functions to load the PCNA-like clamp Rad17p/Mec3p/Ddc1ponto DNA. Checkpoints are regulatory signal transduction cascades that are triggered by incompletely replicated or damaged chromsomes that lead to cell cycle arrest and DNA repair. The Rad24-RFC complex is involved in both mitotic checkpoints for repair of double-strand breaksand meiotic checkpoints that monitor meiotic recombination. The RAD24 pathway is one of two DNA damage checkpoint pathways, the other involving the RAD9 epistasis group, that converge on Rad53p phosphorylation. The ATP-binding activity of Rad24p is necessary for the ATPase and clamp loading activities of the RFC complex. Rad24-RFC interaction with DNA during clamp loading is mediated through interactions with Replication protein A. Rad24p is phosphorylated by the checkpoint kinase Mec1p. Rad24p is also involved in processing double-strand break ends and recombination partner choice, efficient inducible nucleotide excision repair and non-homologous end joining, and telomere maintenance through stimulation of Ty1 transposition. Cells lacking Rad24p function are impaired at the various DNA damage checkpoints (