CpG

Central pattern generator.

The CpG sites or CG sites are regions of DNA where a cytosine nucleotide is followed by a guanine nucleotide in the linear sequence of bases along its 5' → 3' direction. CpG is shorthand for 5'—C—phosphate—G—3' , that is, cytosine and guanine separated by only one phosphate; phosphate links any two nucleosides together in DNA. The CpG notation is used to distinguish this single-stranded linear sequence from the CG base-pairing of cytosine and guanine for double-stranded sequences. The CpG notation is therefore to be interpreted as the cytosine being 5 prime to the guanine base. CpG should not be confused with GpC, the latter meaning that a guanine is followed by a cytosine in the 5' → 3' direction of a single-stranded sequence.

Yin et al. identified a novel hypomethylation signature comprising of three CpGs at non-CpG island (CGI) open sea regions for glioblastomas (Glioblastomas). The hypomethylation signature consistently predicted poor prognosis of Glioblastomas in a series of discovery and validation datasets. It was demonstrated as an independent prognostic indicator, and showed interrelationships with known molecular marks such as MGMT promoter methylation status, and glioma CpG island methylator phenotype (G-CIMP) or IDH1 mutations. Bioinformatic analysis found that the hypomethylation signature was closely associated with the transcriptional status of an EGFR/Vascular endothelial growth factor A/ANXA1-centered gene network. The integrative molecular analysis finally revealed that the gene network defined two distinct clinically relevant molecular subtypes reminiscent of different immature neuroglial lineages in Glioblastomas. The novel hypomethylation signature and relevant gene network may provide new insights into prognostic classification, molecular characterization, and treatment development for Glioblastomas [1].

1)
Yin A, Etcheverry A, He Y, Aubry M, Barnholtz-Sloan J, Zhang L, Mao X, Chen W, Liu B, Zhang W, Mosser J, Zhang X. Integrative analysis of novel hypomethylation and gene expression signatures in glioblastomas. Oncotarget. 2017 Jul 11. doi: 10.18632/oncotarget.19171. [Epub ahead of print] PubMed PMID: 28732379.