The role of CLE peptide signalling in shoot meristem development of pea

Scott T1, Correa-Lozano A1, Foo E1

[Eloise.foo@utas.edu.au](mailto:Eloise.foo@utas.edu.au)

1 Discipline of Biological Sciences, School of Natural Sciences, University of Tasmania, Private Bag 55, Hobart, Tasmania, 7001, Australia

The CLV3/EMBRYO-SURROUNDING REGION (CLE) peptides control plant development and response to the environment. Key conserved roles include the regulation of shoot apical meristems and the long-distance control of root colonisation by nutrient-acquiring microbes, including the widespread symbiosis with arbuscular mycorrhizal fungi and nodulation with nitrogen-fixing bacteria in legumes. At least some signalling elements appear to operate across both processes but clear gaps in our understanding remain. In legumes although CLE peptide signalling has been examined in detail in symbioses, the role of this pathway in SAM development of legumes is poorly understood.

We found that in pea both genetic and environmental buffering of CLE pathway influences SAM development. In pea, the CLAVATA2 CLE receptor and the unknown gene product encoded by the K301 gene are required to limit SAM size and floral organ production under cool temperatures. In contrast, the CLAVATA1 receptor-like kinase actually promotes SAM proliferation and appears to do so via a CLV2-independent pathway. In contrast, we found no role for RDN1 enzyme, capable of arabinosylating CLE peptides, in SAM development. Future studies in other legumes are required to examine the role for other CLE peptide signalling elements in SAM control and studies in non-vascular mycorrhizal hosts could explore if the cross-over in SAM control and symbioses limitation reflects a conserved ancestral role for this signalling pathway.