The Map and the Switches for Plant Natriuretic Peptides

[1]**Ndiko Ludidi**, [2]René Bastian, [1]Johan Burger and [2]Chris Gehring

[1]Department of Genetics, University of Stellenbosch, South Africa [2]Department of Biotechnology, University of the Western Cape, South Africa.

Plant natriuretic peptides (PNPs) are small (14 kD) systemically mobile proteins that regulate salt and water homeostasis at nanomolar concentrations. An *Arabidopsis thaliana* plant natriuretic peptide gene (*AtPNP-A*) has been isolated and its temporal and spatial expression pattern of was investigated using microarray data and *GUS* reporter gene fusion downstream of the *AtPNP-A* promoter. Overexpression of *AtPNP-A* in *Arabidopsis thaliana* was carried out using the CaMV35S promoter. Furthermore, *GFP* fusion downstream of *AtPNP-A* was used to study the cellular localization of AtPNP-A. RNAi was used to effect post-transcriptional gene silencing of *AtPNP-A* in order to establish the *in planta* function of AtPNP-A in *Arabidopsis thaliana*. *AtPNP-A* expression was associated with specific organs/tissues and appeared high in tissues undergoing elongation growth. Specific biotic (pathogen) and abiotic (salt, osmotic, ozone and UVB) stress treatments resulted in elevated expression of *AtPNP-A*. These results suggest that AtPNP-A participates in a signaling process in response to biotic and abiotic stress and may promote elongation growth. Animal natriuretic peptides activate membrane-spanning natriuretic peptide receptors, which contain a guanylyl cyclase domain, to synthesize cGMP. cGMP is one of the signaling molecules instrumental in responses to biotic stress and abiotic stress. AtPNP-A results in elevation of cGMP levels in *Arabidopsis thaliana* seedlings. We thus expect that overexpression and/or post-transcriptional gene silencing of *AtPNP-A* in *Arabidopsis thaliana* will contribute not only to our understanding of the *in planta* function of AtPNP-A but also in cGMP-mediated responses of plants to biotic and abiotic stress conditions.