



Figure 1. Mechanisms for Maintaining a Pattern of DNA Methylation and a Histone Modification during DNA Replication

(a) A mechanism for maintaining a pattern of DNA methylation during DNA replication. During replication, the individual DNA strands, with a specific methylation pattern at CpG or CpXpG residues, become paired with a strand of newly synthesized, unmethylated DNA. CpG on one strand has a corresponding CpG on the other. The maintenance DNA methyltransferase recognizes a hemimethylated site, and methylates the cytosine on the new strand, so that the pattern of methylation is undisturbed. (b) A general mechanism for maintaining a histone modification during replication. The modified histone tail (m) interacts with a protein binder (pb) that has a binding site specific for that modification. pb, in turn, has a specific site for the enzyme (e) which carries out that histone modification. e, in turn, can then modify an adjacent nucleosome. During replication, the newly deposited histones which are interspersed with parental histones can thus acquire the parental modification. A similar mechanism would allow propagation of histone modifications from a modified region into an unmodified one at any stage of the cell cycle.