

E3 ligase HOS15-mediated chromatin remodeling in response to cold stress

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Switching from repressed to active status in chromatin regulation is critical for plant survival in an ever-changing environment. We previously reported that HOS15, a WD40-repeat protein, is involved in histone deacetylation and cold tolerance in *Arabidopsis* (PNAS 2007). However, it remained unknown how HOS15 regulates cold responsive genes. Here, we show that HOS15 interacts with HD2C and these are associate to the promoter of cold-responsive *COR* genes, *COR15A* and *COR47*. Cold induces HD2C degradation, with HOS15 acting as a substrate receptor in CULLIN4 (CUL4)-based E3 ubiquitin ligase complex. Removal of HD2C from the *COR* gene promoters correlated with increased acetylation levels of histone H3. HOS15 also interacts with CBF transcription factors and is required for cold-induced binding of CBFs to the *COR* gene promoters. Our results demonstrate that cold induces HOS15-mediated chromatin modification by degrading HD2C, switching the chromatin status and facilitating recruitment of CBFs to the *COR* gene promoters for cold tolerance acquirement.

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