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

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Epigenetic Approach for Oncogenesis

- DNA Methylation

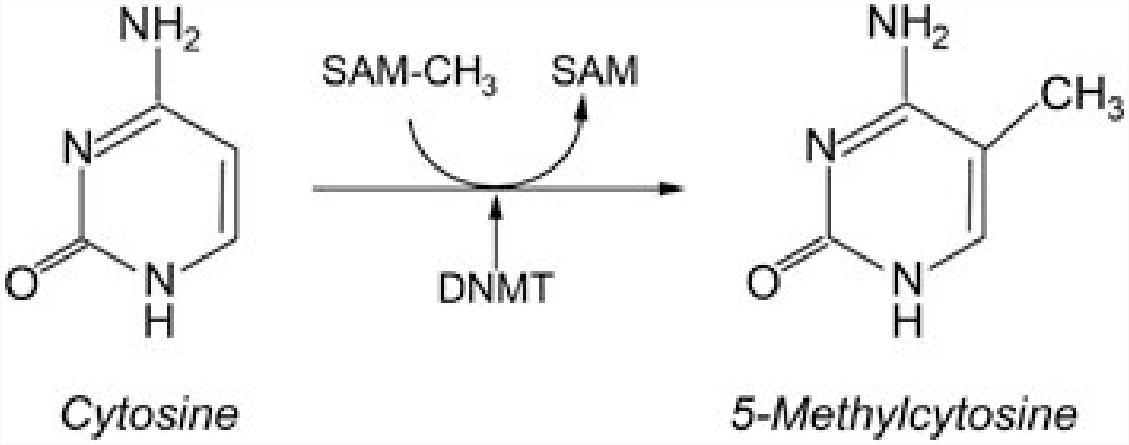
  Hypermethylation of CpG island

- Repressive Histone Modification

  Histone deacetylation

DNA Methylation

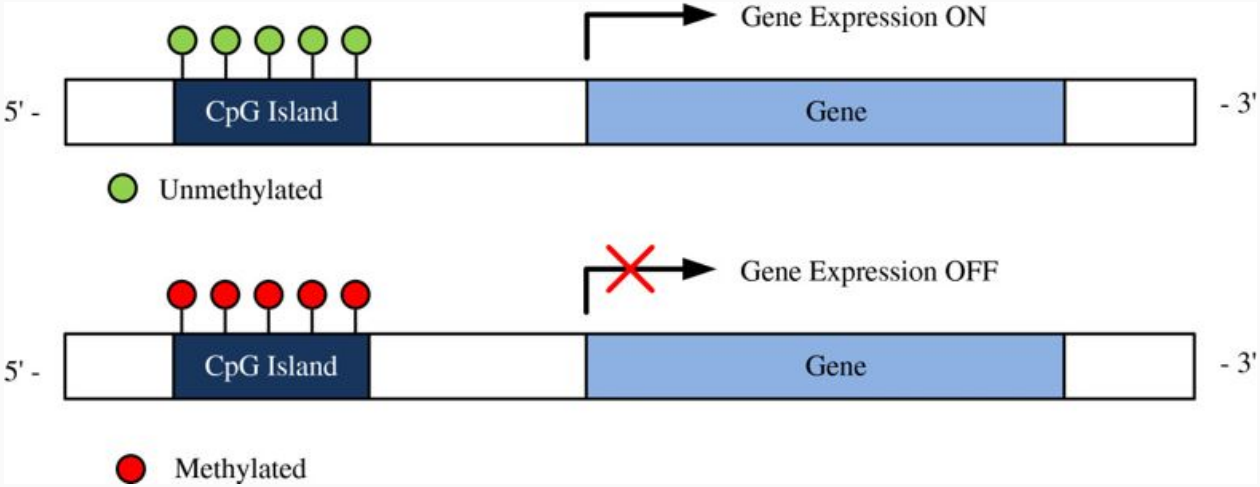
Cytosine before Guanine can be methylated



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

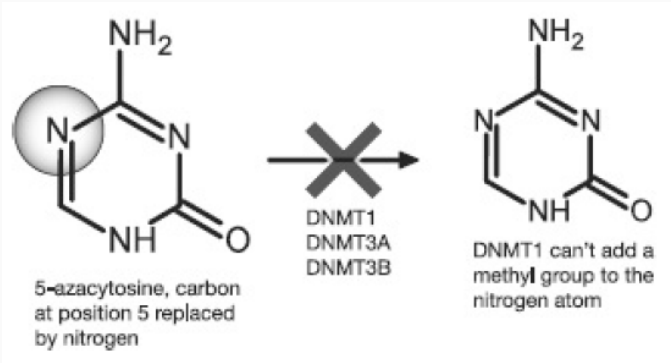
  Inherited oncogenes are slowly expressed
  e.g.) BRCA1 mutation

- Tumour suppressor gene - Switched off
- Alteration with epigenetic access

Approach for Treatment

- DNMT enzyme inhibitors

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



methylation inhibited by 5-azacytidine

Approach for Treatment

- HDAC inhibitor

  SAHA, Romidepsin

No easy wins

- Oncogenesis has numorous mechanisms

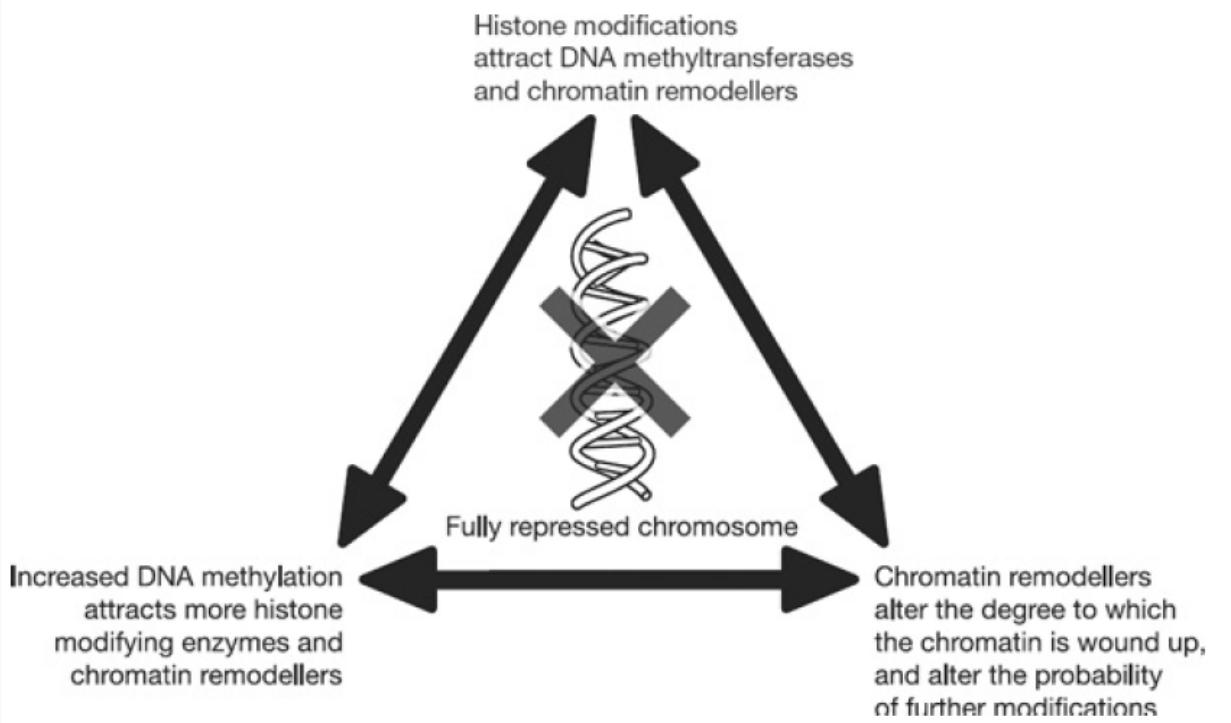
  Case by case, person by person

- The solutions are preferrable for haematological cancer
- Also these solutions should be used in different fields

  DMNT inhibitors for bone marrow, HDAC inhibitors for T-cell lymphoma

Alternative Approach

There are many enzymes that involved in histone alteration



And these interact each other, forms vicious cycle.

Conclusion

References

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[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!