Proteins required for desiccation protection in the moss *Physcomitrella patens*

**Background:**
As water availability is and will be a major limiting factor in crop yields and agricultural land use, extensive research has been completed into plants’ ability to withstand episodic and continual drought. In particular, the moss *Physcomitrella patens* has emerged as a good model system due to simpler development and the yet uncharacterized internal cell-based mechanisms for survival under conditions of long term water stress and extreme desiccation. Because *P. patens* lacks other factors known to be involved in the response to water stress, the genes identified appear to play a more direct role in desiccation tolerance.

**Technology Description:**
By genetic manipulation of cellular signaling pathways known to be involved in the response to water stress, a number of candidate genes have been identified with potential to increase desiccation tolerance. Survival after desiccation was shown to be dependent upon abscisic acid (ABA) as well as the downstream transcription factor abscisic acid insensitive 3 (ABI3). Genetic ablation of the different ABI3 genes rendered cells unable to survive desiccation, while overexpression increased the tolerance of cells for water stress. Thus the three ABI3 genes are ideal candidates to test for the ability to increase drought resistance and protect plant growth in crop plants.

**Key Advantages:**
- *P. patens* is an ideal, clean, model system for analysis
- Extensive genetic tools in the moss research community are readily available
- Transfer/testing in commercial cultivars is well known technology

**Publications:**


**U.S. Patent Number:** [9,243,261](https://www.uspto.gov/)

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