

**Identification and Characterization of Yeast Genes
Regulated by pH with Transposon Tagging Screening and
Saccharomyces Genome Database**

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Budding yeast is an ideal model organism to study eukaryotic genome. Basic cellular processes in the yeast are similar in most respects to those of other eukaryotic organisms. Recent availability of complete genome sequence of *S. cerevisiae* enable us to identify a certain gene with only partial nucleotide sequences, thus reducing the effort of DNA sequencing. By combining a large-scale transposon tagging screening and the *Saccharomyces* Genome Database, we have identified yeast genes, whose expression are differentially regulated in response to the pH of growth medium. Of 35,000 transformants screened, 10 candidate strains were identified initially by the β -gal assay. We finally confirmed two yeast strains carrying the genes whose expression are strictly dependent on pH of growth medium. One of the genes with 20-fold induction by alkali pH was identified as SHC1 gene in Yeast Genome Directory and its expression was the highest at alkaline pH and moderately induced by osmotic stress. However, the gene was neither expressed at acidic pH nor by other stress conditions. The haploid mutant with truncated shc1 gene showed growth retardation and an abnormal morphology at alkaline pH. On the other hand, the mutant strain carrying wild-type SHC1 gene reverted the mutant phenotype. To confirm that Shc1p is an alkali-inducible protein, a monoclonal antibody to Shc1p was produced. While a 55-kDa protein band appeared on the Western blot of cells grown at alkaline pH, Shc1p was barely detectable on the blots of cells grown in YPD. Our results indicates that yeast cells have an efficient system adapting to large variations in ambient pH and SHC1 is one of the genes required for the growth at alkaline pH.