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Hydrogen sulfide induces hydrogen peroxide and nitric oxide mediation of salt stress-caused stomatal closure in *Arabidopsis thaliana* (L.) Heynh.

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The roles of H_2S, hydrogen peroxide (H_2O_2) and nitric oxide (NO) in signaling transduction of stomatal movement response to salt stress in *Arabidopsis thaliana* (L.) Heynh. are still unknown. The role of H_2S and its relationship with H_2O_2 and NO in salt stress-caused stomatal closure by using pharmacological, spectrophotographic and fluorescence microscopic approaches in *A. thaliana* were investigated. Our results will provide evidence for further elucidating the signal transduction mechanism of stomatal movement caused salt stress in plants. Salt stress caused stomatal closure in wild-type and *AtrbohD* mutant, these effects were prohibited by H_2S modulators, H_2O_2 modulators, NO modulators in wild-type, respectively. However, salt stress couldn't significantly change the stomatal aperture of *Atl-cdes*, *Atd-cdes*, *Atmoa1*, *nia1-2*, *nia2-1*, *nia1-2/nia2-5*, *AtrbohF* and *AtrbohD/F* mutants. Salt stress caused rise of H_2S content and *L-/D*-cysteine desulfhydrase (*L-/D*-CDes) activity of leaves in wild-type and *AtrbohD* mutant, but these effects were prevented by H_2S modulators in wild-type. H_2O_2 modulators and NO modulators significantly inhibited salt stress-caused H_2O_2 production and NO synthesis in wild-type, respectively. These results suggested that H_2S, H_2O_2 and NO participate in salt stress-caused stomatal closure. H_2O_2 modulators and NO modulators prevented salt stress-caused H_2S synthesis and *L-/D*-CDes activity increase in leaves of wild-type, but H_2S modulators couldn't inhibit salt stress-caused H_2O_2 production and NO synthesis in wild-type. Salt stress increased H_2O_2 and NO levels in *Atl-cdes* and *Atd-cdes* mutants, but failed to cause H_2S synthesis and L-/D-CDes activity increase in *AtrbohF*, *AtrbohD/F*, *Atmoa1*, *nia1-2*, *nia2-1* and *nia1-2/nia2-5* mutants. All the data suggested that salt stress induced H_2O_2 and NO production, subsequent caused H_2S synthesis, and finally closed stomata in *A. thaliana*.

Keywords: Abiotic stress, H_2O_2 synthesis, H_2S synthesis, L-/D-CDes activity, Mouseear cress, NO production, Rockcress, Salt stress, Thale cress