

Fighting the Enemy Within

Basic Life Science and Issues : Presentation

Group 4

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Fighting the Enemy Within

11th chapter of *The Epigenetics Revolution*

"Epigenetic perspective of Cancer and its treatment"



Healthy cells, have two types of genes:

- proto-oncogenes for cell proliferation
- tumor suppressor genes for regulation



Introduction: Cancer

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However, cancer cells lost balance of these, For example,

- proto-oncogenes is over-activated
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Introduction: Cancer

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Epigenetic Approach for Oncogenesis

- DNA Methylation

Hypermethylation of CpG island

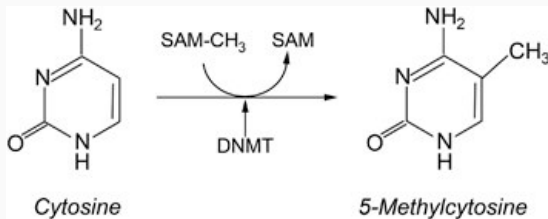
- Repressive Histone Modification

Histone deacetylation



DNA Methylation

Cytosine before Guanine can be methylated

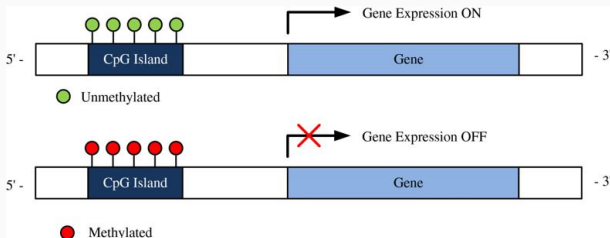


Methyl group is bond on 5' carbon atom



DNA Methylation

CpG dinucleotide 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



No easy wins



Alternative Approach



Conclusion



- [1] Carey, N. (2012). *The Epigenetics Revolution*. Columbia University Press
- [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!