

Plant response to abiotic stress

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Being sessile organisms that cannot relocate, plants are continuously exposed to the ever-changing environment. To accommodate to these changes, plants evolved intensive molecular, biochemical and physiological mechanisms to respond to hostile environments. These changes include a global change in the transcriptome and proteome. I will discuss three molecular examples for plant response to drought and salt stress: (a) Salt stress impairs chloroplast structure and affects this organelle's gene expression and genome copy number. (b) Transcription factors are key players in reaching new steady states in transcript levels. The stress hormone, abscisic acid, regulated ABI4 transcription factor plays central role in root biology under stress and non-stress conditions. ABI4 modulates the activity of the Na⁺ transporter HKT1;1 and controls lateral root formation. (c) The Ubiquitin-Proteasome System (UPS) is a major pathway for controlled protein degradation in all eukaryotes, including plants. Proteins descended for degradation are covalently marked by a short ubiquitin chain, by a three step pathway. The third step, is catalyzed by a large family of substrate specific ubiquitin-ligases, is believed to be the modulated step in the decision of protein fate. We have identified new ubiquitin-ligases involved in plant response to abiotic stress, and study their role in plant response to the environment.