Public Abstract

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Title:ROLE OF THE Arabidopsis PEPTIDE TRANSPORTER AtOPT6 IN HEAVY METAL DETOXIFICATION AND PLANT-PATHOGEN INTERACTION

Plants, being sessile, require proteins to provide them with nutrients and to protect them against several environmental, biotic and abiotic stresses. In this study, we characterize a peptide transport protein, AtOPT6, which is a member of oligopeptide transport (OPT) gene family in model plant Arabidopsis thaliana. There are nine members in the OPT gene family that are thought to be involved in peptide transport. Several genetic and molecular biology approaches were taken to understand the function of AtOPT6 during plant growth and development. Expression studies of AtOPT6 correlates with transport of peptides in the major sink tissues of plants indicating that this transporter may be involved in long distance transport of peptides to provide organic nitrogen to the developing plant organs.
Over-expression of AtOPT6 leads to cadmium hyper-sensitivity and higher accumulation of cadmium and phytochelatins in root tissues. opt6 mutant plants exhibited less sensitivity to a virulent bacterial pathogen Psuedomonas syringae pv tomato DC3000. In addition, opt6 mutant plants also showed less susceptibility when infected with both cyst and root-knot nematode. Expression of AtOPT6 increased during early stages of both cyst and root-knot nematode infection in and around the developing feeding sites. Collectively, these data suggest that AtOPT6 may transport nutrients, bacterial released phytotoxins or nematode secreted peptides into the plants during plant-pathogen interaction. We can modify orthologs of AtOPT6 in crop plants to improve and create transgenic plants that are resistant to a variety of bacterial and nematode pathogens.