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Physiological and proteomic analyses in graft junction reveal novel insight into mechanisms involved in adaptation to different day/night temperature regimes in two tomato cultivars

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Grafting, an established practice of asexual propagation in many plants, is known to induce abiotic or biotic stress. Transfer of genetic materials during graft healing, from the root to the shoot and vice versa, is interest of investigation for signal transduction pathways at the graft junction using proteomic and microarray techniques. Physiological and proteomic responses were studied at the graft junction between the rootstock and the scion of two tomato genotypes exposed to a standard (23/23°C), normal (25/18°C), or high-low (30/15°C) day/night temperature regimes. Graft junctions had varied responses to different temperature regimes. A high-low, but not a standard or normal, temperature regime induced the production of reactive oxygen species (ROS) in the form of H₂O₂ and O₂-1 at the graft junction. Many cell protection molecules, including antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT) and ascorbate peroxidase (APX), and their immunoblots were also induced. Thus it seems that both the rootstock and the scion actively defended against stress by modifying their physiological and proteomic responses to establish a new cellular homeostasis at graft junctions. As a result, many proteins for cellular defense were regulated at the graft junction under different temperature regimes, in addition to the regulation of photosynthetic proteins, ion binding/transport proteins, and protein synthesis. Biomass, physical strength at the graft junction, and vascular transport activity were also affected by the temperature regime. Results provided novel and insightful physiological and proteomic evidences on the responses at the graft junctions of two tomato cultivars to different temperature regimes.

Biography

Byoung Ryong Jeong has completed his PhD from Colorado State University, USA, and Post-doctoral studies from University of Missouri-Columbia, USA, and Chiba University, Japan. He is a Professor in Department of Horticulture and the Dean of College of Agriculture and Life Sciences, Gyeongsang National University, Republic of Korea. He has published more than 250 papers in reputed journals and has been serving as an Editor-in-Chief of *Horticulture, Environment and Biotechnology*, and President of the Korean Society for Floricultural Science.

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