

# Recombinant human mRNA cap methyltransferase binds capping enzyme/RNA polymerase II complexes

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Guanine N-7 methylation is an essential step in the formation of the m<sup>7</sup>GpppN cap structure that is characteristic of eukaryotic mRNA 5' ends. The terminal 7-methylguanosine is recognized by cap-binding proteins that facilitate key events in gene expression including mRNA processing, transport, and translation. Here we describe the cloning, primary structure, and properties of human RNA (guanine-7-)methyltransferase. Sequence alignment of the 476-amino acid human protein with the corresponding yeast ABD1 enzyme demonstrated the presence of several conserved motifs known to be required for methyltransferase activity. We also identified a *Drosophila* open reading frame that encodes a putative RNA (guanine-7-)methyltransferase and contains these motifs. Recombinant human methyltransferase transferred a methyl group from S-adenosylmethionine to GpppG 5'ends, which are formed on RNA polymerase II transcripts by the sequential action of RNA 5'-triphosphatase and guanylyltransferase activities