Cell Death of Rice Roots under Salt Stress May Be Mediated by Cyanide-Resistant Respiration

Hanqing Feng[a,*], Xiuli Hou[a], Xin Li[b], Kun Sun[a], Rongfang Wang[a], Tengguo Zhang[a], and Yanping Ding[a]

[a] College of Life Science, Northwest Normal University, 730070, Lanzhou, China. Fax: 86-931-7971207. E-mail: hanqing_feng@hotmail.com
[b] Food and Bioengineering College, Henan University of Science and Technology, 471000, Luoyang, China

* Author for correspondence and reprint requests

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Treatment with solutions containing high concentrations of NaCl (200 or 300 mM) induced cell death in rice (*Oryza sativa* L.) roots, as well as the application of exogenous hydrogen peroxide (H_2O_2). Moreover, the pretreatment with dimethylthiourea (DMTU), a scavenger of H_2O_2, partially alleviated the root cell death induced by 200 mM NaCl. These observations suggest that the cell death of rice roots under high salt stress is linked to H_2O_2 accumulation *in vivo*. NaCl stress increased the level of cyanide-resistant respiration to some extent and enhanced the transcript levels of the alternative oxidase (AOX) genes *AOX1a* and *AOX1b* in rice roots. High-salt-stressed (200 mM NaCl) rice roots pretreated with 1 mM salicylhydroxamic acid (SHAM), a specific inhibitor of alternative oxidase, exhibited higher levels of cell death and H_2O_2 production than roots subjected to either 200 mM NaCl stress or SHAM treatment alone. These results suggest that cyanide-resistant respiration could play a role in mediating root cell death under high salt stress. Furthermore, this function of cyanide-resistant respiration could relate to its ability to reduce the generation of H_2O_2.

Key words: Cell Death, Cyanide-Resistant Respiration, Salt Stress