



# Plant Molecular Biology

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Molekylærbiologi: Ja  
Molekylær medicin: Nej  
Bioteknologi: Ja

Plant development requires nutrient resources, which can be limiting in certain environments. In order to alleviate nitrogen limitation, legume plants have evolved specialised symbiotic relationships with soil bacteria to obtain fixed nitrogen. This symbiosis requires the establishment of a new root organ, called a nodule. As with any organogenesis, this requires extensive transcriptional reprogramming, hormone signaling and regulatory mechanisms. Our group is exploring the role of plant hormones, particularly cytokinin, in this process. The basis of our studies is the model legume, *Lotus japonicus*, which is amenable to genetics, can be transformed easily and has well developed mutant resources.

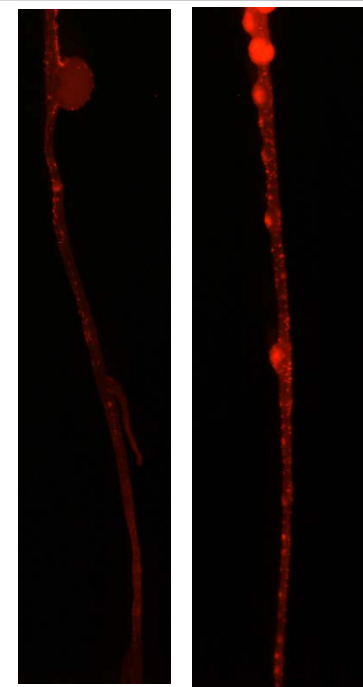


*Lotus japonicus* grown in presence (left) or absence (right) of nitrate

## Project 1: The role of cytokinin and ethylene in regulating symbiotic infection

Mutants either insensitive or hypersensitive to both hormones are now available and can be analysed to determine the role of these pathways in controlling symbiotic gene expression and development of nodules and infection structures.

Techniques: This project will use genetics, molecular biology and direct hormone measurements to characterise the molecular nature of cytokinin and ethylene regulation of infection.

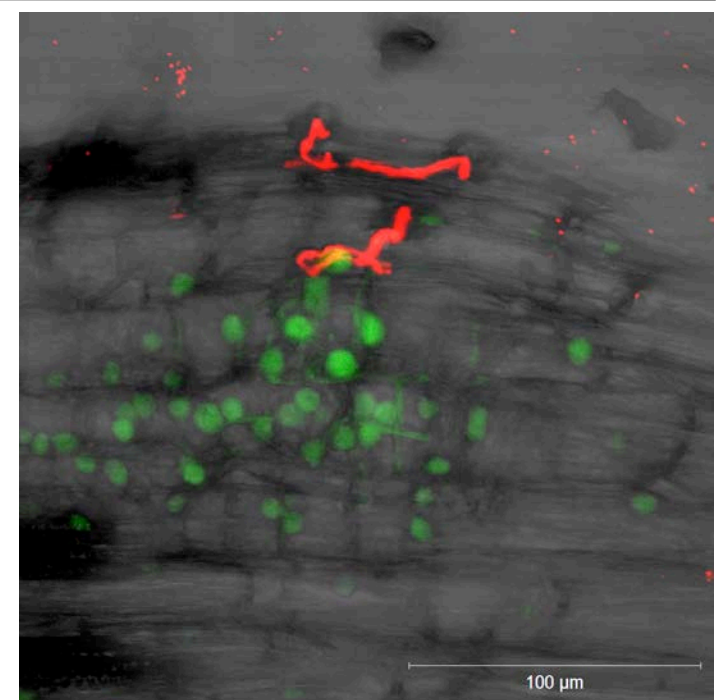


*Lotus japonicus* mutants insensitive to ethylene (right) have much higher rhizobia infection than wild-type (left)

## Project 2: Hormone signaling in organ development

Fluorescent reporters make monitoring of temporal and spatial changes in gene expression possible in live tissue. We have coupled these reporters with synthetic hormone-responsive promoters in order to follow hormone signaling during nodule development. This project will assess several new variants of such markers in order to monitor plant hormone signaling during root and nodule development.

Techniques: Cloning, Plant transformation, Microscopy



Cytokinin signaling during nodule development. Image Marcin Nadzieja