

Molecular mechanism of homologous recombination in meiosis: Origin and biological significance

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Abstract

Sexual reproduction prevails among eukaryotic organisms. The problem of advantage of sexual reproduction over asexual reproduction remains a subject of not stopping discussions. According to one of the hypotheses, sexual reproduction and homologous recombination which accompanies gamete formation during meiosis has arisen to increase genetic variability and, as consequence, a fitness of organisms. Many researches show that homologous recombination play an important role in reparation of DNA in various groups of organisms irrespective of the way of their reproduction. Involvement of recombination in meiosis, however, is impossible to explain only by DNA repair functions. The hypothesis, that a recombination in the course of sexual process is a source of variability, also is not capable to explain existence of this process well. There is convincing evidence that the homologous recombination in meiosis is necessary for formation of bivalents. A physical connection between homologous chromosomes that is formed by recombination is required for correct chromosome segregation during meiotic division and formation of gametes of full value.
