SMC4 is an essential gene that encodes a member of a ubiquitous family of chromosome-associated ATPases. SMC proteins are found in eukaryotes, prokaryotes, and archaea, and appear to play roles in chromosome dynamics. In eukaryotes, SMC proteins form two kinds of heterodimers, corresponding to Smc1p-Smc3p and Smc2p-Smc4p in yeast. The Smc2p-Smc4p heterodimer interacts with additional proteins, Brn1p, Ycg1p, and Loc7p, to form the yeast condensin complex. Originally identified in Xenopus egg extracts, the condensin complex is required for chromosome condensation. Condensin complexes have been identified in many eukaryotes, including Drosophila, human, and S. pombe.