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# Expression analysis of barley S-adenosylmethionine synthetase gene

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## Objective

In a previous report, we isolated and molecular characterized a noble gene, *HvSAMS*, which was differentially expressed in seed development of extra early maturity barley. In the present study, an overexpression of *HvSAMS* in the heterologous plant system was analysed.

## Materials & Methods

Plant materials: Arabidopsis 'Columbia', Onion

Methods:

Vector construct : 326-GFP vector, pCAMBIA 3301 binary vector

Transformation : Biolistic PDS-1000/He Particle Delivery System
*Agrobacterium* 'GV3101'

Microscope : Confocal Laser Scanning Microscope (MRC 1024)

## Results

To study gene expression of *HvSAMS* (*Hordeum vulgare S-AdenosylMethionine Syntase*), we constructed transformation vector and transient GFP expression vector (Fig. 1). In order to examine the localization of HvSAMS protein, green fluorescent protein (GFP) was fused in-frame to the C-terminus of *HvSAMS*, and the fusion protein was allowed to express in the epidermal cell of onion. Undoubtedly, 35S::HvSAMS::GFP expression was detected in nucleus, but 35S::GFP (control vector) expressed in cytosol, nucleus, and cell wall (Fig. 2).

To analyse the biological functions of HvSAMS, we generated transgenic *Arabidopsis* plants in which *HvSAMS* was overexpressed (*Ubiqutin::HvSAMS*) examination. The *HvSAMS*-overexpressed plants growing on Murashige-Skoog (MS) agar plates showed slightly early germiability. The growth of the transgenic plants was compared with that of wild-type plants at 4 weeks after sowing (Fig. 3). The *HvSAMS*-overexpressed plants reached early reproductive development.

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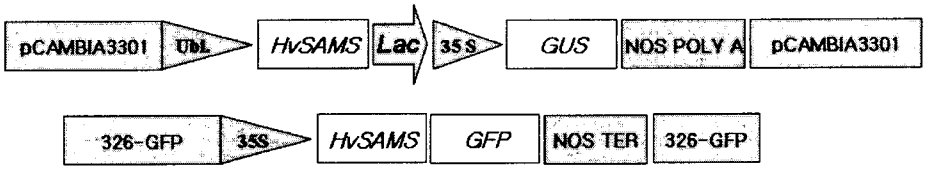


Fig 1. Schematic diagrams of *HvSAMS* transformation and GFP vector construction.

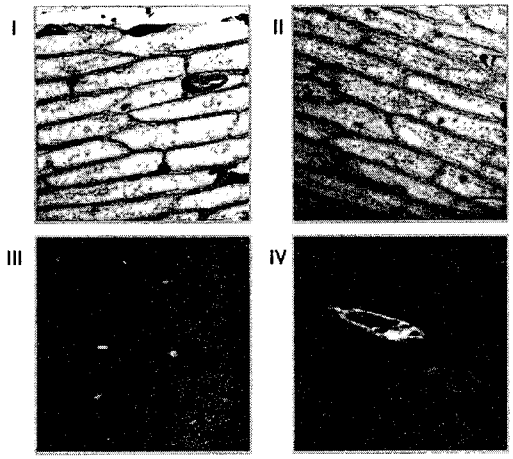


Fig. 2. Nuclear localization of the HvSAMS protein. HvSAMS::GFP (I, III) and GFP (II, IV) fusion proteins were transiently expressed in onion epidermal cells and analyzed by confocal microscopy.

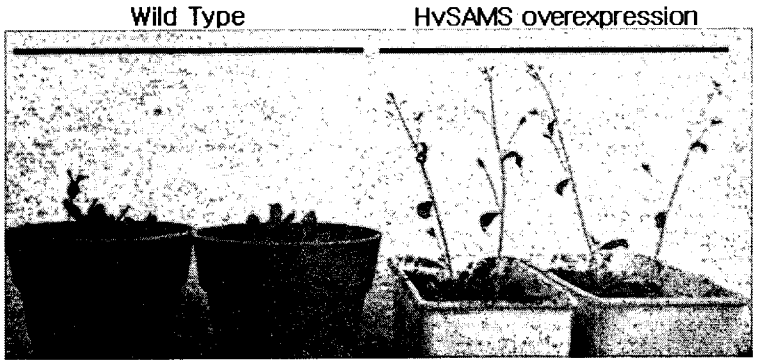


Fig. 3 Plant growth comparison of wild type and *HvSAMS*-overexpression lines. Wild type and *HvSAMS*-overexpression plants were germinated on MS plates for two weeks. To investigate of plant growth, wild type and *HvSAMS*-overexpression plants were transplanted to soil for three weeks.