

## Computational epigenetic profiling of CpG islets in methylenetetrahydrofolate reductase

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Computational epigenetics is a new area of research focused on exploring how DNA methylation patterns affect transcription factor binding that affect gene expression patterns. The aim of this study was to produce a novel protocol for the detection of DNA methylation patterns using computational analysis which can be further confirmed by bisulfite PCR with serial pyrosequencing. The upstream regulatory element and pre-initiation complex relative to CpG islets within the methylenetetrahydrofolate reductase (MTHFR) gene were determined via computational analysis and online databases. The 1104 bp long CpG islets located near to or at the alternative promoter site of MTHFR gene was identified. The CpG plot indicated that CpGs A and B contained 62% and 75% GC content CpG ratios of 0.70 and 0.80-0.95, respectively. Further exploration of the CpGs A and B indicates that the transcription start sites was GGC which were absent from the TATA boxes. In addition, although six PROSITE motifs identified in CpG B, no motifs were detected in CpG A. A bunch of cis-regulatory elements was bound to different regions within the CpGs A and B. Transcription factors were found to bind to CpGs A and B with varying affinities depending on the DNA methylation status. In addition, transcription factor binding may influence the expression patterns of the MTHFR gene by recruiting chromatin condensation inducing factors. These results have significant implications for the understanding of the architecture of transcription factor binding at CpG islets as well as DNA methylation patterns that affect chromatin structure.

### Biography

Keat Wei Loo has gained her Ph.D. at the age of 24 years from Universiti Sains Malaysia. She won a prestigious award called the "Australia Endeavour Research Fellowship" and had the opportunity to be attached to Griffith University. She has published more than nine papers in reputed ISI-indexed journals and has been serving as a reviewer and an editorial board member of several journals.

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