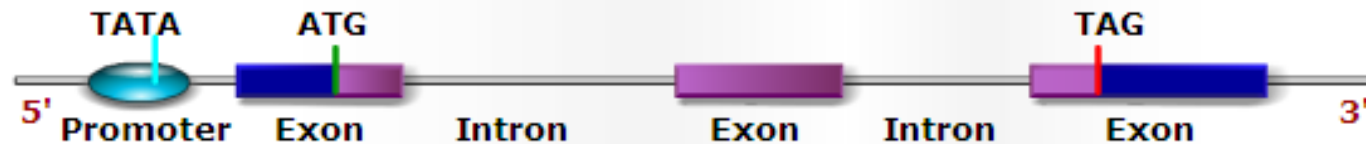


# Pathway Leading to GST Inactivation

## □ Eukaryotic Gene Structure



<http://dynamicgene.org/structure/structure.html>

## □ Key components:

- Promoter – site to which RNA Polymerase binds for transcription
- Exons – those sequences of nucleotides expressed in the final RNA molecule
- Introns – those sequences of nucleotides removed during RNA processing

- The promoter regions of some genes have been found to be rich in C and G nucleotides
  - When C is found next to G (in the 5' to 3' direction) the dinucleotide is referred to as a CpG dinucleotide.



[www.insidecancer.org](http://www.insidecancer.org)

- The “p” indicates the two nucleotides are separated by a phosphate and are therefore on the same strand.
- When this dinucleotide is present numerous times the region is referred to as CpG island

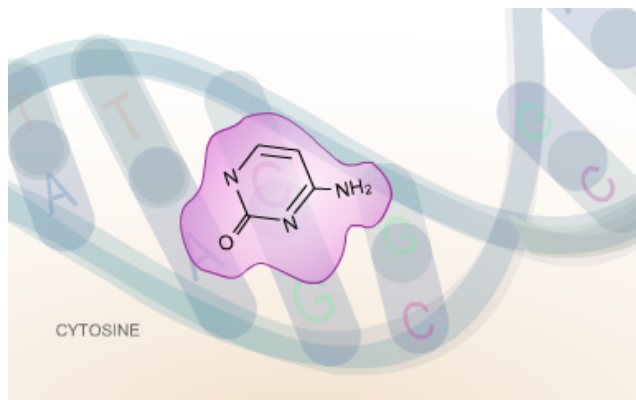
# Regulating Gene Expression



- Methylation: a key mechanism cells use to regulate gene expression.
  - Click [here](#) to see the role of methylation in gene expression

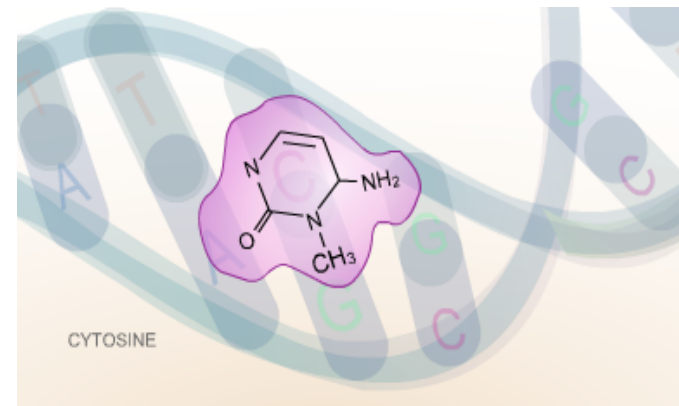
□ Conclusion:

- Methyl groups,  $-CH_3$ , are added to cytosine nucleotides in the CpG islands found in the promoter regions of genes



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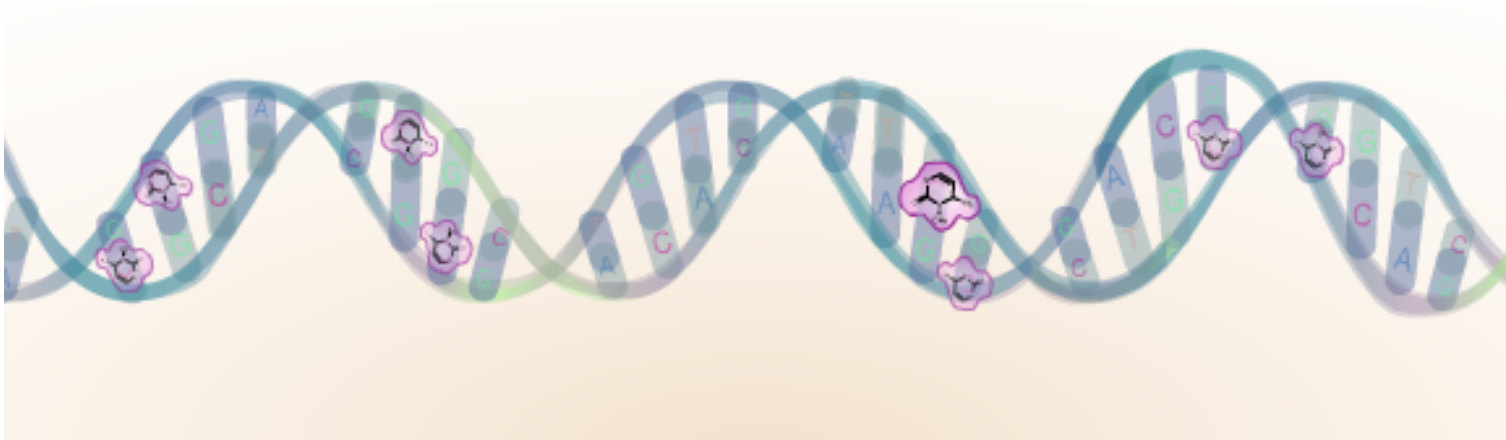
Unmethylated Cytosine



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Methylated Cytosine

- This results in a suppression of the expression of the gene



# Methylation and Prostate Cancer



- The suppression GST expression is due to excessive methylation of the CpG islands in the promoter region of the gene
  - ▣ As a result molecules such as oxidants and PAH's remain in the cell