Abstract

Proteins of the CSL family (CBF1/RBP-Jκ/Suppressor of Hairless/LAG-1) act as effectors of the Notch signalling pathway in metazoan organisms. They function as repressors or activators of gene transcription in the framework of this pathway and influence many developmental processes. Metazoan CSL proteins can regulate gene expression Notch-independently as well. Notch-independent functions of CSL proteins might be evolutionarily ancestral and in cells and organisms may be important equally as Notch-dependent functions. Presence of CSL proteins was identified in several fungal species, organisms lacking the Notch signalling pathway components and most of known metazoan interacting partners of CSL proteins.

CSL paralogs of the fission yeast *Schizosaccharomyces pombe*, cbf11 and cbf12, are non-essential genes encoding proteins localized in the nucleus of the cell. They exert antagonistic effects on regulation of processes like coordination of nuclear and cellular division and cell cycle progression, ploidy maintenance, cell adhesion and other. In this study, we have proved that both CSL paralogs are able to sequence-specifically bind the CSL-response element DNA *in vitro* and Cbf11 *in vivo* as well. Both proteins could activate gene expression *in vivo* and perform the function of transcription factors. Using the ChIP-chip method, we have analysed the binding of CSL proteins in the whole genome of *S. pombe in vivo*. We have discovered that CSL proteins bind to intergenic as well as coding regions. Next, we have studied the dynamics of Cbf11 binding to DNA during the cell cycle and we have discovered that Cbf11 binds S phase/cytokinesis-specifically the promoter regions of a subset of periodically expressed genes and directly regulates their expression. The products of these genes regulated by Cbf11 are important to prevent catastrophic mitosis.

Key words: CSL proteins, *Schizosaccharomyces pombe*, transcription factor, DNA binding, cell cycle, gene expression regulation