PublisherInfo		
PublisherName	:	BioMed Central
PublisherLocation	:	London
PublisherImprintName	:	BioMed Central

End-joining in yeast

ArticleInfo		
ArticleID	:	4271
ArticleDOI	:	10.1186/gb-spotlight-20011206-01
ArticleCitationID	:	spotlight-20011206-01
ArticleSequenceNumber	:	342
ArticleCategory	:	Research news
ArticleFirstPage	:	1
ArticleLastPage	:	2
ArticleHistory	:	RegistrationDate : 2001–12–06 OnlineDate : 2001–12–06
ArticleCopyright	:	BioMed Central Ltd2001
ArticleGrants	:	
ArticleContext	:	130592211

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The DNA-repair mechanism referred to as non-homologous end-joining (NHEJ) involves the Ku proteins (Ku70 and Ku80), DNA ligase IV and Lif1/XRCC4. Meiotic cells down-regulate NHEJ, to favour homologous recombination. In the December 6 Nature, Maria Valencia and colleagues describe a mechanism for the down-regulation of NHEJ in meiosis-competent *MAT* ***a*** */MATα* diploid *Saccharomyces cerevisiae* cells (*Nature* 2001, **414:**666-669). They found that *LIF1* (encoding ligase-interfacing factor 1) expression was decreased in the diploid strain, but *LIF1* overexpression only partially restored NHEJ. Microarray analysis of mating-type mutant strains led them to identify a novel gene, *NEJ1* (non-homologous end-joining defective). Deletion of *NEJ1* reduces NHEJ, and the gene is strongly mating-type-regulated. The promoter regions of both the *LIF1* and *NEJ1* genes contain binding sites for the Mat**a**1-Matα2 repressor. Valencia *et al.*suggest that NEJ1 affects the cellular localization of LIF1 during meoisis. It will be interesting to see whether similar regulation of NHEJ components occurs during meiosis in mammalian cells.

References

1. DNA breakage and repair.

2. *Nature*, [http://www.nature.com]