**Gene introduction ATH GAI et SPY**

**GAI**

Gibberellic-Acid Insensitive (*GAI)* is a gene in Arabidopsis thaliana in chromosome 1 which is involved in the regulation of plant growth. Precisely, it mediated the input signals and module the growth by decreasing the responsiveness to gibberellin1. Gibberellin is a tetracyclic diterpenoid growth factor and influence essentially the stem elongation and other plant developmental processes2. If it’s mutated (*gai)* and the plant growth better, it a gain of function gene, in contrary it’s a loss of function. The cellular *gai’s* component is in the nucleus and is described as a transcription region of DNA and bind it directly. The mutation in SPY (*spy)* is a suppressor of *gai,* conferring to the plant a normal phenotype. GA-deficient Arabidopsis mutants display characteristic phenotypes, including dark green leaves and a dwarf growth habit attributable to reduced stem elongation1. The *gai* mutation affects GA reception or subsequent signal transduction and does not result in GA deficiency2. gai encodes a mutant protein that lacks a region of 17 amino acids from close to the N terminus and confers a dominant dwarf, reduced GA-response phenotype3. The gai allele contains a deletion of 51-bp from within the GAI ORF. This in-frame deletion results in the absence of a 17-amino-acid residue segment situated close to the amino terminus of the predicted protein sequence3.

**SPY**

For spy, three independent recessive mutations at the SPINDLY (SPY) locus of Arabidopsis confer resistance to the gibberellin (GA) biosynthesis inhibitor paclobutrazol4. Paclobutrazol or α-tert-Butyl-β-(4-chlorobenzyl)-1H-1,2,4-triazole-1-ethanol, is a plant growth retardant. It is an antagonist of the plant hormone gibberellin. It works by inhibiting gibberellin biosynthesis by inhibiting endoplasmic reticulum monooxygenases. Relative to wild type, spy mutants exhibit longer hypocotyls, leaves that are a lighter green colour, increased stem elongation, early flowering, parthenocarpy, and partial male sterility. All of these phenotypes are also observed when wild-type Arabidopsis plants are repeatedly treated with gibberellin A3 (GA3). The spy-1 allele is partially epistatic to the ga1-2 mutation, which causes GA deficiency. In addition, the spy-1 mutation can simultaneously suppress the effects of the ga1-2 mutation and paclobutrazol treatment, which inhibit different steps in the GA biosynthesis pathway. This observation suggests that spy-1 activates a basal level of GA signal transduction that is independent of GA4.

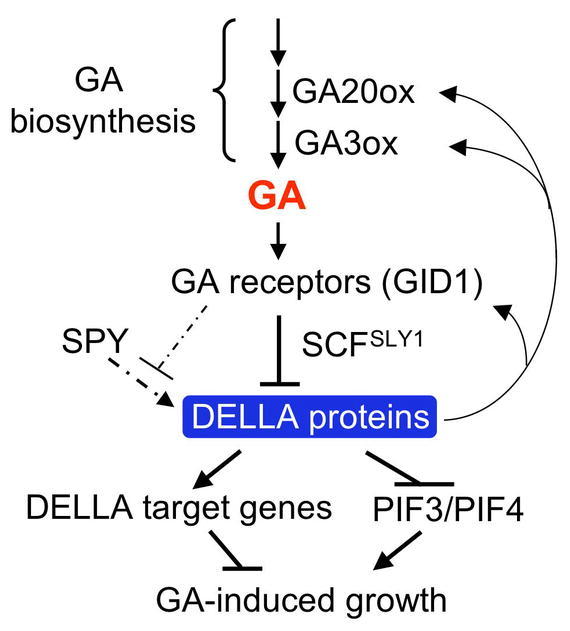


Figure 1:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243332/figure/i1543-8120-64-1-1-f21/

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