



Figure 3. Mating type switching in yeast. (A) Homothallic yeast strains are able to switch mating type after one division cycle. The switch occurs before DNA replication so that both mother and daughter cells assume the new mating type. (B) In a wild-type population of yeast, this allows rapid conjugation between daughter cells to form a diploid. (C) The position of the silent and expressed mating type loci on Chr III are shown here. The active *MAT* locus is able to switch through gene conversion roughly once per cell cycle because of cleavage by the HO endonuclease. The percentages indicated show the frequency with which the gene conversion event replaced the *MAT* locus with the opposite mating type information. The directionality of switching is guaranteed by the recombination enhancer on the left arm of Chr III. (D) Repression at the silent mating type loci *HMR* and *HML* is mediated by two silencer DNA elements that flank the silent genes. These silencers are termed E (for essential) and I (for important) (Brand et al. 1987) and provide binding sites for Rap1 (R), Abf1 (A), and origin recognition complex (O). Artificial silencers can be created using various combinations of the redundant binding sites, although their efficiency is less than that of the native silencers. *HML α* and *HMR α* are 12 kb and 23 kb, respectively, from the telomeres of Chr III. Telomeric heterochromatin domains at Chr III are silenced independently from the *HM* loci in a process that is initiated at the telomeres through binding sites for Rap1.