Expression of *BrSAC1* gene encoding a phosphoinositide phosphatase from Chinese cabbage (*Brassica rapa* L.) showing tolerance to cold, dehydration and salt stress in transgenic tobacco

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A cDNA, encoding a phosphoinositide phosphatase (PIP), was isolated from a stem cDNA library of Chinese cabbage (*B. rapa*) seedling and characterized. This gene (named as *BrSAC1*: GenBank accession no. GU434275) had a total length of 1999bp with an open reading frame of 1785bp, and encoded a predicted polypeptide of 594 amino acids residues with a predicted molecular weight of 65 kDa, including a putative N-terminal signal peptide. Other relevant regions found in its sequence included the KxKxx conserved COPI binding motif, the consensus Cx5R(T/S) sequence for Sac1–catalytic domain. Gene expression analyses revealed that *BrSAC1* was constitutively expressed with high level in the pistil, stamen and flower bud, but with low level in leaf and stem. Also, *BrSAC1* was induced after different types of stresses, namely cold, desiccations, salt, submergence, abscisic acid and heavy metals as well as injury. Overexpression of the gene in transgenic tobacco conferred tolerance to cold, dehydration, and salt stress at the seed–germination/seedlings stage as reflected by the percentage of germination/green seedlings, the fresh weight of seedlings, and their developmental pattern. Thus *BrSAC1* seems to be an important determinant of stress response in plant.

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