FungiDB: Genomic Segments search: DNA motifs

1. Find fungal genes downstream of a regulatory DNA motif.

Transcriptional start sites are often located within a certain distance upstream of the genes or gene clusters that they regulate. In fungi, DNA motifs are also important for regulation of processes linked to host cell invasion or production of secondary metabolites. Readily available genomic data facilitate the discovery of regulatory motifs via examination of orthologous sequences.

The basic-helix-loop-helix (b-HLH) motif is involved in transcriptional regulation and cell-type determination. *S. cerevisiae* transcription factor PHO4 is one of the b-HLH motif proteins and it positively regulates the acid phosphatase gene PHO5 and binds to the CACGTG DNA motif. Identify genes with upstream CACGTG DNA motif in *Saccharomyces cerevisiae*.

a) Find the CACGTG DNA motif in the *Saccharomyces cerevisiae* genome.
   - Navigate to the Search for Other Data Types panel
   - Select DNA motif pattern from the Genomic Segments menu and look for CACGTG in *S. cerevisiae*.

![Image of FungiDB search interface]
- Your search should return multiple DNA segments containing GACGTG motif. Next, let’s look for putative regulatory targets of this motif by searching for genes that are located 600bp downstream of this sequence.

b) **Identify genes with the CACGTG motif located 600bp upstream of an open reading frame.**

Use the genomic colocation function to set relevant distance conditions for genes in relation to the CACGTG motif.

- Click *Add Step*. Choose *Run a new search for Genes > Taxonomy> Organism* and select *Relative to genomic location*.

- Set up the colocation using the following guidelines:

  *Return each Gene from step 2 whose upstream region (600bp) overlaps the exact region of a Genomic Segment in Step1 (CACGTG) and is on either strand.*
References:
