

MCB PLANT BIOLOGY SEMINAR

Surya Kant,
Department of Molecular and Cellular Biology,
University of Guelph

" Characterization of novel genes aimed at improving nitrogen use efficiency in plants "

Monday, January 17, 2010
3:30 p.m.
SCI2315

ABSTRACT:

Nitrogen (N) is an essential macronutrient and one of the major limiting factors for crop growth. Most of the crop plants are able to utilize only 30-40% of the applied N from soil with the remaining N lost to the environment. Excessive use of nitrogenous fertilizers further increases the cost of crop production and N pollution. To overcome these issues, there is an urgent need to develop crops with improved N use efficiency (NUE). This would require identification, characterization and genetic engineering of genes conferring higher NUE and improving plants adaptability to limiting N conditions. We are working on the characterization of such genes in Arabidopsis, rice and corn and using this knowledge to develop crop plants with higher NUE. We have recently characterized a Nitrogen Limitation Adaptation (NLA) gene in Arabidopsis and have shown that NLA has a key role in the genetic regulation for maintaining nitrate dependent phosphate homeostasis in Arabidopsis. In rice, a N responsive early nodulin (OsENOD93) gene was identified. Transgenic rice plants over-expressing the OsENOD93 gene had increased shoot dry biomass and seed yield more particularly under low N conditions. Transgenic plants accumulated a higher amount of total amino acids and total N in roots. The results suggested that the OsENOD93 gene might have potential role in transporting amino acids from roots to shoots in rice plants. In corn, we are screening different genes for their involvement in NUE.