

DESCRIPTION OF HYPOXIA RESPONSE ELEMENTS IN THE YEAST GENOME

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The hypoxia-inducible factor-1 (HIF-1) is a heterodimeric transcription factor activated when cells are submitted to hypoxia. During hypoxia, HIF-1 α is stabilized, enters the nucleus and binds to HIF-1 β , thus forming the active complex and binding to the regulatory sequences of various genes involved in human physiological and pathological processes. The specific regulatory sequence recognized by HIF-1 is the hypoxia response element (HRE; 5'BRCGTGVB β 3'). *Saccharomyces cerevisiae* does not express HIF-1 subunits. However, we hypothesized that baker's yeast has a protein analogous to HIF-1 which participates in the response to changes in oxygen levels by binding to HRE sequences. We observed DNA-binding activity in yeast extracts from cells grown under hypoxia conditions when using as a probe the double-stranded oligonucleotide containing the HRE from the enhancer of the human erythropoietin gene. Thus, we screened the yeast genome for HREs using probabilistic motif search tools (RAST and TRANSFAC). We identified 24 yeast motifs-containing genes with high probability of being HREs (p-value < 0.1). The products of these genes are involved in sugar and amino acid metabolism; glutathione biosynthesis, and iron ion metabolism; among others. Therefore, it is conceivable that *S. cerevisiae* has a transcription factor that acts through HRE and therefore is the functional analogue of human HIF-1.