

Biotechnology / Life Sciences

Seminar Series



Wednesday

November 4, 2009

Reception - 3:30 pm

Seminar - 4:00 pm

E103 Beadle Center

Dr. Brent L. Nielsen

Professor & Department Chair
Brigham Young University
Department of Microbiology & Molecular Biology

The role of the Arabidopsis TWINKLE homologue in regulation of mitochondrial genome copy number

Plant mitochondrial genomes are large, complex, and may replicate by a recombination-dependent mechanism or by more than one mechanism. We have recently identified an Arabidopsis nuclear-encoded gene for a homologue of the bacteriophage T7 gp2 protein, which has both DNA primase and DNA helicase activities. The plant homologue has high homology with the T7 protein, while the animal homologue lacks homology over the DNA primase domain and has been shown to have DNA helicase but not DNA primase activity. In animals this protein has been shown to control mtDNA replication and genome copy number. We have shown that this protein is localized specifically to Arabidopsis mitochondria, and that it has both DNA primase and DNA helicase activities. Homozygous T-DNA insertion lines are germination lethal, while heterozygous plants show severely reduced growth rates and premature flowering with significantly lower seed production. Quantitative real-time PCR analysis shows a reduction in mtDNA levels in the mutant lines. Our results suggest that this protein is necessary for mtDNA replication and normal plant development.

CENTER FOR BIOTECHNOLOGY

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