Australian National University

Secreted RAR peptides are important mediators of root architecture in *Medicago* and *Arabidopsis*

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Slatyer seminar room R.N. Robertson Building (Bldg. 46), Linnaeus Way, ANU

Plant growth requires the coordinated regulation of many developmental processes. The development of side organs results from repetitive developmental programs but the manifestation of these is modulated in response to the environment and how this is done is not fully understood.

We are examining root development in *Medicago* and *Arabidopsis* as both systems represent models for elucidating and dissecting main root growth, lateral root and, in *Medicago*, root nodule formation. Together these developmental programs influence plant root architecture in these model plants. It is important to understand all key regulatory components regulating root architecture to enable crops to be developed with root systems that match the prevailing growth conditions. Although the classical phytohormones are key players in many aspects of root development, short range, cell-to-cell communication is also a vital component of most developmental processes.

Secreted regulatory peptides ranging from 5 to 50 amino acids have been shown over the past 15 years to be 'paracrine hormone'-like signalling molecules in plants that mediate intracellular communication. Several families of these peptides play vital roles for example in root and shoot apical meristem growth and control (CLE/CLV, RGF), abscission (IDA) and the develvopment of stomata (EPF) and root vascular tissue (CLE). We are working on RAR (root architecture regulator) peptides which have several unique properties compared to other regulatory peptide families. Our studies implicate them in influencing root, lateral root and root nodule formation. Several RAR genes in roots are influenced by environmental parameters such as nitrogen and carbon levels. Our results suggest that RARs may represent a regulatory component that coordinates the repetitive processes of lateral organ formation in roots with the effects of important environmental influences.

Presented by

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