



# IDENTIFICATION AND CHARACTERIZATION OF GENES REGULATED BY AQS<sub>R</sub>, A LUXR-TYPE REGULATOR IN *ACINETOBACTER OLEIVORANS* DR1

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**Introduction.** Complete genome of *Acinetobacter oleivorans* DR1 revealed presence of the AqsR and AqsI which are LuxR and LuxI homologs, respectively. In our previous study, we demonstrated that quorum sensing (QS) signals play an important role in biofilm formation and hexadecane biodegradation. But, the regulation of genes controlled by QS system in DR1 remains unknown

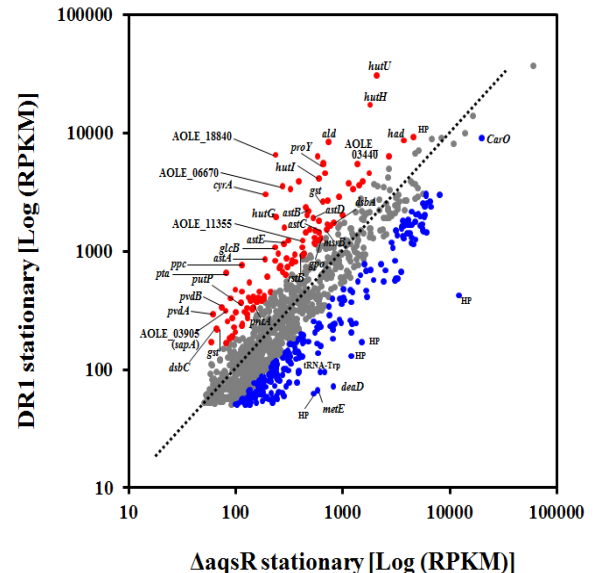
**Methods.** We constructed the aqsR mutant and performed RNA-seq analysis to understand QS system. AqsR proteins were successfully purified in *E. coli* harboring both the aqsR and aqsI genes. Electrophoretic mobility shift assays (EMSA) with purified AqsR was performed to know direct binding of AqsR to the promoter region .

**Results.** (1) 353 genes were differentially expressed during the stationary phase of wild type cells compared to that of aqsR mutant. AqsR appears to be a very important regulator because knockout of aqsR affected global gene expression. Genes involved in posttranslational modification, chaperones, cell wall structure, secondary metabolites biosynthesis, and stress defense were highly up regulated only in the wild type.

(2) Among up-regulated genes, both AOLE\_03905 (putative surface adhesion protein, hereinafter sapA) and AOLE\_11355 (L-asparaginase) genes have putative LuxR-binding sites at their promoter regions.

(3) Our electrophoretic mobility shift assays (EMSA) with purified AqsR showed direct binding of AqsR to those promoter regions

**Conclusions.** Our data showed that AqsR functions as an important regulator and is involved in several phenotypes, such as hexadecane utilization, biofilm formation and sensitivity to cumene hydroperoxide.



**Figure. 1.** Patterns of gene expression between wild type and aqsR mutant. Y axis means RPKM values of wild type cells and X axis represents those of aqsR mutant cells during stationary phase according to the genome locus tag. Red dots means up-regulated genes and blue dots means down-regulated genes in wild type cells. Hypothetical proteins are designated as HP.

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