DNMT1

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Abstract

DNA (cytosine-5-)-methyltransferase 1 has a role in the establishment and regulation of tissue-specific patterns of methylated cytosine residues. Aberrant methylation patterns are associated with certain human tumors and developmental abnormalities. Two transcript variants encoding different isoforms have been found for this gene

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DNA methyltransferases (Dnmts) are mainly divided into two families in mammalian: DNA methylation maintenance enzyme (Dnmt1) and DNA de novo methylation enzymes (Dnmt3a, Dnmt3b and Dnmt3L). Dnmt1's structure consists of two parts: N-terminal large domain contains a number of regulatory sites and C-terminal catalytic domain. Changes in the conformation of Dnmt1 are associated with changes in the active state, which affects the binding of the proximal amino acid to the catalytic domain and may also cause phosphorylation of Ser515.

Dnmt1s is a key enzyme that maintains methylation after replication. Methylation proceeds rapidly and tends to terminate this process along DNA and the CGCTC site. It may be the terminator of Dnmt1, and also the CTCF binding site of the repressor, which can prevent DNA methylation from spreading to DNA non-methylated regions via accumulating CTCF or an independent pathway.