Fighting the Enemy Within

Basic Life Science and Issues : Presentation

Group 4

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Chapter Abstraction

Fighting the Enemy Within

11th chapter of *The Epigenetics Revolution*

”Epigenetic perspective of Cancer and its treatment”

Introduction: Cancer

Healthy cells, have two types of genes:

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Epigenetic Approach for Oncogenesis

- DNA Methylation

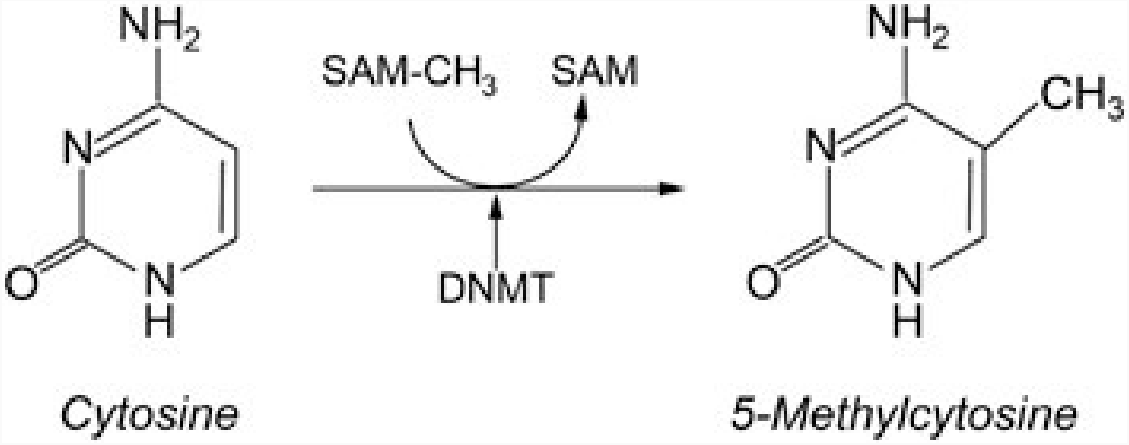
  Hypermethylation of CpG island

- Repressive Histone Modification

  Histone deacetylation

DNA Methylation

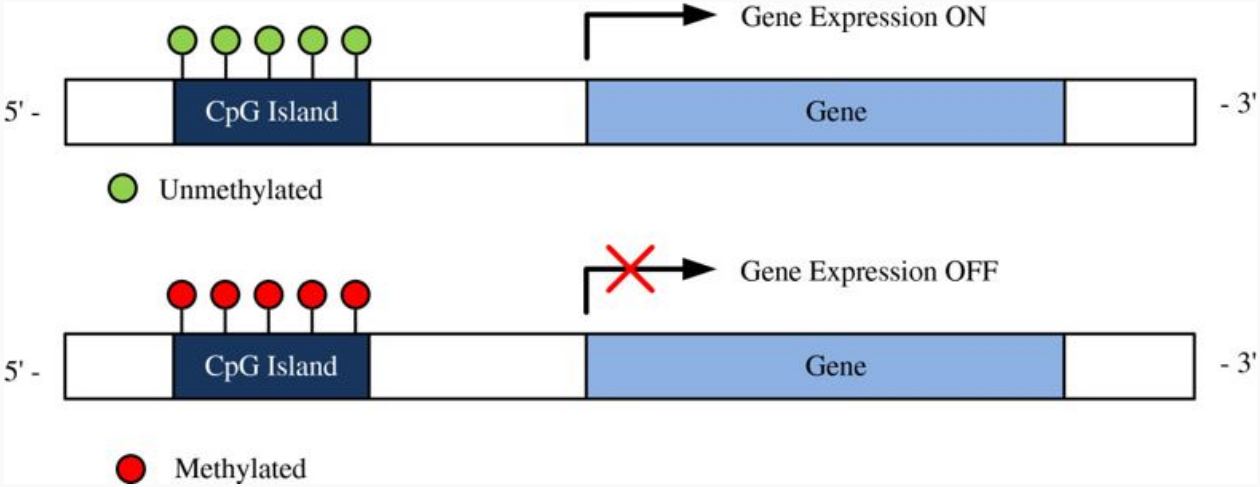
Cytosine before Guanine can be methylated



Methyl group is bond on 5’ carbon atom

DNA Methylation

CpG dinuclotide cluster (CpG island, CGI) are usually located in the promoter regions of genes in a DNA sequence.



Hypermethylated CGI disables specific gene expression.

Histone deacetylation

Characteristics of Oncogenesis

- Multi-step process
- Defections must be accumulated

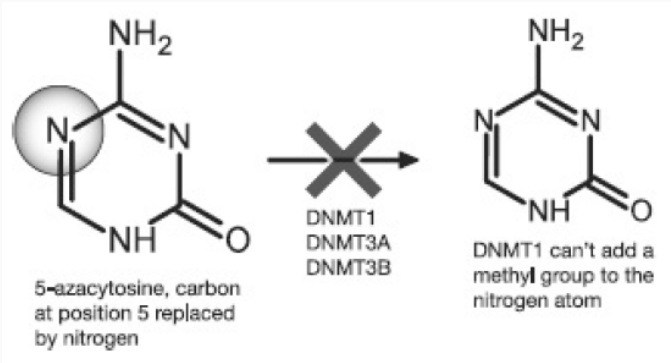
  Inherited oncogenes are slowly expressed
  e.g.) BRCA1 mutation

- Tumour suppressor gene alteration - Switched off
- Epigenetical access

Approach for Treatment

- DNMT enzyme inhibitors

  5-azacytidine, 2-aza-5'-deoxycytidine



methylation inhibited by 5-azacytidine

No easy wins

Alternative Approach

Conclusion

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[2] Kakumani, R.; et al. (2012). *Identification of CpG islands in DNA sequences using statistically optimal null filters*, EURASIP Journal on Bioinformatics and Systems Biology

[3] Kazantsev, Aleksey G; et al. (2008). *Therapeutic application of histone deacetylase inhibitors for central nervous system disorders*, Nature Reviews. Drug Discovery London Vol. 7 Iss. 10 854-68.

Q & A

Thank you!