

DNA Methylation Patterns in *Crassostrea gigas*

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- **Epigenetics** describes DNA modifications that change gene expression without altering the underlying nucleotide sequence.
- **DNA methylation** in organisms is extremely diverse, variable among species, and can change genome function under external influences.

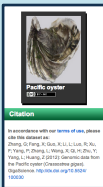
The objective of this study is to use the Pacific Oyster as a model organism to characterize the distribution and identify potential functions of DNA methylation.

Approach

- **High-throughput Bisulfite Sequencing** was used to examine genome DNA methylation in sperm cells of the Pacific oyster.

Mapping to the Oyster Genome

1670 Scaffolds - 502 Mbp



Bisulfite Treated Library [Sperm]
171 million - 72bp paired-end reads

Bisulfite Sequence Mapping Program (BSMAP)

- A short reads mapping software for bisulfite sequencing reads
- Total number of aligned reads: Pairs: 85 million
- Singles: 32.4 million

Galaxy Workflow

1 million *Methylated CpGs
2.9 million Unmethylated CpGs
*5x coverage / 50% methylation

Methylated CpGs

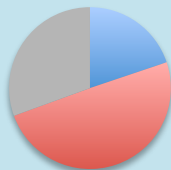
Total	949,478
mRNA	736,195
Exons	306,956
Introns	403,503
Repeat regions	5,961
Transposable elements	28,334
Promoter region	275
High expression windows	40,653

Distribution of CpGs Across the Genome

Methylated CpGs

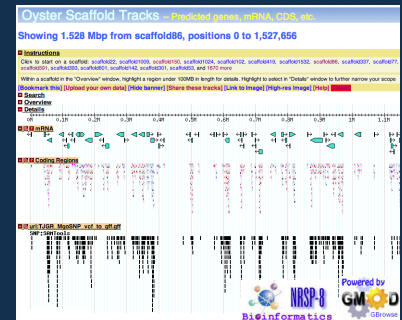
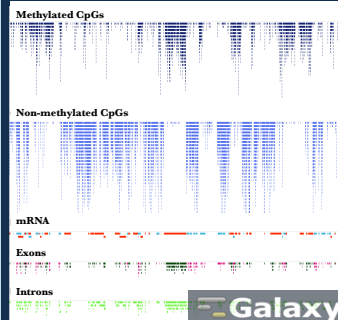


All CpGs

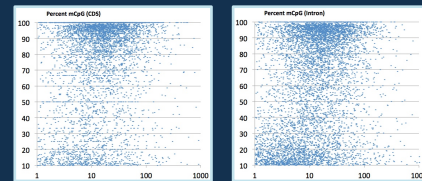


- Exons
- Introns
- Other

Genomic Visualization Tools

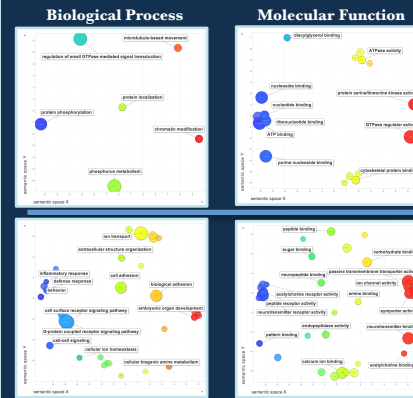


Gene Body Methylation and Expression



Gene Expression in Male Gonad (RPKM) - Zhang et al 2012

Gene Ontology and Enrichment Analysis

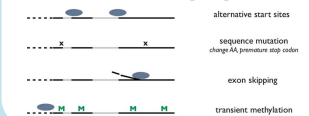


Genes that were predominantly (80%) **methylated**

Genes that were predominantly (80%) **unmethylated**

- DNA methylation is dispersed throughout the oyster genome, occurring primarily in expressed portions.
- Sparsely methylated genes are associated with inducible expression.

Theory: Absence of methylation contributes to increased adaptive potential.



Additional Information

Supporting data including genomic feature tracks, links to software, an electronic version of this poster, and other resources are available at: <http://goo.gl/pqBE4>

