Structure and transcriptional impact of divergent repetitive elements inserted within *Phanerochaete chrysosporium* strain RP-78 genes

Luis Larrondo, Paulo Canessa, Rafael Vicuña, Philip Stewart, Amber Vanden Wymelenberg, Dan Cullen

Abstract

We describe the structure, organization, and transcriptional impact of repetitive elements within the lignin-degrading basidiomycete, *Phanerochaete chrysosporium*. Searches of the *P. chrysosporium* genome revealed five copies of *pce1*, a ~1,750-nt non-autonomous, class II element. Alleles encoding a putative glucosyltransferase and a cytochrome P450 harbor *pce*insertions and produce incomplete transcripts. Class I elements included *pcret1*, an intact 8.14-kb *gypsy*-like retrotransposon inserted within a member of the multicopper oxidase gene family. Additionally, we describe a complex insertion of nested transposons within another putative cytochrome P450 gene. The disrupted allele lies within a cluster of >14 genes, all of which encode family 64 cytochrome P450s. Components of the insertion include a disjoint *copia*-like element, *pcret3*, the *pol* domain of a second retroelement, *pcret2*, and a duplication of an extended ORF of unknown function. As in the case of the *pce* elements, *pcret1* and *pcret2/3* insertions are confined to single alleles, transcripts of which are truncated. The corresponding wild-type alleles are apparently unaffected. In aggregate, *P. chrysosporium*harbors a complex array of repetitive elements, at least five of which directly influence expression of genes within families of structurally related sequences.