The HMGB1 Protein Binds to non-Bent DNA Sites in the oriGNAI3 Replication Origin Amplified AMPD2 Locus

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At present, it is not known yet, whether there is a consensus sequence in the initiation of DNA replication in mammalian cells. Therefore, the identification of many proteins involved in the replication processes, the analysis of the accessory DNA-binding proteins, involved in the origins identification and firing, remains as an open question to be analyzed. In this work, two straight DNA sites (non-bent DNA sites \(nb6a\) and \(nb8a\)), localized near oriGNAI3 hamster replication origin segment in AMPD2 locus, were evaluated by \textit{in silico} and electrophoretic mobility shift assay (EMSA) with HMGB1 protein. The \textit{in silico} analysis shows that there is a similarity, related to Gibbs free energy, between positive control (fragment of PUR-alpha-like protein from \textit{Schistosoma mansoni}) and the \(nb6a\) and \(nb8a\) sequences. The binding of HMGB1 protein to \(nb6a\) and \(nb8a\) sequences was confirmed by the EMSA assay. In conclusion, the HMGB1 protein could be implicated as an accessory protein in the initiation of DNA replication, at least, in hamster oriGNAI3 AMPD2 amplified domain. Perhaps, the complete analysis of its function could help us to unveil the complex machinery in the initiation of the DNA replication in mammalian cells.

Key Words: AMPD2 locus, EMSA, non-bent DNA sites, oriGNAI3 replication origin.
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