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Global Transcriptional and Metabolite Analysis of Desulfovibrio vulgaris Hildenborough Responses to Long-Term Exposure to Elevated NaCl

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Global Transcriptional and Metabolite Analysis of Desulfovibrio vulgaris Hildenborough Responses to Long-Term Exposure to Elevated NaCl

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RESULTS

Table 1. Expression changes of representative genes of D. vulgaris involved in energy metabolism under NaCl exposure

<table>
<thead>
<tr>
<th>Gene</th>
<th>NaCl 500mM / 0mM</th>
<th>NaCl 1500mM / 0mM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVU2182</td>
<td>Up</td>
<td>Up</td>
</tr>
<tr>
<td>DVU2442</td>
<td>Up</td>
<td>Down</td>
</tr>
<tr>
<td>DVU2815</td>
<td>Up</td>
<td>Down</td>
</tr>
</tbody>
</table>

Fig. 1 Changes in gene expression profiling by category

- **Significantly changed genes were involved in amino acid synthesis and transportation, energy metabolism, and regulatory processes.**

Table 2. Examples of up-regulated ORFs under short-term NaCl exposure

<table>
<thead>
<tr>
<th>ORF</th>
<th>Short-term NaCl exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVU2182</td>
<td>Up</td>
</tr>
<tr>
<td>DVU2442</td>
<td>Down</td>
</tr>
<tr>
<td>DVU2815</td>
<td>Down</td>
</tr>
</tbody>
</table>

Fig. 2 Examples of up-regulated genes under short-term NaCl exposure

- **Most significantly changed genes were across different categories:**

Table 3. Examples of down-regulated ORFs under short-term NaCl exposure

<table>
<thead>
<tr>
<th>ORF</th>
<th>Short-term NaCl exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVU2182</td>
<td>Down</td>
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<tr>
<td>DVU2442</td>
<td>Up</td>
</tr>
<tr>
<td>DVU2815</td>
<td>Up</td>
</tr>
</tbody>
</table>

Fig. 3 Changes in gene expression under short- and long-term NaCl exposure

SUMMARY

- **Glu and Ala may be used as potential osmotic protection solutes in D. vulgaris under salt stress conditions.**
- **Electron transport flows were induced while carbon metabolism was repressed under salt stress conditions.**
- **Gene expression had a similar trend but also showed differences under short- and long-term exposure of D. vulgaris to NaCl.**
- **Many function-unknown genes were identified to be associated with salt tolerance, indicating salt-tolerance mechanisms are largely unknown.**

ACKNOWLEDGEMENT