Does the GLABRA1 gene effect the trichome phenotype of *Arabidopsis kamchatica ?*

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Introduction:

Our objective was to determine if the mutation in the GLABRA1[1] gene was associated with the lack of leaf hairs in the *Arabidopsis kamchatica*. Our hypothesis is that the GL1 has a mutation that makes it unable to function in plants without hairs, but the GL1 is functional in plants with hairs[2].

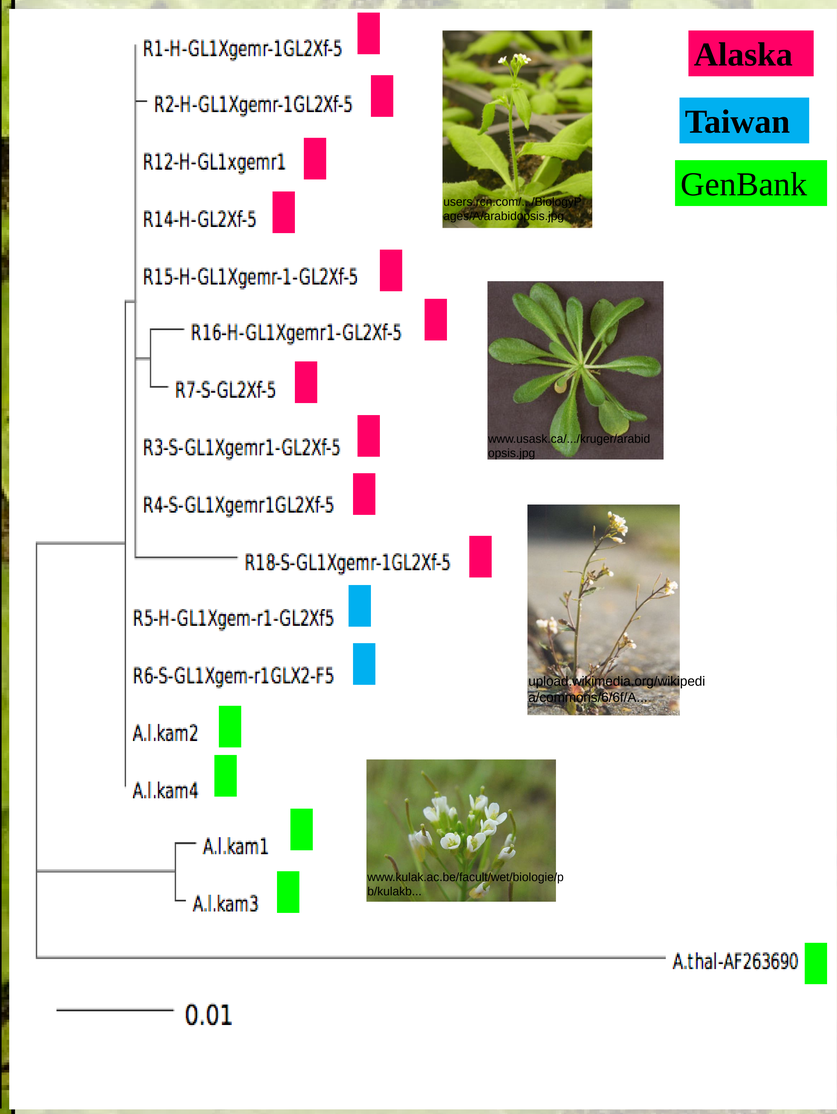
Methods:

Collected 6 samples of *Arabidopsis kamchatica* at greenhouse, collected 12 samples at Herbarium. Most samples were from Alaska but two from Taiwan. Collected an even number of smooth and hairy morphology.

- Extracted DNA using the Puregene DNA Purification kit.
- Nanodropped the samples, to determine DNA concentration and purity.
- PCR using primers: GL1 gem r-1 and GL2 f-5, to amplify GLABRA1 gene.
- Thermocycling
- Ran PCR through Gel, to check if PCR worked:14 out of 18 samples were successfully amplified.
- PCR clean up using Wizard PCR clean up, removing nucleotides, taq polymerase, buffer, Mg
- Nanodropped of cleaned samples
- Cycle sequence with ABI Big Dye
- Purify sequence DNA by Sephadex
- Used Sequencher to assemble complimentary strands, and cleaned up data.
- Down loaded five DNA sequence from GenBank
- All sequence were manually aligned by MEGA
- Looked for a pattern with in the sequence: frame-shifting mutation, mutation at exon and intron splicing sites, termination codon indicating a nonfuctional GLABRA1 gene.
- Constructed a phylogenetic tree by PAUP*

Results:

I found no potential mutations causing the lack of trichomes such as termination codons, frameshifting, loss of intron splicing sites in *Arabidopsis* plants. After constructing a phyliogenetic tree no clustering of smooth vs. hairy were found. Concluding that it is unlikely that a single mutation at this locus is responsible for production of smooth morph.



Discussion/Conclusion:

- Through this data the evidence suggest that GLABRA1 gene is functional in both smooth and hairy *Arabidopsis* plant. But that doesn't necessarily indicate whether the GLABRA1 gene is responsible for the phenotype of having no trichomes.
- My hypothesis was that if the GLABRA1 gene did determine the phenotype then the smooth leaved would cluster in one branch and the hairy in another, in a phylogenetic tree.
- My data was limited; my genetic sequence wasn't the whole locus but just particular parts. Therefore there may be a mutation in another part of the GLABRA1 gene that is responsible for the no-trichome phenotype.

Cited Information:

[1]Larkin, J.C., D.G.Oppenheimer,A.M. Lloyd,E.T. Paparozzi and M.D. Marks. 2008.Roles of the GLABROUS and TRANSPARENT TESTA GLABRA. Gene in Arabidopsis Trichome development. Plant Cell.Vol 8:1065-1076.

[2]Shui Wang, Jia-Wei Wang, Nan Yu, Chun-Hong Li, Bin Luo, Jin-Ying Gou, Ling-Jian Wang and Xiao-Ya Chen.2004.Control of Plant Trichiome Develpoment by a Cotton Fiber MYB Gene.The Plant Cell. Vol 16:2323-2334

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