

The GAL system in *Saccharomyces cerevisiae* enables this budding yeast to metabolize galactose. Expression of GAL genes is controlled by a regulatory cascade in which galactose triggers the activation of GAL gene expression, whereas glucose acts as a repressor. GAL genes in yeast have been used for decades as a model system for transcription regulation in eucaryotes. The products of GAL genes are GAL regulatory and GAL structural genes. Intriguingly, during studies of the GAL system it has been discovered that one of the regulatory genes and the structural gene for the galactokinase enzyme are apparently related. It has been suggested that an ancestor of the two genes underwent a gene duplication event which allowed the paralogs to gain different functions.

The GAL genes serve as a model system for the study of chromatin changes during transcription activation or repression. Transcriptional repression of GAL1 and GAL10 genes via ncRNA represents one of the recently discovered regulatory mechanisms of the GAL system. This mechanism has been discovered due to the changes in the histone methylation pattern across the GAL10 locus. However, the latest discovery in GAL gene regulation has probably been the role of nuclear localization of the GAL1,-7,-10 cluster in response to changes of carbon sources. GAL genes demonstrate how diverse and variable eucaryotic regulation can be.