

ORGANIZACJA, FUNKCJA I FILOGENEZA BAKTERYJNEGO SYSTEMU NAPRAWY BŁĘDNIIE SPAROWANYCH ZASAD W DNA

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1. Wprowadzenie. 2. Ogólna organizacja i funkcja systemu MMR. 3. Charakterystyka genów i białek naprawczych układu MMR. 4. Udział systemu MMR w innych, molekularnych procesach komórkowych. 5. System MMR w świetle osiągnięć genomiki bakterii

Organization, function and phylogeny of the DNA mismatch repair system in bacteria

Abstract: The postreplication mismatch repair system (MMR) is evolutionarily conserved and stabilizes the cellular genome by correcting DNA replication errors. The methyl-directed Mut HSL pathway is able to recognize and repair all base-base mismatches (except C/C) and small insertion/deletion mismatches that arise during DNA replication. The MMR enzymes protect the cell against mutations as well as interspecies recombination, whereas the SOS response increases both. There is the wide range of effects that MMR can exert; the VSP (Very Short Pathway) and TCR (Transcription-Coupled Nucleotide-Excision Repair) systems of *Escherichia coli* are strongly stimulated or supported by the MMR factors MutS and MutL but not by MutH. MMR factors are required for the repair of mismatches in heteroduplex DNA that form as a result of interspecies recombination between divergent DNA sequences. In addition, MutH, S, L proteins play an important role in rearrangement of chromosomal DNA subsequent to strand-slippage mutagenesis of tandemly repeated sequences, and can act to prevent interchromosomal exchanges between homologous DNAs. The multiple homologues of bacterial MutS and MutL exist in eukaryotes but play different roles in the MMR pathway or in recombination.

1. Introduction. 2. General organization and function of MMR system. 3. Characteristics of genes and repair proteins of MMR. 4. Contribution of MMR to the other molecular processes in the cell. 5. MMR system in the light of bacterial genomics achievements

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Wpłynęło w maju 2002 r.