P3–12

Functional study on reactive oxygen species regulation of sweetpotato anionic peroxidase gene \textit{swpa4}

Yun–Hee Kim, Jae–Cheol Jeong, Haeng–Soon Lee, Sang–Soo Kwak*
Environmental Biotechnology Research Center, Korea Research Institute of Bioscience and Biotechnology (KIRIBB), Daejeon, Korea

The secretory class III peroxidases (PODs) have been implicated in a broad range of physiological processes, including defense against pathogenic attack and a variety of abiotic stress tolerances. Recent findings have indicated that extracellular POD may generate H$_2$O$_2$ as a consequence of its reactions, and H$_2$O$_2$ production may play important roles in response to various stresses in plants. Previously we have reported that transgenic tobacco overexpressing the \textit{swpa4} gene, a sweetpotato anionic POD gene, exhibited increased tolerance to various abiotic and biotic stresses. Moreover, overexpression of \textit{swpa4} gene induced an increased generation of H$_2$O$_2$ in transgenic tobacco plants and increased expression of various apoplastic acidic pathogenesis–related (PR) genes followed by enhanced H$_2$O$_2$ production. In this study, we observed that the \textit{swpa4} transgenic tobacco showed ROS–generating activity using NADH, and increased expressions of \textit{RbohD} and \textit{SOD} genes, thereby \textit{swpa4} transgenic plants exhibited POD–direct or indirect ROS generating activity. Our results suggest that the expression of \textit{swpa4} in the apoplastic space may function as a positive defense signal in the ROS–regulated stress response signaling pathway. For a better understanding of the roles of \textit{swpa4}, transgenic sweetpotato and \textit{Arabidopsis} plants expressing \textit{swpa4} were generated by overexpression or knock–down. Functional study on ROS signal regulation of \textit{swpa4} gene in transgenic sweetpotato and \textit{Arabidopsis} is under way.

*Corresponding author: Tel. 042–860–4432, e–mail: sskwak@kribb.re.kr