

## The Role of Natriuretic Peptides in Plant Homeostasis and Growth

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Immunological and physiological evidence suggests the presence of biologically active natriuretic peptide hormones (NPs) in plants<sup>1</sup>. Evidence includes specific binding of rat atrial NP, [rANP (99-126)] to plant membranes, the promotion of cyclic guanosine-3',5'-monophosphate (cGMP) mediated stomatal responses, modulation of cation transport as well as the regulation of osmoticum-dependant water transport. Furthermore, anti-ANP affinity purifies biologically active plant immunoreactants (PNPs) and a biologically active *Arabidopsis thaliana* PNP (AtPNP-A) has been identified. AtPNP-A belongs to a novel class of molecules that share some similarity with the cell wall loosening expansins but do not contain the carbohydrate-binding wall anchor. We hypothesize that PNP-like molecules have evolved from primitive glucanase-like molecules that have been recruited to become systemically mobile modulators of homeostasis acting via the plasma membrane<sup>2</sup>. Such a function is compatible with localisation in the conductive tissue, the physiological and cellular modes of action of PNPs and phenotype of mutants with altered PNP-expression. Finally we proposed that this novel class of molecules has a specific role in plant elongation growth as well as abiotic stress responses.

<sup>1</sup>Gehring, C. A. and Irving, H. R. (2003) Int. J. Biochem. Cell Biol. 35, 1318-1322.

<sup>2</sup>Ludidi, N. N., Heazlewood, J. L., Seoighe, C., Irving, H. R. and Gehring, C. A. (2002) J. Mol. Evol. 54, 587-594.