

## **Genome under extreme desiccation: shifting transcription initiation regions in anhydrobiotic cell line**

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Broad core promoters can include several overlapping transcription initiation regions (TIR), with a specific regulated. Such multiple TIR structure allows to adjust the expression levels of certain genes under various conditions. Cap analysis gene expression (CAGE) technology allows mapping the transcription starting sites (TSS) across the genome with single nucleotide resolution [1]. It is known, that sometimes, a shift of the dominant region of transcription initiation in a single cluster of CAGE tags can be observed during embryonic development stages [2] or between different tissues [3]. To estimate impact of extreme desiccation process on the TSS-associated events, we analyzed CAGE data generated using the anhydrobiotic cell line *Pv11* derived from the African chironomid *Polypedilum vanderplanki*, known for ability to anhydrobiosis. As anhydrobiosis-associated patterns of mRNA expression can be initiated in *Pv11* cells by trehalose treatment. Thus we compared CAGE profile during trehalose treatment, drying and rehydration stages in *Pv11*.

We obtained 1372 CAGE tags clusters containing multiple TSS, among them 338 contained a several TSS with different expression profile. We found that the dominant TSS in these heterogeneously reacting clusters shifts in a 5'-3' direction during dehydration of the cells. Remarkably, the TSS shift direction in heterogeneous clusters within the promoters itself, apparently, is not associated with a change in transcription level. However, there is a strong increase of transcripts in the dehydration stage with a shorter 5'-untranslated region, that may be related to the impact of some regulatory elements defining translation speed.

The dinucleotide analysis on all heterogeneously expressed promoters showed the A / T enrichment on ~50 bp downstream of the down-regulated TSS followed by a periodic pattern which may indicate the position of the nucleosome. A similar pattern is observed for most TSS in the *Polypedilum vanderplanki*. However, the TSS which increases the expression for drying and trehalose treatment, shows absence of A / T peak, but there is enrichment of downstream G / C dinucleotides near TSS. Consequently, we suppose the presence of a special translation initiation mechanism in these promoters under the influence of drying.

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