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**Title:**  
**Nod Factor signaling genes form the toolbox of the Rhizobium-legume symbiosis**

**Abstract:**

Legumes have the unique ability to live in symbiosis with nitrogen fixing Rhizobium bacteria. This symbiosis leads to the formation of root nodules, which are organs specifically formed to host the bacteria, allowing them to differentiate into a symbiotic form that can fix atmospheric nitrogen which is used by the plant. Nodule formation requires developmental reprogramming of root cells as well as infection by the bacterium. Both processes are triggered by specific lipochito-oligosaccharides - named Nod factors- that are secreted by Rhizobium when colonizing the root. Nod factors induce many symbiotic responses that are essential for root nodule formation and in some species even the formation of complete nodules can be triggered (lacking bacteria). This underlines the importance of Nod factor signalling in root nodule development.

Since long it has been questioned why legumes are so special that they can have a nitrogen fixing Rhizobium symbiosis? Since Nod factor perception and signalling is in the heart of this symbiosis, it can be argued that underlying signalling pathway could be unique for legumes. The recent cloning of 7 key-components of the legume Nod factor signalling network, as well as the availability of comprehensive genome sequence information of different plant species makes it possible to determine to what extend Nod factor genes are unique to legumes.