Other news

A meiotic XPF–ERCC1-like complex recognizes joint molecule recombination intermediates to promote crossover formation

Chromosome dynamics and recombination (CNRS/UPMC/Institut Curie) team studies the process of recombination, that ensures genome stability and faithful chromosome segregation, during the production of haploid gametes at meiosis. Their last work has been published in the prestigious *Genes & Development* journal.

A meiotic XPF–ERCC1-like complex recognizes joint molecule recombination intermediates to promote crossover formation
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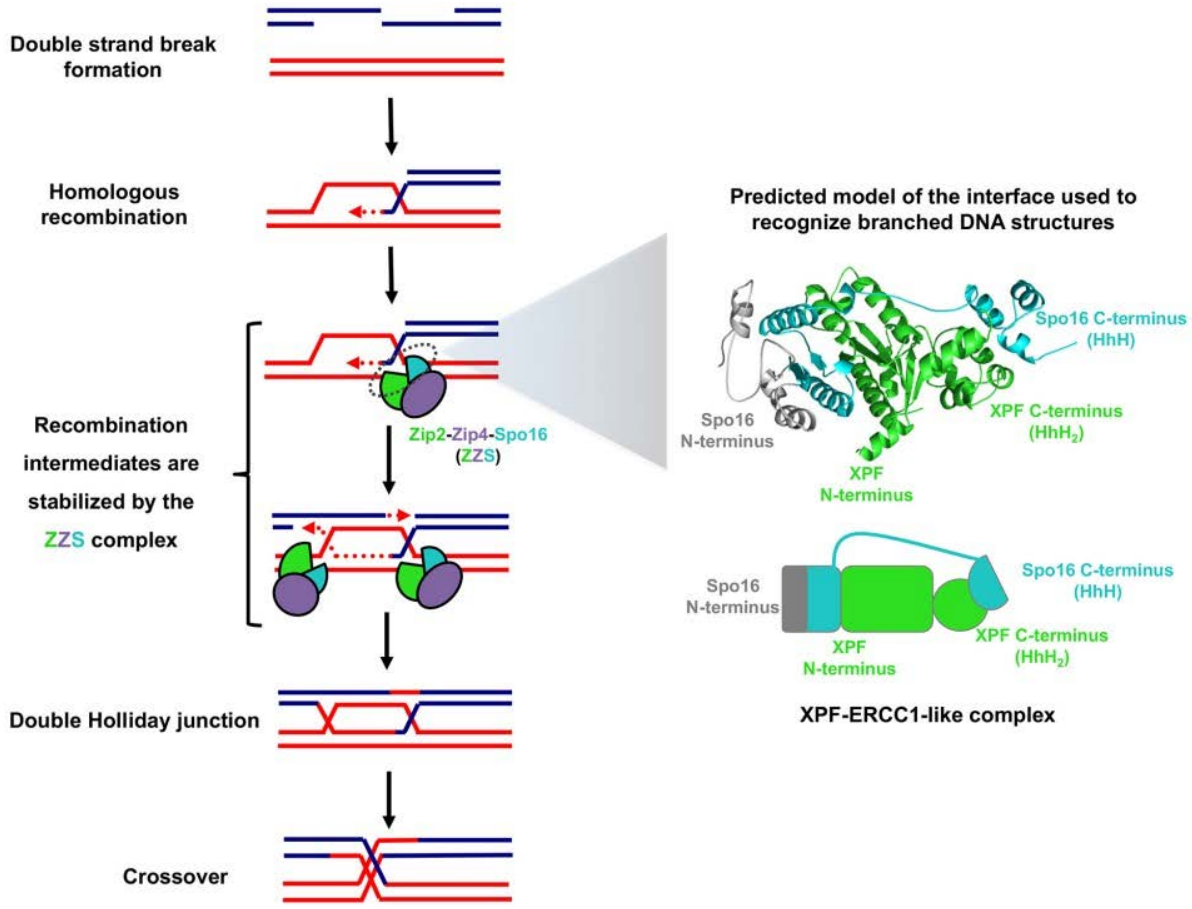

To repair DNA double-strand breaks and generate the crossovers, essential for homologous chromosomes segregation, meiotic cells use a specific complex, called ZZS, that contains a structural module recognizing and binding branched DNA structures. This stabilizes the recombination intermediates and ensures their resolution as a crossover.

Abstract

Meiotic crossover formation requires the stabilization of early recombination intermediates by a set of proteins and occurs within the environment of the chromosome axis, a structure important for the regulation of meiotic recombination events. The molecular mechanisms underlying and connecting crossover recombination and axis localization are elusive. Here, we identified the ZZS (Zip2–Zip4–Spo16) complex, required for crossover formation, which carries two distinct activities: one provided by Zip4, which acts as hub through physical interactions with components of the chromosome axis and the crossover machinery, and the other carried by Zip2 and Spo16, which preferentially bind branched DNA molecules in vitro. We found that Zip2 and Spo16 share structural similarities to the structure-specific XPF–ERCC1 nuclease, although it lacks endonuclease activity. The XPF domain of Zip2 is required for crossover formation, suggesting that, together with Spo16, it has a noncatalytic DNA recognition function. Our results suggest that the ZZS complex shepherds recombination intermediates toward crossovers as a dynamic structural module that connects recombination events to the chromosome axis. The identification of the ZZS complex improves our understanding of the various activities required for crossover implementation and is likely applicable to other organisms, including mammals.