Abstract of Presentation

Presentation Title(Should be no more than 20 words):

Production of lignocellulose biomass from eucalyptus and poplar varieties
—"Approach to improve woody biomass qualitatively and quantitatively" —

Prof. Taku Demura, Nara Institute of Science and Technology / RIKEN Biomass Engineering Program

Abstract :

Lignocellulose biomass represents one of potentially renewable resources for bioenergy and biorefinery. Two types of polysaccharides (cellulose and hemicelluloses) and a phenolic compound (lignin) in thick cell walls (secondary cell walls, SCWs), are major components of lignocellulose biomass. Therefore, it is quite important to understand the mechanisms underlying SCW formation for future manipulation of lignocellulose biomass toward bioenergy and biorefinery. We have identified several important genes for regulation of SCW formation in the model plant, Arabidopsis. The VNS genes encoding plant specific NAC-type transcription factors can initiate the program for SCW formation in several types of plant cells such as xylem vessels and xylem fibers. Our analysis revealed that the VNS genes are functional in poplar trees: activation of VNS genes in poplar produced more SCWs and repression of VNS genes in poplar resulted in the inhibition of SCW formation. Based on these data, a new project for improvement of lignocellulosic woody biomass qualitatively and quantitatively in poplar and eucalyptus has been started in RIKEN Biomass Engineering Program. We are planning to produce GM trees (poplar and Eucalyptus) with some genes controlling lignocellulose production for qualitative modification and those controlling environmental stress resistance, growth, and pest resistance for quantitative improvement. We will collaborate with several domestic and international groups to evaluate the GM trees in green houses and in trial fields.