

Abstract of thesis

Thesis title Analyses of *cis*-elements for the fundamental transcription in basidiomycetes
(担子菌類の基本的転写に関わるシスエレメントの解析)

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The regulation of gene expression is primarily controlled at transcriptional level, at every step from initiation to termination by regulatory *cis*-elements and their interactions with *trans*-acting protein factors. Basidiomycetes plays an important role in nature as a key player in carbon cycle; however, understanding of transcriptional regulation is in its infancy, largely because of the lack of appropriate promoter assay systems. Here, the *cis*-elements for fundamental transcription in basidiomycetes were elucidated. Using a transient transformation as a promoter assay, a 14-bp core promoter element (BCE) and CT-rich stretch were identified as core promoter elements in basidiomycetes β_1 -*tubulin* promoters. Additionally, the features of *cis*-elements required for transcription termination of *C. subvermispora gpd* and the dispensability of introns for the efficient expression of a recombinant *hph* gene were also demonstrated. Furthermore, novel promoter assays, with or without CRISPR/Cas9 technique, that can fully reflect endogenous gene regulation on chromosomes including epigenetic control, were developed. These promoter assays also experimentally confirmed the function of a TATA box in the *Pleurotus ostreatus mnp3* and *Coprinopsis cinerea cel6A* promoters. This study is the first work on identification of *cis*-elements for fundamental transcription in basidiomycetes as well as a novel tool for elucidation of a mechanism for gene expression control in this important fungal class.