[P3] Abiotic Stress for Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 3 (Poster) (Abiotic Stress for Crop Production)

12:15 PM - 1:00 PM

[P3-19]NaCl-Stimulated ATP Synthesis in a Halophyte (*Mesembryanthemum crystallinum* L.)

*Nominated for Presentation Awards

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NaCl is one of the factors causing damages in plants that severely impedes their growth and reduces crop productivity. Halophyte, a group of salt-tolerant plants, evolved sophisticated mechanisms to survive under the severe salinity conditions, and they also show halophilism, which is a growth response that increases in the presence of NaCl at a concentration in which almost all crops die. The salt-tolerant and halophilic reactions require a large amount of ATP. In the previous study, we found that the ATP synthesis increased with increasing NaCl concentration in the mitochondria isolated from a halophyte, the common ice plant (*Mesembryanthemum crystallinum* L.). In the present study, RNA-Seq analysis was performed to determine the genes related to NaCl-stimulated ATP synthesis in the NaCl-treated cultured cells of the ice plant. We found that mRNA encoding the subunit B of ATP synthase is expressed at a higher level with NaCl. We also identified a specific amino acid sequence of the ice plant that shows high homology with vacuolar ATPase (V-ATPase, a member of ATP synthase superfamily) using BLASTP and the amino acid sequences of Na^+-driven ATP synthases isolated from archaea. Besides, we found that ATP synthesis of the mitochondria treated with uncoupling agent to dissipate H^+ gradient between the mitochondrial matrix and intermembrane space was maintained with NaCl. In the presentation, we will discuss the possibility of Na^+-driven ATP synthesis and the mechanism of increased H^+-driven ATP synthesis in the halophyte.