REDOX REGULATION OF HISTONE ACETYLATION IN RESPONSE TO ENVIRONNEMENTAL STRESS IN A. THALIANA

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High temperatures impact plant growth and survival. Chromatin modification isan essential gene expression reprogramming process during plant response to high temperature. Histone deacetylases (HDAs) that regulate histone acetylation levels have been shown to play an important role in the adaptation of plants to the environment. In animals, some HDAs are regulated by post-translational oxidation-reduction (redox) modifications involving the oxidation of conserved cysteines. In plants, the redox regulation of HDAs is very little known. A recent study demonstrated that redox modifications affect histone acetylation by inhibiting HDA activities. During my thesis, I detected a redox modification of HDA6 (a highly conserved plant HDA) under oxidative conditions, affecting its oligomerization state. I also showed that the expression of genes regulated byHDA6 is affected by the redox environment of the cell. Additionally, I discovered that HDA6 is involved in high temperature response of plants, which is known to generate cellular oxidation. Specifically, I studied two different high temperature regimes: a rise in ambient temperature from 20°C to 27°C inducing a developmental adaptation program called thermomorphogenesis, and a 37°C treatment mimicking an intense heat wave and affecting plant viability. I have shown that *hda6-6* and *hda6-7* (HDA6 KO mutants) are extremely sensitive to heat stress and are unable to induce thermomorphogenesis. To decipher which genes are mis-regulated in *hda6* mutants, I performed RNA-seq analysis and found a marked deviation in genome expression in the mutant at high temperature (27°C and 37°C). Furthermore, I found that HDA6 co-localizes with the stress granule marker protein PAB2 at 37°C in a redox-dependant manner, suggesting that HDA6 is part of stress granule complexes. Finally, I will discuss the emerging link between redox signaling and histone acetylation in response to heat stress.