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ANALYSIS OF ALLELIC MUTANT OF CLOCK GENE, *WC-1*, IN *NEUROSPORA CRASSA*

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An allelic mutant of clock gene, *wc-1*, was isolated by DNA insertional mutagenesis in *Neurospora crassa*. This strain shows no rhythm of conidial banding under constant darkness, but shows diurnal conidial banding under light-dark condition. Sequencing result shows that down stream of glycine-rich region in *wc-1* gene may be expressed constitutively by the inserted calmodulin-promoter(P_{cmd}). This result suggests that glycine-rich region is necessary for expressing the rhythm.

P_{cmd}::*wc-1* gene was introduced into *his-3* site of *wc-1* null strain. This strain shows no difference from wild type strain in circadian rhythm expression and in response to light pulse treatment. These results suggest that intrinsic promoter region of *wc-1* gene is not important but constitutive existence of WC-1 protein is necessary for expressing the circadian rhythm in *Neurospora*.

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FUNCTIONAL ANALYSIS OF A CLOCK-CONTROLLED GENE, *GLP* IN TRANSGENIC TOBACCO PLANTS.

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To clarify the molecular basis of the photoperiodic induction of flowering, we isolated *PnGLP1*(*Pharbitis nil germin-like protein1*) whose transcripts transiently increased during the 16-h flower-inductive darkness in leaves from a short-day plant *P. nil* cv. Violet. *PnGLP1* is a leaf-type germin-like protein and showed circadian rhythms at a transcriptional level during continuous darkness in leaves. To study the function of *PnGLP1* in relation to photoperiodism, we made the transgenic plants of *Nicotiana tabacum* cv. Maryland Mammoth, a short-day cultivar, expressing *PnGLP1* cDNA with sense and antisense orientation driven by CaMV 35S promoter. Some flower-promotive effects were observed in the sense plants grown under long-day condition.

344(1aG11)

PROMOTER ANALYSIS OF CLOCK-CONTROLLED GENES (*ATC401*, *PNC401*) RELATING TO PHOTOPERIODIC INDUCTION OF FLOWERING

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PnC401 was isolated whose transcripts transiently increased during flower-inductive darkness in short-day plant *Pharbitis nil* choisy cv. Violet. *PnC401* and it's homologue in long-day plant *Arabidopsis thaliana*, *AtC401*, are clock-controlled genes (CCGs) and showed circadian rhythmic expression peaking at night. To clarify the mechanism of regulation of *C401* expression, we sequenced promoter regions of *C401s* and searched for cis-acting elements. And we performed the reporter assays using transgenic *Arabidopsis* plants expressing the firefly luciferase driven by *AtC401* promoter. Result of *AtC401* promoter deletion analysis revealed that 146 bp upstream of the transcription start site was sufficient for the regulation of the circadian rhythmic expression of *AtC401*. Furthermore we also demonstrated the promoter analysis of *PnC401* in *Arabidopsis*.

345(1aG12)

DIFFERENTIAL DIURNAL EXPRESSION OF RICE CATALASE GENE: THE 5'-FLANKING REGION OF *CatA* IS NOT SUFFICIENT FOR CIRCADIAN CONTROL

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Three rice catalase genes (*CatA*, *CatB*, *CatC*) are expressed in a growth- and tissue-specific manner. In seedlings, the *CatA*, *CatB* and *CatC* genes were highly expressed in the leaf sheath, root and leaf blade, respectively. The expression of the *CatA* gene in the leaf sheath was modulated by a circadian rhythm with the maximum late in the light period. On the other hand, diurnal oscillations of *CatC* expression were detected in the leaf blade when plants were grown in the dark. The β-glucuronidase (GUS) gene driven by the 5'-flanking region of *CatA* was expressed with diurnal fluctuations, the pattern of which is different from that of the endogenous *CatA* mRNA, both at the pre-mRNA and at the mRNA level in transgenic plants. These results suggest that the circadian rhythmic expression of *CatA* is due to a transcriptional or post-transcriptional event such as modulation of pre-mRNA stability and requires some other region(s), in addition to the promoter region, exon-1 and intron-1.

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