

RESEARCH PROJECT SUMMARY  
by  
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The formation of nitrogen-fixing nodules on the roots of legumes is symbiotically induced by the soil bacteria rhizobia. This process involves a complex exchange of signals between the plant and bacteria. The bacterial genes required for the initiation of nodule formation have been identified and cloned using transposon mutagenesis. The DNA sequence of these genes has been determined, and their regulation studied. Many plant genes involved in the physiology or physical structure of the nodule have been identified and cloned. Several genes controlling nodule initiation, nodule number, and nodule function have been identified by chemical mutagenesis. However, in plants, there is not a direct mechanism for the isolation of genes following chemical mutagenesis. We propose to develop transposon mutagenesis for legumes in order to isolate genes controlling nodulation.

For transposon mutagenesis, we have identified species of *Lotus* and *Vigna* which have the essential characteristics of a small nuclear genome, diploidy, and autogamy. These legumes will be tested for transformation and regeneration with initial emphasis on using *Agrobacterium rhizogenes* as the transforming vector. The maize transposable element *Ac* will be transformed into these legumes and assayed for transposition. Upon confirmation of transposition of *Ac* in the legume, we will construct appropriate lines of transgenic plants to screen for nodulation mutants.