

Plant Genomics

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Genomics and genetics to analyze nodulation regulation of legumes

Legume plants, like peas, beans, medics and soybeans, have the ability to interact with prokaryotes like *Bradyrhizobium* and *Rhizobium* to develop novel root organs called 'nodules'. These house the inducing bacterium to develop a nitrogen-fixing symbiosis that benefits the plant, the bacterial population and resultant agronomy/economy/environment. Genetics and coupled genomic approaches have opened our understanding of the underlying processes related to the nodule ontogeny. Recent advances have clarified further the molecular mechanisms of control of the basic steps of ontogeny. Thus the molecular signals initiating 'Autoregulation of Nodulation (AON)', the critical receptor kinase in the leaf tissue (GmNARK in soybean) and the subsequent signaling cascades of shoot-derived inhibition have been revealed. Plant peptides, LRR receptor kinase, microRNA, cytokinin hormone and transcriptional factors are directly involved. Amazingly the revealed mechanisms appear to be common among all legumes, suggesting possibilities to improve the nitrogen-fixing potential of many crop legumes through lateral transfer of information and technology.

Biography

Peter M Gresshoff is a Professor of Botany at The University of Queensland and Director of the Australian Research Council's (ARC) Centre of Excellence in Integrative Legume Research. He has received his PhD in Genetics from ANU, Canberra in 1974 and DSc in Molecular Genetics in 1988. In his 40 year career in plant science, he has developed deep interests in plant development and its genetic control. He has focused his interests on legume plants and especially the process of nodulation. He has published over 100 papers and has 12 patents. He is a fellow of the Indian National Academy of Agricultural Sciences, the Russian Academy of Agricultural Sciences and the American Association for the Advancement of Science (AAAS). He is a Member of numerous international Editorial Boards as well as expert Advisor to the IAEA, the European Union, Qantas and other biotechnology interests. He is a dedicated Teacher and Researcher and feels that the understanding of biological processes is essential for industrial development of an idea.

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